Construction Permit Application (MKE16/17 Data Center) and Modification of MKE 3B Permit (23-DMM-104)

May 2024

Prepared for:

Microsoft Corporation
Racine, Wisconsin
Racine County

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Table of Contents

LIST OF APPENDICES

1.0 INTRODUCTION

Microsoft Corporation (Microsoft) is currently constructing the MKE3B data center, which was authorized by the Wisconsin Department of Natural Resources (DNR) air construction and operating permits 23-DMM-104 and 25230249A-F01, respectively. Microsoft is now proposing to construct the MKE16/17 Data Center, located on approximately 242 acres south of Braun Road, east of W. 105th Street, west of a Canadian Pacific Railroad line, and north of County KR (1st Street) in Mount Pleasant, Wisconsin. MKE16/17 Data Center will be located to the directly west of and adjacent to the permitted MKE 3B Data Center. The MKE16/17 data center will consist of two data center buildings (MKE16 and MKE17), which will utilize internal compression emergency generators to provide emergency backup power. Since the proposed MKE16/17 data center is adjacent to the currently permitted MKE3B data center, the two combined data centers would be considered a single source for air permitting applicability.

1.1 PURPOSE

This application is for the construction and operation of a new data center (MKE16/17 Data Center) that will have:

- thirty-nine (39) core internal compression emergency generators rated at 3,000 kilowatts (eKW) equipped with selective catalytic reduction (SCR) control devices,
- one (1) administrative internal compression emergency generator rated at 1,000 eKW equipped with SCR control device, and
- two (2) emergency firewater pumps rated at 130 hp.

The application further seeks to modify the permitted MKE 3B Data Center (permit numbers 23-DMM-104 and 25230249A-F01) with addition of SCR control equipment on all the thirty-nine (39) core internal compression emergency generators rated at 3,000 eKW each.

As described below, the combined MKE3B and MKE16/17 data center source would have enforceable permit conditions to limit the potential emissions of any regulated air pollutant to less than 100 tons per year, and thus, remain a minor source for air permitting.

1.2 CONSTRUCTION PERMIT APPLICATION

Microsoft Corporation is required to obtain a construction permit for MKE16/17 Data Center under NR 406, Wisconsin Administrative Code (Wis. Adm. Code). Total facility maximum theoretical emissions (MTE) calculations for the MKE3B and MKE16/17 facility would result in emissions above 100 tons per year (tpy) of NOx. Microsoft is proposing to install SCR controls on the internal compression emergency generators rated at 3,000 and 1,000 eKW and limit annual fuel usage to limit potential to emit (PTE) of oxides of nitrogen (NOx) from the facility to be less than 100 tons per year (tpy).

As this is the first Construction Permit authorize MKE16/17 data center and first modification to the existing MKE3B data center sources, all significant sources are listed in the application, along with emission calculations, regulatory applicability, and required Wisconsin Department of Natural Resources (WDNR) permit application forms.

1.3 PERMIT REQUEST

Microsoft Corporation is committed to demonstrating compliance with all federal and state air quality permitting requirements. This permit application demonstrates compliance with both federal and state requirements. Microsoft is accepting enforceable limits (annual fuel usage) to limit PTE of NOx (and subsequently all other regulated air pollutants) to less than 100 tpy and remain a synthetic minor facility.

1.4 APPLICATION STRUCTURE

This application is comprised of the following information:

- Sections 1 through 3 consist of technical support documentation;
- Appendix A consists of the application forms;
- Appendix B consists of the project emission calculations;
- Appendix C consists of the highlighted NESHAP ZZZZ and NSPS IIII;
- Appendix D contains the manufacturer specifications and vendor statement;
- Appendix E contains the malfunction prevention and abatement plan for SCR;
- Appendix F contains the petition for alternate to the requirements under NR 428.04(3)(b), Wis. Adm. Code; and
- Appendix G contains the environmental questionnaire

2.0 FACILITY INFORMATION

2.1 SITE LOCATION

MKE16/17 Data Center is located on approximately 242 acres south of Braun Road, east of W. 105th Street, west of a Canadian Pacific Railroad line, and north of County KR (1st Street) in Mount Pleasant, Wisconsin. Appendix A provides the plant location map and site map. The proposed MKE16/17 data center would be directly west of the permitted Microsoft MKE3B data center (permit numbers are 23-DMM-104 and 25230249A-F01), and as such, would be considered a single source for purposes of air permitting.

The portion of Racine County where the project is located is designated as “moderate non-attainment” for the 2015 ozone National Ambient Air Quality Standards (NAAQS).

The operations at the data center will be categorized under Standard Industrial Classification code 7374, Computer Processing and Data Preparation and Processing Services, and under the North American Industry Classification System code 518210, Computing Infrastructure Providers, Data Processing, Web Hosting, and Related Services.

2.2 PROCESS DESCRIPTION

MKE16/17 Data Center will consist of thirty-nine (39) internal compression emergency generators, rated at 3,000eKW; one (1) internal compression emergency generator, rated at 1,000 eKW; and two (2) internal compression emergency generator fire pump engines, rated at 130 hp. The internal compression emergency generators rated at 3,000eKW and 1,000ekW will be EPA Tier 2 certified with SCR control equipment to reduce potential NOx emissions. The internal compression engines will each have their own fuel storage tank. The fuel storage tanks qualify as insignificant activities under NR 407.05(4)(c)(9) due to the size of the tanks.

The engines will use traditional ultra-low sulfur diesel fuel and will also utilize renewable diesel (hydrotreated vegetable oil (HVO)). Emissions from combustion of the renewable diesel will be comparable to traditional low-sulfur diesel fuel, as described in Section 3.4.3.
Each 3,000 eKW and 1,000 eKW engine would also be equipped with a diesel exhaust fluid (DEF) or urea storage tank for use in the SCR system to reduce NOx emissions. The DEF fluid is non-volatile and would be exempt from air permitting.

MKE 3B Data Center was recently permitted by the Wisconsin Department of Natural Resources (WDNR). The construction permit and operation permit numbers are 23-DMM-104 and 25230249A-F01, respectively. Microsoft is proposing to modify the construction and operation permit to include installation of SCR control equipment on all of the thirty-nine (39) internal compression emergency generators rated at 3,000eKW.

Following table provides a summary of all the significant emission sources at MKE16/17 Data Center and MKE 3B Data Center.

Table 1 – Summary of all significant emission sources at MKE16/17 Data Center and MKE 3B Data Center

Application Identifier	Facility Identifier	Source Identifier	Source Description	Size (kWe)	SCR Control (Yes/No)
New	MKE16/17	P43 - P81	Cummins C3000 D6e	3000	Yes
New	MKE16/17	P82	Cummins 1000DQFAD	1000	Yes
New	MKE16/17	P83, P84	130 hp	97	No
Permitted	MKE 3B	P01 - P39	Cummins C3000 D6e	3000	Yes
Permitted	MKE 3B	P40	Cummins 500DFEK	500	No
Permitted	MKE 3B	P41, P42	130 hp	97	No

Microsoft is proposing the following limits with the goal of maintaining minor source status:

- Units P01-P39 and P43-P81 (3000 ekW core engines): No more than 592,176 gallons per month of diesel and HVO fuel used in all engines combined, calculated on a 12-month rolling average basis. This is equivalent to 7,106,112 gallons per year. The units will include SCR control equipment to control NOx emissions from the internal compression emergency generators. The malfunction prevention and abatement plan for SCR is included in Appendix E.

- Unit P82 (1000 eKW admin engine): No more than 2,635 gallons per month of diesel and HVO fuel used in all engines combined, calculated on a 12-month rolling average basis. This is equivalent to 31,624 gallons per year. The unit will include SCR control equipment to control NOx emissions from the internal compression emergency generator. The malfunction prevention and abatement plan for SCR is included in Appendix E.

- Unit P40 (500 eKW admin engines): No more than 1,267 gallons per month of diesel and HVO fuel used in all engines combined, calculated on a 12-month rolling average basis. This is equivalent to 15,199 gallons per year.

- Units P41, P42, P83 and P84 (fire pump engines): No more than 891 gallons per month of diesel and HVO fuel used in all fire pump engines combined, calculated on a 12-month rolling average basis. This is equivalent to 10,687 gallons per year.

2.3 EMISSIONS CALCULATIONS

The maximum theoretical emissions (MTE) and potential to emit (PTE) calculations for each significant emissions source are included as Appendix B of this construction application. The emissions calculation for the 3,000 and 1,000 eKW engines with SCR control equipment accounts for 10 minutes of uncontrolled emissions during engine start-up. The engines will have a period during start-up where exhaust temperatures are too low. The catalyst must be pre-heated for the desired NOx emission reduction to occur. For calculation purposes, assumed the engine will have pre-treatment emissions for 10 mins (50 startups/yr for maintenance)

3.0 REGULATORY APPLICABILITY SUMMARY

MKE16/17 Data Center is subject to a variety of federal and state air quality regulations which are discussed in this section.

3.1 NEW SOURCE PERFORMANCE STANDARDS (NSPS)

NSPS contained in 40 CFR 60 require new, modified, or reconstructed sources to control emissions to the level achievable by the best demonstrated technology as specified in the relevant regulations. These NSPS regulations were reviewed to determine their applicability to MKE16/17 Data Center equipment or to confirm non-applicability as appropriate. The results of this review are summarized below by regulatory citation.

3.1.1 40 CFR 60 Subpart A – General Provisions

This regulation has general provisions that are referenced by other more specific NSPS regulations.

3.1.2 40 CFR 60 Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (CI ICE)

The engines at the MKE16/17 Data Center will all be constructed after June 11, 2005 and classified as emergency engines. Therefore, this regulation applies to all CI ICE at the site. Highlighted sections of 40 CFR 60 Subpart IIII as applicable to the MKE16/17 Data Center has been included in Appendix C.

3.1.3 40 CFR 60 Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (SI ICE)

3.1.3 40 CFR 60 Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (SI ICE). MKE 16/17 Data Center will not have any spark ignition internal combustion engines. As such, Subpart JJJJ is not applicable to any of proposed engines at the facility,

3.1.4 40 CFR 60 Subpart Kb – Volatile Organic Liquid Storage Vessels

NSPS Subpart Kb applies to storage vessels with a capacity greater than or equal to 75 cubic meters (approximately 19,800 gallons) used to store volatile organic liquids with a maximum true vapor pressure greater than 15 kilopascals (kPa) that were constructed after July 23, 1984. All tanks being installed at the facility are below the applicability threshold of 19,800 gallons, and each tank will store fuel which has a maximum true vapor pressure less than 15 kPa. As such, Subpart Kb is not applicable to any of the proposed storage tanks at the facility.

3.2 NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP)

Federal NESHAP regulations promulgated pursuant to Section 112 of the Clean Air Act (CAA) are found in 40 CFR Parts 61 and 63. In general, NESHAP, or Maximum Achievable Control Technology (MACT) standards apply to major stationary sources of HAP emissions, defined as potential-to-emit of 10 tons or more per year of any single HAP or 25 tons or more per year of any combination of HAP, and minor stationary sources of HAP emissions (thresholds less than a major source). The combined MKE3B and MKE16/17 Data Centers will be an area source of HAPs. Potentially applicable NESHAPs are discussed below.

3.2.1 40 CFR 63 Subpart A – General Provisions

This regulation has general provisions that are referenced by other more specific NESHAP regulations.

3.2.2 40 CFR 63 Subpart ZZZZ – NESHAP for Stationary Reciprocating Internal Combustion Engines (RICE)

NESHAP Subpart ZZZZ regulates HAP emissions from existing, new, and reconstructed stationary compression ignition (CI) and spark ignition (SI), emergency and non-emergency, RICE located at major and area sources of HAP emissions. This standard is applicable to the MKE16/17 Data Center. As new stationary RICE located at an area source of HAP, the emergency generators meet the requirements of Subpart ZZZZ by meeting the requirements of 40 CFR part 60 (NSPS) Subpart IIII, for compression ignition engines. No further requirements apply for such engines under this part. Highlighted sections of NESHAP Subpart ZZZZ as applicable to the MKE16/17 Data Center has been included in Appendix C.

3.3 COMPLIANCE ASSURANCE MONITORING (CAM)

Enhanced monitoring requirements have been adopted into 40 CFR 64. The enhanced monitoring requirements are referred to as Compliance Assurance Monitoring (CAM). CAM is applicable to sources that have a potential to emit in excess of major source thresholds, not considering “tailpipe” emission controls, and use an “active” control device to achieve compliance with the emission limit. Combustion controls may be considered in evaluating the potential to emit.

An emission unit is subject to CAM if all of the following criteria are satisfied:

- the unit is located at a major source that is required to obtain a Part 70 or Part 71 permit;

- the unit is subject to an emission limitation or standard for a regulated air pollutant;
- the unit uses an active control device to achieve compliance with any such emission limit or standard, and
- the unit has potential pre-controlled emissions of the applicable air pollutant above the major source threshold.

The MKE16/17 Data Center will be accepting limits on fuel usage and include add-on emission control equipment to reduce emissions (SCR) to operate as a minor source. The potential pre-controlled emissions of the engines are not above the major source threshold after taking into the account the federally-enforceable limit on fuel usage. Thus, the facility is exempt from the CAM requirements in 40 CFR 64.

3.4 STATE REGULATIONS

3.4.1 NOx Reasonably Available Control Technology (RACT) Analysis

Emissions of nitrogen oxides (NOx) must be controlled through the implementation of Reasonably Available Control Technology (RACT) regulations in ozone nonattainment areas that are classified as "moderate" or higher. Wisconsin RACT requirements that apply to NOx emissions units are listed in subchapter IV of ch. NR 428, Wis. Adm. Code. NO_X RACT requirements apply to sources with maximum theoretical NO_X emissions equal to or greater than 100 tpy in Kenosha, Milwaukee, Ozaukee, Racine, Sheboygan, Washington, or Waukesha Counties that are or had been previously classified as “moderate” ozone nonattainment areas.

A reciprocating engine that is certified to meet the Tier 2 standard, as specified in 40 CFR part 89, or a reciprocating compression ignition engine that is certified as meeting the requirements of a more stringent Tier standard, as specified in 40 CFR part 89 or 1039 is exempt from the emission limitations of NR 428.22 (1)(i).

The engines at MKE16/17 Data Center will be exempt from emission limitations of NR 428.22 (1)(i) because they will be certified to meet the Tier 2 Standard at a minimum. Additionally, the internal compression emergency generators rated at 3000eKW and 1000ekW will be EPA Tier 2 certified with SCR control equipment.

3.4.2 NOx Emissions Performance Program General Provisions

The proposed emergency engines P01-P39 and P43-P82 are greater than 1,000 brake-horsepower (bhp) and therefore are subject to NR 428.04(3), Wis. Adm. Code (summarized below).

NR 428.04(3) Monitoring requirements: The owner or operator of each NOx emissions unit subject to the requirements of sub. (2) shall comply with the monitoring requirements of subch. III.

NR 428.07 Subchapter III:

1. *Install all monitoring systems required under s. NR 428.08 for monitoring NOx emissions. This includes all systems required to monitor NOx emission rate, NOx concentration, heat input and flow, in accordance with ss. NR 428.08 and 439.09.*
2. *Install all monitoring systems for monitoring heat input, if required under this chapter, for developing NOx emission rate determinations expressed in pounds per million Btu.*

3. *Successfully complete all certification tests and meet all operating specifications of this subchapter and 40 CFR parts 60 and 75 as applicable to the monitoring systems required for an emissions unit under subds. 1. and 2.*
4. *Record and report data from the monitoring systems under subds. 1. and 2.*

The NR 428.04(2)(h) limitation for a compression ignition unit with a maximum design power output of 1,000 hp or greater is 6.9 grams per brake horsepower-hour. Since the engines will be constructed after June 11, 2005, 40 CFR 60 Subpart IIII – Standard of Performance for Stationary Compression Ignition Internal Combustion Engines (CI ICE) applies. Per 40 CFR 60.4205(b), the emergency engines will meet Tier 2 emission standards. The NMHC + NOx emission standard for Tier 2 engines greater than 750 bhp is 6.4 grams per brake horsepower-hour. By meeting the requirements for NSPS IIII for a certified emergency engine, the emergency engines will comply with the NR 428.04(2)(h) limitation.

Due to the emergency engine limited run-times and EPA Tier 2 certifications, Microsoft is requesting the emergency engines not require monitoring systems as described in (NR 428.07), as Tier 2 certified engines meet the NR 428.04(2)(h) emission rate limitation as described above.

The petition for alternate to the requirements under NR 428.04(3)(b), Wis. Adm. Code is included in Appendix F.

3.4.3 Wisconsin Air Toxics Rule (NR 445)

Wisconsin's air toxics rule (NR 445) applies to all stationary air contaminant sources which may emit hazardous contaminants. Facilities must identify air toxics, quantify emissions, and reduce or control emissions where necessary.

The emergency engines that will be installed at MKE16/17 Data Center are expected to emit hazardous air pollutants (HAPs). In addition to traditional ultra-low sulfur diesel (which is exempt from NR 445), an alternate fuel that will be used for the operation of engines will be renewable diesel (hydrotreated vegetable oil (HVO)). A statement from the vendor shows that emissions from engines running on HVO fuel should be comparable, if not lower, to that of the same engine model running on a petroleum diesel (vendor statement included along with the application in Appendix D). Since emission factors for HAPs resulting from combustion of HVO are not available, HAP emission factors for diesel fuel were used to estimate potential emissions (US EPA AP-42 Table 3.4-3 & 3.4-4). The facility does not emit 1-BP. 1-BP is not listed in any emission factor database for IC engines (AP-42, CATEF, SCAQMD, VCAPCD, SDAPCD, WA Ecology).

The stationary source achieves compliance with the emission limitations and control requirements in NR 445.07 (1), (2) or (3) for each hazardous air contaminant by limiting potential emissions from the source of each hazardous air contaminant to less than the applicable threshold in column (c), (d), (e) or (f) of Table A, B or C of s. NR 445.07. Potential emissions from the engines are below the thresholds in (c), (d), (e) or (f) of Table A, B or C of s. NR 445.07 (See Appendix B Emissions Calculations for detailed compliance demonstration).

Additionally, NR 445 includes specific provisions for compression ignition engines. Since the engines at MKE16/17 Data Center are emergency units that will provide an essential service (asset protection in emergency), they are exempt from the requirements of NR 445.09.

The emergency generators at the data center provide emergency backup power to ensure continuous operation of critical public and private infrastructure supported by the data centers, such as maintaining data integrity and access for public safety, emergency response, emergency management, national security, and economic and business continuity.

The emergency generators provide an essential service as defined under safety or asset protection in an emergency situation. During an emergency situation, the generators are critical for maintaining temperature and ventilation of data center equipment to avoid equipment failure or other malfunction. In addition, the generators maintain data access and communications that are critical during an emergency situation for public and private infrastructure services, such as those necessary for continued function of hospitals, fire departments, police departments and other emergency preparedness and response services.

3.4.4 Emissions Inventory (NR 438)

This regulation requires facilities that emit an air contaminant in quantities above applicable reporting levels to submit annual emission inventory for primary particulate matter, primary PM10, primary PM2.5, sulfur dioxide, nitrogen oxides, carbon monoxide and volatile organic compounds. Microsoft Corporation will continue to comply with the annual emissions inventory requirements of the regulation.

3.4.5 Control of Visible Emissions (NR 431)

Visible emissions are regulated under NR 431.05. Microsoft Corporation will continue to comply with emission limitations outlined in NR 431.05.

Appendix A

APPLICATION FORMS

State of Wisconsin
Department of Natural Resources
dnr.wi.gov

Facility Details and Permit Actions
Air Pollution Control Permit Application
Form 4530-100 (R 06/22)

Notice: Completion of this form is required by the department for any air pollution control permit application filed pursuant to ss. 285.61, 285.62 or 285.66, Wis. Stats. The department will not consider or act upon an application unless this form is submitted and complete. Any personal information collected will be used for administrative purposes only and may be provided to requestors to the extent required by Wisconsin's Public Records Law [ss. 19.31-19.39, Wis. Stats.].

Facility Information

1. Facility Name	2. SIC and NAICS	3. Facility ID (FID) Number
Microsoft Corporation - MKE16/17 Data Center	7374 (518210)	New Facility
4. Street Address (where pollution sources are/will be located)	**5.** ◯ City ◯ Town ◉ Village	**6. County**
S of Braun Rd, E of W.105th St, N of County KR (1st St)	of Mount Pleasant	Racine

7. Primary Operating Activity (e.g., lead-acid battery manufacturer or sulfite paper mill)

Data Center

8. Is the facility located in an area designated as "nonattainment"? (refer to instructions)	9. If yes, indicate the pollutant(s) for the nonattainment designation
◉ Yes ◯ No	Ozone (moderate)

Applicant Contact Information

10. Responsible Official (person legally responsible for the operation of the permitted air pollution sources [see NR 400.02(136), Wis. Adm. Code])

Responsible Official Name	Title		
Christa Markgraff	EAST Region Leader - AMER		
Mailing Address	**City**	**State**	**ZIP Code**
2200 Lakewood Blvd.	Hoffman Estates	IL	60192
Email	**Phone Number**	**Ext.**	
cmarkgraff@microsoft.com	(630) 327-5430		

11. Permit Contact (contact for additional information concerning this permit application)

Permit Contact Name	Title		
John Frohning	Sr. Air Quality Permitting Program Manager		
Mailing Address	**City**	**State**	**ZIP Code**
One Microsoft Way	Redmond	WA	98052
Email	**Phone Number**	**Ext.**	
johnfrohning@microsoft.com	(503) 964-1517		

12. Billing Contact (contact for billing related information)

Billing Contact Name	Title		
Travis Crayosky	Senior Principal, Business Center Practice Leader		
Mailing Address	**City**	**State**	**ZIP Code**
5209 Center Street	Williamsburg	VA	23188
Email	**Phone Number**	**Ext.**	
travis.crayosky@stantec.com	(757) 220-6869		

13. Parent Corporation (If not wholly owned by applicant)

Parent Corporation or Owner Name				
Microsoft Corporation				
Mailing Address	**City**	**State**	**ZIP Code**	**Country (if not U.S.)**
One Microsoft Way	Redmond	WA	98052	United States of America

Permit Information

14. Construction Permit Actions:

Instructions: If applying for a construction permit action (including modification, reconstruction, relocation, replacement, and revision), the facility MUST also apply for an operation permit option. The department will not process an application until the application fee is received. Application fees are listed below in section A. Additional fees may be required and a final invoice will be sent when a final permit decision is made. See ch. NR 410 for current fee amounts and additional review fees.

A. Permit Actions:

◉ New Construction/Modification ($7,500) – Anticipated start dates: 10/01/2024 (Construction) _____ (Operation)

☒ **Requesting Expedited Review –** If expedited review of construction permit is requested and fulfilled within expected time period, the construction permit review fee, invoiced with the final permit, will include an additional charge from $4000 to $7500 depending on the permit type and timeframe in which is issued. See ch. NR 410 for fee details.

☐ **Requesting Waiver to Commence Construction** under s. NR 406.03(2), Wis. Adm. Code (include a fee of $300 in addition to construction permit initial application fee of $7500)

◯ Construction Permit Revision ($1,500 fee) – List permit(s) to be revised: _____

☐ **Project involves construction on over 10,000 square feet of undisturbed ground.**

B. Construction Permit Exemption Determinations: (Select one ONLY if the facility is requesting a review and response from the department. The department will not respond to a request until the appropriate exemption fee listed below is received.)

◯ Controlled Actual Emissions Exemption under NR 406.04(1q) (for construction project only) ($1,250)

◯ Research and Testing Exemption Under NR 406.04(1)(i) ($1,250)

◯ Modification for Source with Plant-wide Applicability Limit under NR 406.04(1f) ($1,500 / $2,400 with modeling)

◯ Significant Net Emissions Increase under NR 406.04(1k) ($5,500 / $6,500 with modeling)

◯ General Exemption under NR 406.04(2) ($500)

◯ Specific Categories of Exemptions under NR 406.04(1) ($500) **– Enter appropriate code citation(s):** _____

See specific categories of exemptions: https://docs.legis.wisconsin.gov/code/admin_code/nr/400/406/04/1

◯ Other: _____

For more information on exemption citations: https://docs.legis.wisconsin.gov/code/admin_code/nr/400/406.pdf

C. Construction Permit Actions Application Fee:
How will the application fee be paid? (select only one)

◯ Check payable to Wis. Dept. of Natural Resources is enclosed with the application (paper copy submittals only).

◯ Check payable to Wis. Dept. of Natural Resources will be sent under separate cover (mail to: Department of Natural Resources, Air Management Program AM/7, Attn: Construction Permit Processor, P.O. Box 7921, Madison, WI 53707-7921).

◉ E—Payment. Upon receipt of the application, the department will send an email to the Billing Contact with an invoice and instructions for paying electronically. A processing fee of 2.5% is added to payments made by credit or debit card. E-check and ACH payment options are also available.

The department will not process the application until the application fee is received. See Item 14 Sections A and B for application fee information for construction permit actions. There is no application fee required for operation permit actions.

15. Operation Permit Actions:

A. Operation Permit Actions (if applying for an operation permit select the type the facility is requesting. For Operation permit exemptions see section C):

- ◯ Original Operation Permit
- ◯ Renewal **NOTE**: For more information: https://dnr.wi.gov/topic/AirPermits/Renew.html
- ◉ Revision

Note: List Permit(s) to be renewed or revised: 25230249A-F01

B. Type of Operation Permit Requested (select one):

- ◯ Part 70 Source
- ◉ Synthetic Minor, Non - Part 70 Source
- ◯ Non - Part 70 Source
- ◯ Elective

NOTE: Facilities that do not have a facility-wide operation permit issued MUST select the appropriate option. All other requests should indicate type of permit, to reflect continued or changing status.

C. Operation Permit Exemption Options (If applying for an operation permit exemption, select the type of exemption the facility is requesting)

- ◯ Controlled Actual Emissions Exemption under NR 407.03(1m)
- ◯ Natural Minor Source Exemption under NR 407.03(1s)
- ◯ General Exemptions under NR 407.03(2)
- ◯ Specific Categories of Exemptions under NR 407.03(1) **Enter appropriate code citation(s):**

Note: Controlled Actual Emissions and Natural Minor Source Exemptions require revocation of existing operation permits.

See specific categories of exemptions: https://docs.legis.wisconsin.gov/code/admin_code/nr/400/407/03/1

16. For All Permit Actions:

Is additional information attached? ◉ Yes ◯ No

Submit the completed application using either Option 1 or Option 2 below:

Option 1:

Email an ELECTRONIC COPY* to DNRAMAirPermit@wisconsin.gov.

* Applications must be signed by the Responsible Official for the source. If submitting an electronic application, the department will send an email with instructions for e-Signing or submitting an ink signature upon receipt of the electronic application. A photocopied or scanned signature does not meet the department's signature requirements. The department will not process an application until the signature is received.

OR

Option 2:

Mail the original copy of all materials with ink signature on this form to:
WISCONSIN DEPARTMENT OF NATURAL RESOURCES
AIR MANAGEMENT PROGRAM
ATTN: PERMITS
P. O. BOX 7921
MADISON, WI 53707-7921

17. Signature of Responsible Official

A. Statement of Completeness:
I have reviewed this application in its entirety and, based on information and belief formed after reasonable inquiry, I certify that the statements and information contained in this application are true, accurate and complete.

B. Certification of Facility Compliance Status: (select one only)

This is not a requirement for initial non-part 70 source operation permit applications and initial applications for new or modified sources for which no construction permit is required. (NR 407.05(8))

◯ I certify that the facility described in this air pollution permit application is fully in compliance with all applicable requirements.

◯ I certify that the facility described in this air pollution permit application is fully in compliance with all applicable requirements, except for the following emissions unit(s) (list all non-complying units):

_____

_____ _____
Signature of Responsible Official* Date Signed

_____ _____
Print or type name of Responsible Official Print or type title of Responsible Official

* Applications must be signed by the Responsible Official for the source. If submitting an electronic application, the department will send an email with instructions for e-Signing or submitting an ink signature upon receipt of the electronic application. A photocopied or scanned signature does not meet the department's signature requirements. An electronic signature has the same effect of certifying the completeness and compliance status reflected in the above statements. The department will not process an application until the signature is received.

Digital Signature Receipt

This is the electronic signature receipt. This receipt contains information about the document submitted, who signed it, when it was signed, and other technical information that may be used by the Department of Natural Resources to prove the authenticity of the document. This receipt is securely stored in the electronic signature system with the submitted document and neither the document nor this receipt can be altered. Electronic signatures are authorized under Wis. Stat. ch. 137 and have the same legal recognition as ink signatures on paper.

Document ID:	4WP85
Document Description:	
File Name:	252302490_25230249A-F02_24-DMM-104_Emailed_Application_Need_SIG.pdf
File Size [KB]:	38182
Wisconsin User ID (WAMS):	cmarkgr
User Name:	Christa Markgraff
User Verified Status:	
Temporary PIN Sent To:	CMARKGRAFF@microsoft.com
Signature ID:	4WP5C
Signature Date/Time:	6/3/2024 10:44:20 AM
Certification Statement:	I certify, under penalty of law, that the information provided in this document is, to the best of my knowledge and belief, true, accurate, and complete. I understand that there are significant civil and criminal penalties, including fines, imprisonment, or both, for submitting false, inaccurate, or incomplete information.

For DNR Use Only:

User IP Address:	69.245.195.181	Public Key Type: RSA-2048	Hash Type: SHA-512
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Public Key Value:	0602000000A400005253413100080000010001009 15B37B7FD28A39721C672D538BF2068AFBF774364BCCA9C32E33C271CAB637D79D80F5F70E0AB3C23AC5E1AC5FAA0D529DDF4D53C308E6F8CA4E57C28B4CBBD08D311EFDB71F7A33376E1A72E135EB0F9D3638C5E7DC7521095C5AA2986232551C1C64A1B72E2783EF094C753D7AA935DACBEA2463F028163CDB4EFB3F492CAB11DC26326C96B3314109B0F439E4BED32949513397FBD4D7FFEFE74198D1D48FD768EEC877381B6317CAF269DF94C1097816D1BDC8999FA8680793388B361FEE802E59D4C1D117DA1F66F59A8AD413E59FF1EF8885DF3A69FD5E76C5C4DCB7DE86C382A54841640881540337DBE79DCFE10795FCAE26F6CF41AD70FD192BCE0		
Document Hash Value:	2927016C8742CB259F5918DE9C627E4F10120AB15D1845C2E8AB6FE622FE6BA98C0C66D726884F22F3105E49D703E980054F3E684422B3902CE5331D1DBDF892		
Document Signature Value:	C1CA0DF2A82260503EC25C26320B63C17D96DFE66EC453184760947F4C97A569894088AF65CC2A65E5C07D84483177F2FEBC96697F001479609DD64418C81B3C9BFF3CFCC251198B2609167C89A5CBE3272819B62ECA9AC369032AFD2A71A93F70CD07F2765740393D0B9EAC096E6FC07073DB0B6BDEEAC7F1565242813B7DB1EBF2FBC490B8B55D55BF39497831EE843E0970F3F4D70B99376F52D4BE30B851BD229E46709B0E96349A0C3BAE7AE4385ECF24B5CD05C56B5F01E2BE45CC07D503366D32310B03ACD514EE702DE0DCAD9123A0DAE66F4981448AA4D2F4EC87EB33465E3B5AB9AA194A477848161A266A43F78A66E793C6293FA4EB752DD2377A		

State of Wisconsin
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FACILITY PLOT PLAN
Air Pollution Control Permit Application

Notice: Completion of this form is required for any air pollution control permit application filed pursuant to ss. 285.61, 285.62 or 285.66, Wis. Stats. The department will not consider or act upon an application unless this form is submitted and is complete. Any personal information collected will be used for administrative purposes only and may be provided to requesters to the extent required by Wisconsin's Public Records Law [ss. 19.31-19.39, Wis. Stats.].

For a comprehensive air quality analysis to be accomplished, a facility plot plan must be included with the permit application. The plot plan must include the following for the permit application to be considered complete:

- ☒ 1. A layout (blueprint, plan view, annotated aerial photograph, or graphic submitted for land use zoning approvals) including all buildings occupied by or located on the site of the facility.
- ☒ 2. The maximum height, and eave height, of each building and solid structure (excluding stack height).
- ☒ 3. The location and numerical designation of each stack. The stack designations must correspond to the appropriate stack designations listed on the other permit forms in this application and/or designations in current permits issued to the facility.
- ☒ 4. The location of fenced property lines (if any).
- ☒ 5. Identify direction "North" on all submittals.
- ☒ 6. All drawings shall be to scale and shall have the scale graphically depicted.
- ☒ 7. An additional regional map depicting the facility location in relation to the surrounding vicinity (roads or other features) shall be included.

Are there any outdoor storage piles on the facility site? ○ Yes ◉ No

If so, what material(s) does the pile(s) consist of?

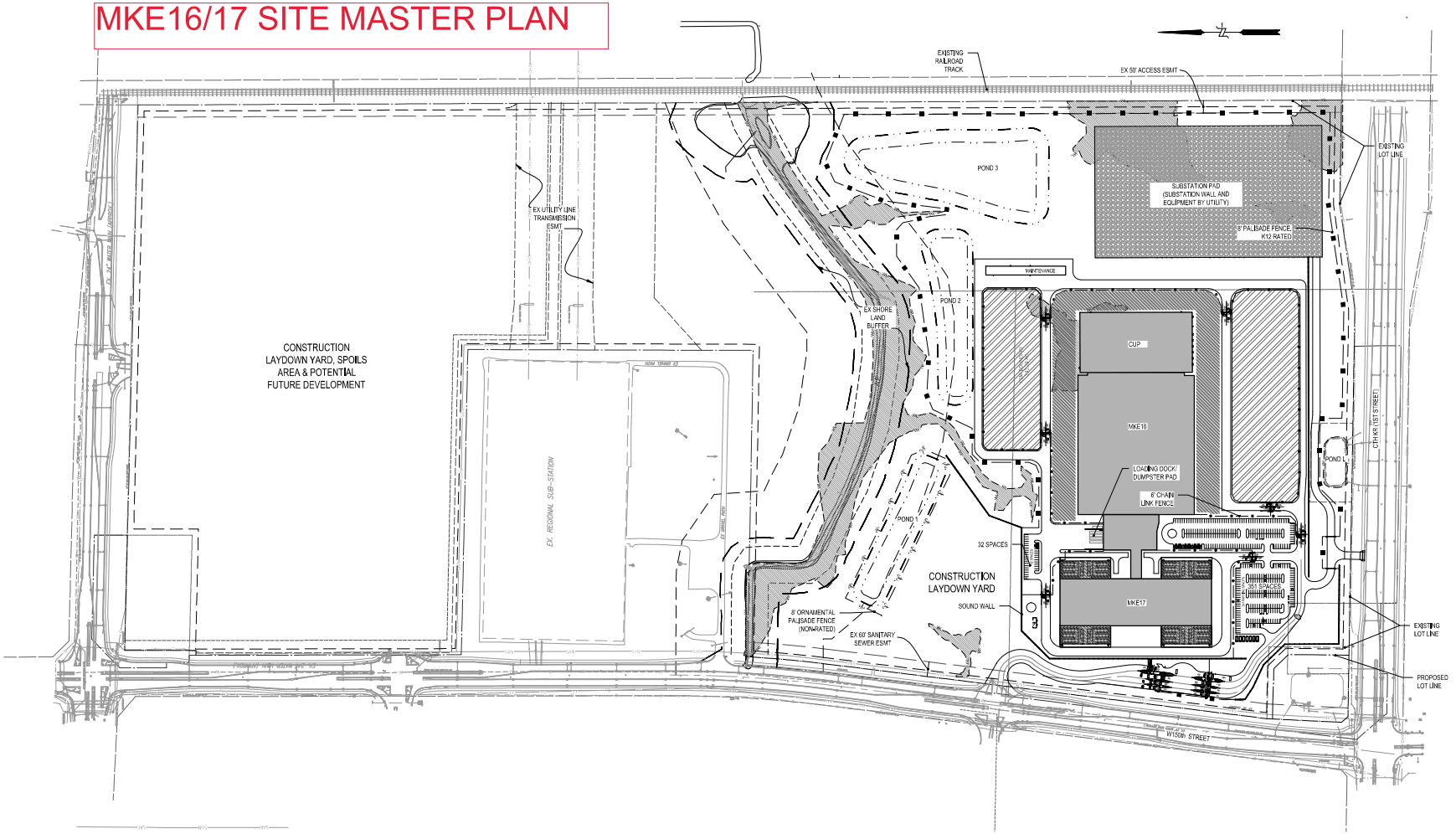
Are there any dirt roads or unpaved parking lots on the facility site? ○ Yes ◉ No

If so, describe:

Date: March 2024

FACILITY PLOT PLAN
MKE16/17 and 3B DATA CENTER - RACINE, WI

MKE16/17 SITE MASTER PLAN



ZONING REQUIREMENTS: (Per Code of Ordinances, Village of Mt. Pleasant, Wisconsin)

Zoned: BP (Business Park)

Sec.90-130.40 – Lot and Building Regulations Table 90-130-2	Required	Proposed MKE16/17
(a) Lot - Minimum lot area (square feet) =	As needed to comply with other applicable regulations	9,961,981 SF (+-)
Minimum lot area per dwelling unit (square feet) =	N/A	N/A
Minimum lot width (feet) =	As needed to comply with other applicable regulations	2,393' (+-)
(b) Principal building siting - Street setback (minimum; feet) =	25'	25' min.
Driveway side setback (minimum; feet) =	25'	25' min.
Non-driveway setback (minimum; feet) =	0' or 10'	0' min.
Rear setback (minimum; feet) =	25'	25' min.
(c) Principal building size - Maximum ground floor area (square feet) =	No maximum	N/A
(d) Accessory Building Site - Allowed Location =	Allowed in rear yard only	N/A
Minimum side and rear setbacks (feet) =	10'	10' min.
Minimum building separation (feet) =	10'	10' min.
(e) Maximum Building Height - Principal Building Height (feet) =	80'	90' max.
Accessory Building Height (feet) =	24'	24' max.

GENERAL NOTES:

1. Proposed development will show conformance with section 90-430 Landscaping and Screening at final site plan.
2. Mechanical and vehicular screening will meet one of the 3 options set forth in Table 90-430-1 and Table 90-430-3.
3. Proposed development will show conformance with Chapter 400 regulations at final site plan.
4. Depicted property line subject to active Certified Survey Map (CSM).

LEGEND:

- 6' TALL BLACK VINYL-COATED CHAIN LINK FENCE WITHOUT BARB WIRE
- 8' TALL BLACK VINYL-COATED CHAIN LINK FENCE WITHOUT BARB WIRE
- 8' ORNAMENTAL PALISADE, BLACK, NON-RATED. INSTALL PER MANUFACTURER'S STANDARDS. (TYP)
- 8' PALISADE BLACK, K4 RATED. INSTALL PER MANUFACTURER'S STANDARDS. (TYP)
- 8' PALISADE BLACK, K12 RATED. INSTALL PER MANUFACTURER'S STANDARDS. (TYP)
- CUP — CENTRAL UTILITY BUILDING
- EXISTING WETLANDS
- ELECTRICAL EQUIPMENT YARD
- MECHANICAL EQUIPMENT YARD
- SUBSTATION PAD

Dewberry

Dewberry Engineers Inc.
600 Parsippany Road
Suite 300
Parsippany, NJ 07054
973.739.9400

MKE16-17
DATA CENTER

MT. PLEASANT, WISCONSIN

Design: VOYTEK KLEIN, RYAN BETTO
Drawn: TBD
Checked: WALTER BRONSON, DUANE THOMAS
Date: JANUARY 10, 2024
Dewberry Project No.: 50113236
MJL Project No.: 7-TBD

Revisions

No.	Date	Description
0	15-Feb2024	MKE16-17 Master Site Plan IFR

Registration

0' 100' 200' 400'
SCALE: 1" = 200'

Sector Key Plan

Bar Code

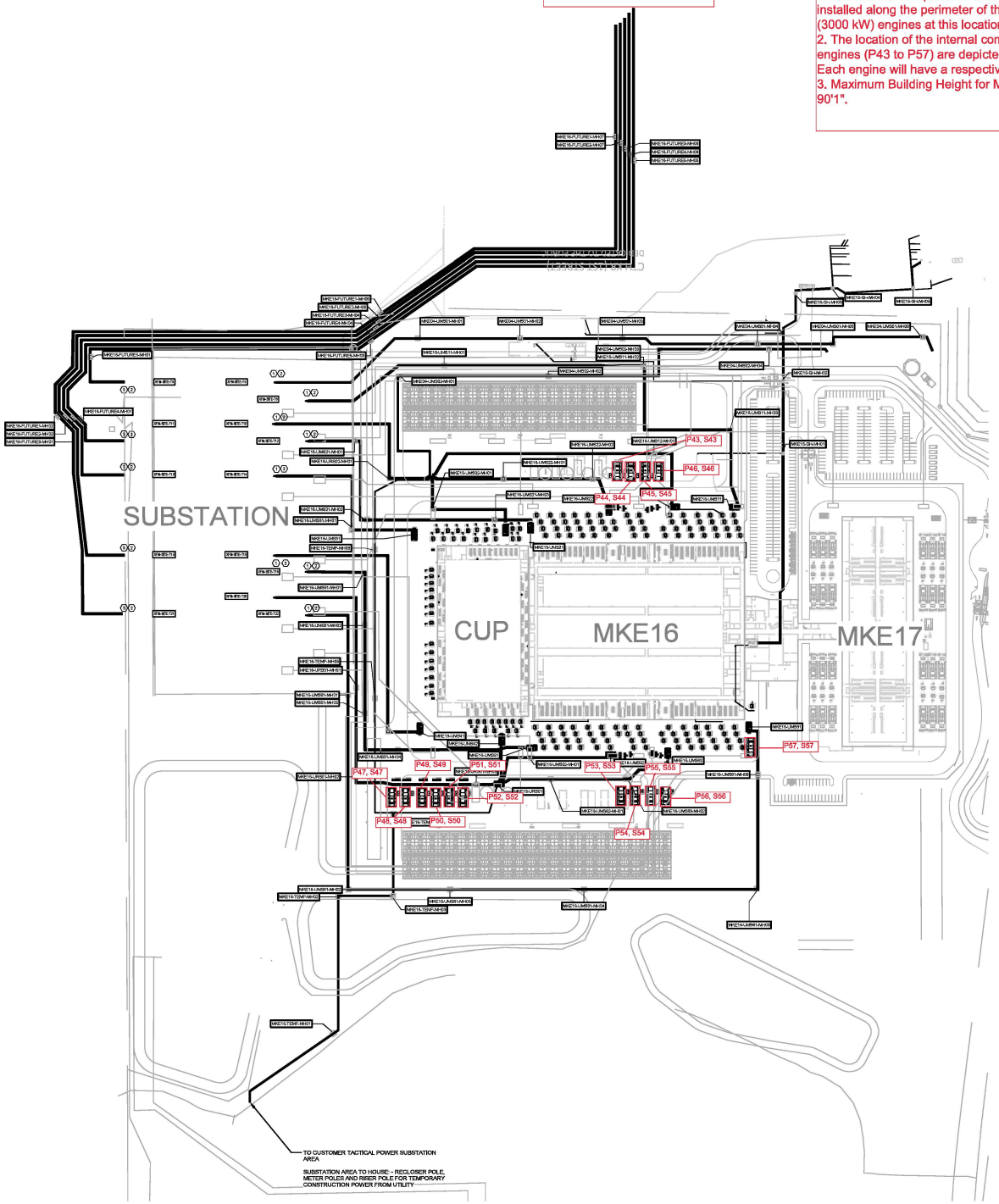
[PROPRIETARY AND CONFIDENTIAL – TRADES SECRET AND COMMERCIAL INFORMATION – EXEMPT FROM RELEASE UNDER FOIA (5 U.S.C. § 552 (b)(4)) AND STATE PUBLIC DISCLOSURE LAWS]

Sheet Title/Number

MKE16-17
SITE MASTER
PLAN

MKE16 SITE MAP

1. The internal compression emergency engines will be installed along the perimeter of the building. There will be 15 (3000 kW) engines at this location.
2. The location of the internal compression emergency engines (P43 to P57) are depicted by the red rectangles. Each engine will have a respective stack (S43 to S57)
3. Maximum Building Height for MKE16 will be approximately 90'1".



1 ELECTRICAL SITE POWER PLAN - OVERALL
1" = 100'-0"

GENERAL NOTES

A. SEE DRAWING E-A-01-0 FOR LEGENDS, NOTES AND ABBREVIATIONS.

B. SEE DRAWING E-G-01-0 FOR UNDERGROUND PARTIAL SECTION DETAILS AND CONDUIT ELEVATIONS.

C. REFER TO E-H SERIES SINGLE LINES FOR ADDITIONAL INFORMATION ON CONDUCTOR SIZES AND EQUIPMENT TERMINATIONS.

D. REFER TO CU SERIES CIVIL ELECTRICAL PLAN & PROFILE FOR MANHOLE AND DUCTBANK ELEVATIONS AND PROFILES. CIVIL PROFILING PLANS ARE TO BE USED FOR LOCATING AND ROUTING ALL SITE ELECTRICAL DUCTBANKS AND MANHOLES.

E. COORDINATE STUB UP LOCATIONS WITH EQUIPMENT MANUFACTURER SITE SPECIFIC SHOP DRAWINGS PRIOR TO INSTALLATION.

F. COORDINATE LOCATION OF CONDUIT PENETRATIONS AT BUILDING FOUNDATION STEM WALL WITH UNDERGROUND UTILITIES AND SITE POWER AND CONTROL REQUIREMENTS.

G. COORDINATE UNDERGROUND CONDUITS WITH OTHER TRADES PRIOR TO INSTALLATION.

H. REFER TO DETAILS ON SHEET E-I-03-0 FOR DUCTBANK REQUIREMENTS.

I. EXTERIOR SAFETY DISCONNECTS, TRANSFORMERS AND PANELS SHALL BE RATED NEMA-3R.

J. PROVIDE SIGNED AND SEALED SIZE, AMPACITY, AND HEAT CALCULATIONS TO SUPPORT FINAL DUCTBANK ROUTING.

K. COORDINATE MANHOLE SIZE, QUANTITY AND LOCATIONS WITH CABLING AND PULL CALCULATIONS, EQUIPMENT SUBMITTALS, AND SHOP DRAWINGS.

L. MEDIUM VOLTAGE CONDUIT MINIMUM BEND RADIUS: HORIZONTAL-36", VERTICAL-36".

M. HATCHED AREAS NOT PART OF UTILITY PERMIT PACKAGE. REFER TO CIVIL PLANS FOR ADDITIONAL INFORMATION.

KEYED NOTES

1 STUB CONDUITS UP AT UTILITY TRANSFORMER. FEEDER FROM SUBSTATION TO SITE UMSURS PROVIDED BY CONTRACTOR. COORDINATE WITH UTILITY FOR FINAL DETAILS.

2 REFER TO DETAIL 22 ON SHEET E-A-01-0 FOR ADDITIONAL SCOPE RESPONSIBILITY MATRIX AT UTILITY TRANSFORMER SECONDARY RISER.

3 FUTURE UTILITY SUBSTATION TRANSFORMER LOCATION. CAP CONDUITS, REFER TO DETAIL 11 IN SHEET E-H-03 FOR ADDITIONAL INFO.

BURNS McDONNELL
9400 Ward Parkway
Kansas City, MO 64114
www.burnsmcd.com
REGISTRATION #: 1305-11

Microsoft

MKE16
DATA CENTER

MOUNT PLEASANT, WI

Design	J. Pham
Drawn	S. Mew
Checked	W. Schaumann
Date	
BMcD Project No.	E.116397
M.S. Project No.	T1.21108

MICROSOFT

Design Manager	ANDREW T. AYLOR
Layout Manager	
Civil, Site Survey, Landscaping Technical Lead	HALIM CHAMOUN
Architectural & Structural Technical Lead	TUDOR NEVELOV / DAVID IWANSON
Mech. Plumbing & Fire Protection Technical Lead	
Building Automation Technical Lead	BILL DEMBERSKI
Electrical Technical Lead	RYAN CARTWRIGHT
Electrical Power Management Technical Lead	SERGEI FRANCO
Telecommunications / Network Technical Lead	TATYANA WIBLEY
Security Design Manager	AMY SMITH

DESIGN TEAM

Civil Engineering Lead	BRIAN BRADNER / DUANE THOMAS / DEWBERRY
Structural Engineering Lead	BRYAN JEMAL / BMcD
Architectural Lead	NEAL CLEMENTS / BMcD
Mechanical Engineering Lead	TANA ALLEN / BMcD
Plumbing Engineering Lead	DANIEL GARCIA / BMcD
Fire Protection Engineering Lead	JOE MIRACLE / BMcD
QAQI Engineering Lead	KALI ANN WARD / BMcD
Electrical Engineering Lead	WESLEY MAKAREA / BMcD
Telecommunications / Network Engineering Lead	DAVID STEWART / BMcD
Security Systems Engineering Lead	VINCENT MACHÉ / Z BETA

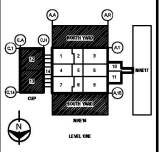
Revisions

No.	Date	Description
0	03/01/2024	DRAFT OFCI LLE IFR

Registration

PRELIMINARY

Sector Key Plan



Bar Code

Package
OFCI/LLE

Sheet Title/Number

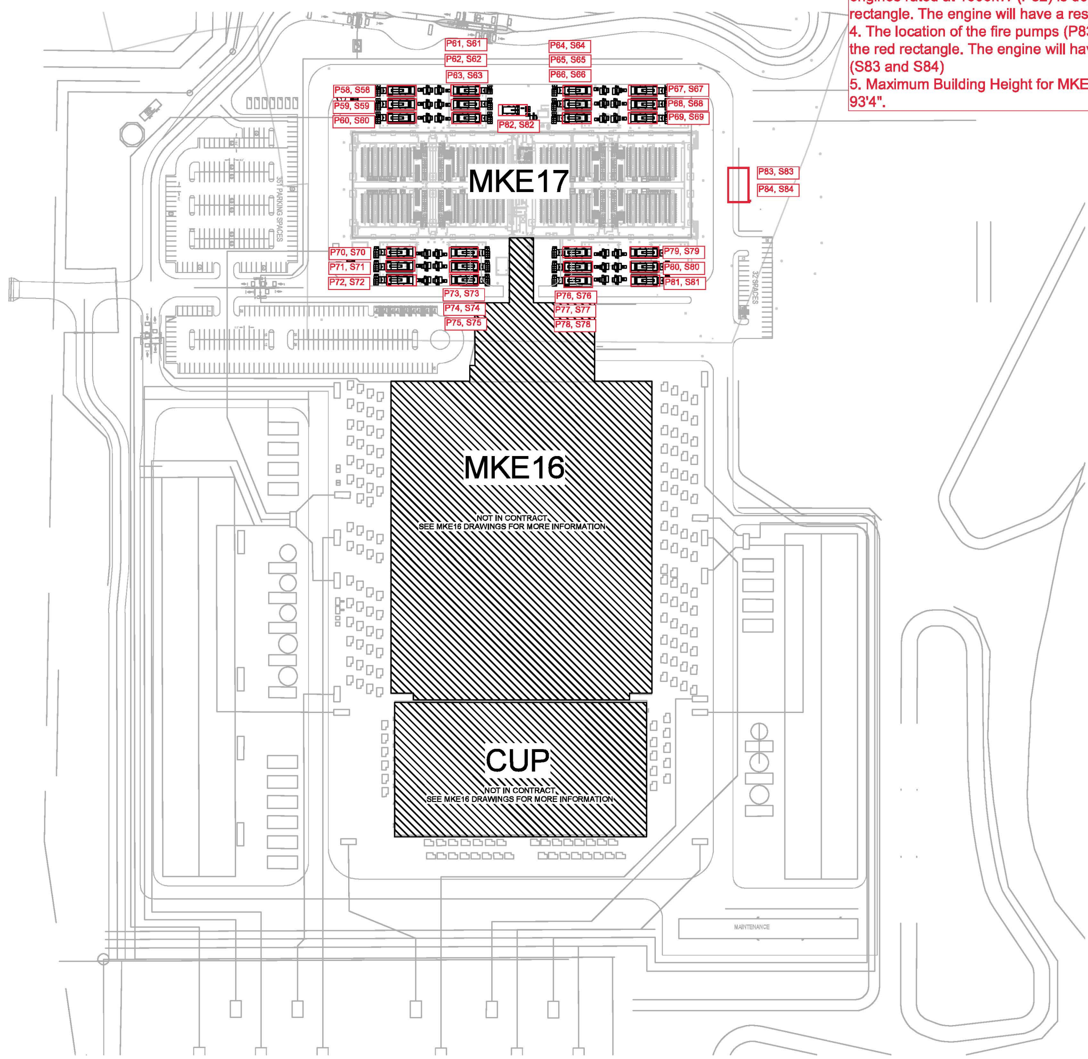
ELECTRICAL SITE POWER PLAN - OVERALL

MKE16
E-C-00-00

E-C-00-00

MKE17 SITE MAP

1. The internal compression emergency engines will be installed along the perimeter of the building. There will be 24 (3000 kW) engines, 1 1000kW engine and 2 Fire pump engines at this location.
2. The location of the internal compression emergency engines rated at 3000kW (P58 to P81) are depicted by the red rectangles. Each engine will have a respective stack (S58 to S81)
3. The location of the internal compression emergency engines rated at 1000kW (P82) is depicted by the red rectangle. The engine will have a respective stack (S82)
4. The location of the fire pumps (P83 and P84) is depicted by the red rectangle. The engine will have a respective stack (S83 and S84)
5. Maximum Building Height for MKE17 will be approximately 93'4".



1 ELECTRICAL SITE PLAN - OVERALL
1" = 80'-0"

GENERAL NOTES

A. SEE DRAWING E-A-01-0 FOR LEGENDS, NOTES AND ABBREVIATIONS.
B. SEE DRAWING E-G-01-0 FOR UNDERGROUND PARTIAL SECTION DETAILS AND CONDUIT ELEVATIONS.
C. REFER TO E-H SERIES SINGLE LINES FOR ADDITIONAL INFORMATION ON CONDUCTOR SIZES AND EQUIPMENT TERMINATIONS.
D. COORDINATE STUB UP LOCATIONS WITH EQUIPMENT MANUFACTURER SITE SPECIFIC SHOP DRAWINGS PRIOR TO INSTALLATION.
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F. COORDINATE UNDERGROUND CONDUITS WITH OTHER TRADES PRIOR TO INSTALLATION.
G. REFER TO DETAILS ON SHEET E-I-03-0 FOR DUCTBANK REQUIREMENTS.
H. EXTERIOR SAFETY DISCONNECTS, TRANSFORMERS AND PANELS SHALL BE RATED NEMA-3R.
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K. MEDIUM VOLTAGE CONDUIT MINIMUM BEND RADIUS: HORIZONTAL-36", VERTICAL-36".

KEYED NOTES

1 MV DUCTBANK FROM URS SWITCHGEAR AND SUBSTATION ARE PART OF MKE16 PRIMARY UTILITIES PACKAGE. COORDINATE EXACT LOCATION OF THE UMS WITH INPUT FEEDERS STUB-UP LOCATION.

BURNS McDONNELL
9400 Ward Parkway
Kansas City, MO 64114
www.burnsmcd.com
REGISTRATION #: 1308-11

Microsoft
MKE17
DATA CENTER
MOUNT PLEASANT, WI

Design	J. Pham
Drawn	S. Meier
Checked	W. Schaumann
Date	02/01/2024
BMcD Project No.	P. 166387
M.S. Project No.	P. 21108

MICROSOFT

Design Manager	ANDREW TAYLOR
Layout Manager	
Civil, Site Survey, Landscaping Technical Lead	NALINI CHANDRAN
Architectural & Structural Technical Lead	TODOR NIKOLOV / DAVID SWANSON
Mech, Plumbing & Fire Protection Technical Lead	PETER CZERWINSKI
Building Automation Systems (BAS) Technical Lead	BILL GEMBINSKI
Electrical Technical Lead	RYAN CARTWRIGHT
Electrical Power Management Systems (EPMS) Technical Lead	SERGIO FRANCO
Telecommunications / Network Technical Lead	NATHAN WRIEDT
Security Design Manager	AMY SMITH

DESIGN TEAM

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Structural Engineering Lead	BINYAM JEMAL / BMcD
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Mechanical Engineering Lead	SAM ALLEN / BMcD
Plumbing Engineering Lead	DANIEL GARCIA / BMcD
Fire Protection Engineering Lead	JOE MIRACLE / BMcD
BAS Engineering Lead	KALI ANN WANG / BMcD
Electrical Engineering Lead	WESLEY MWANZIA / BMcD
Telecommunications / Network Engineering Lead	CHAD STILWELL / BMcD
Security Systems Engineering Lead	VINCENT MACHI / Z BETA

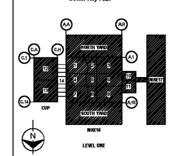
Revisions

No.	Date	Description
0	02/01/2024	DRAFT OFCI LLE IFR

Registration

PRELIMINARY

Sector Key Plan



Bar Code

Package
OFCI/LLE

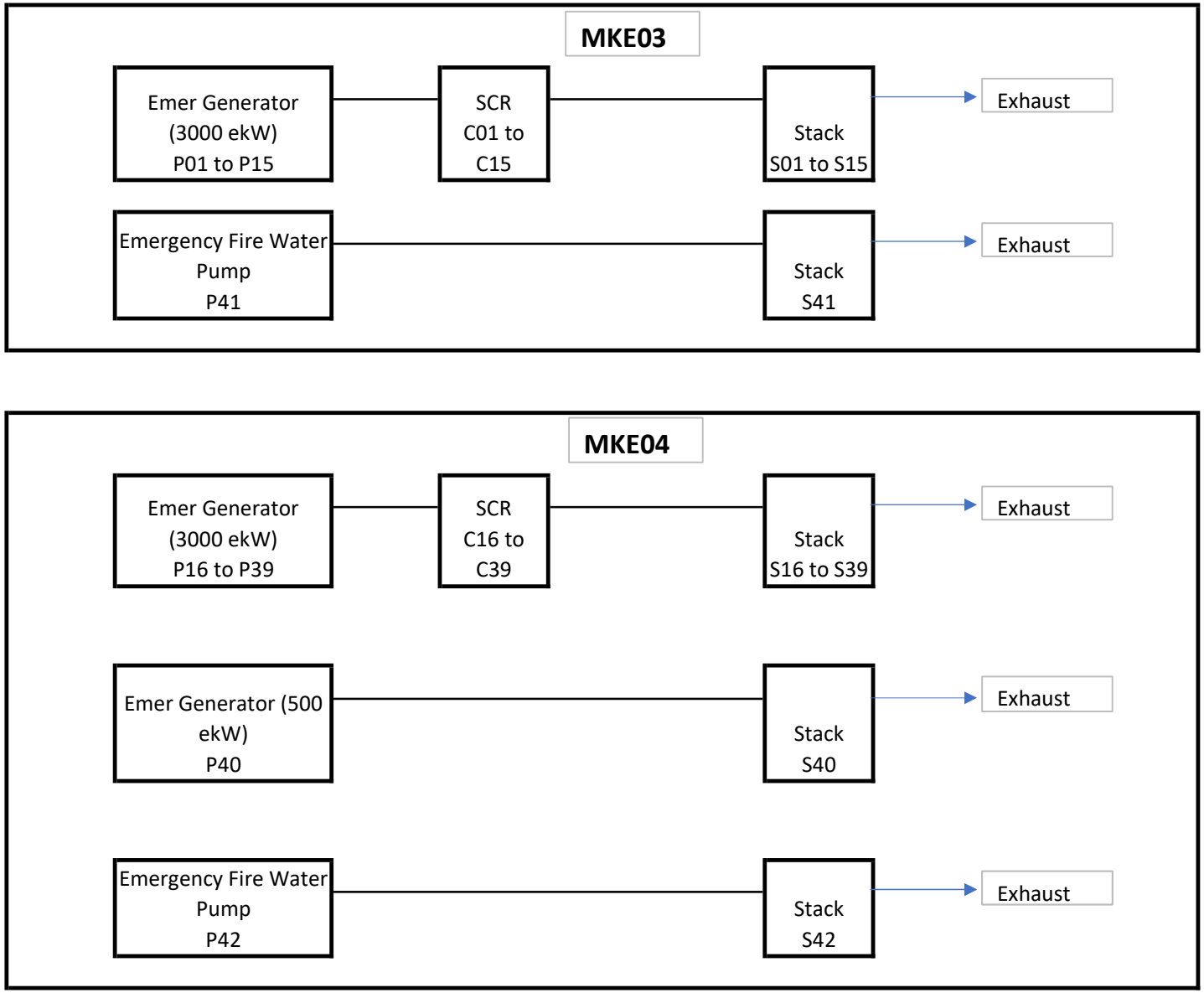
Sheet Title/Number

ELECTRICAL SITE PLAN - OVERALL

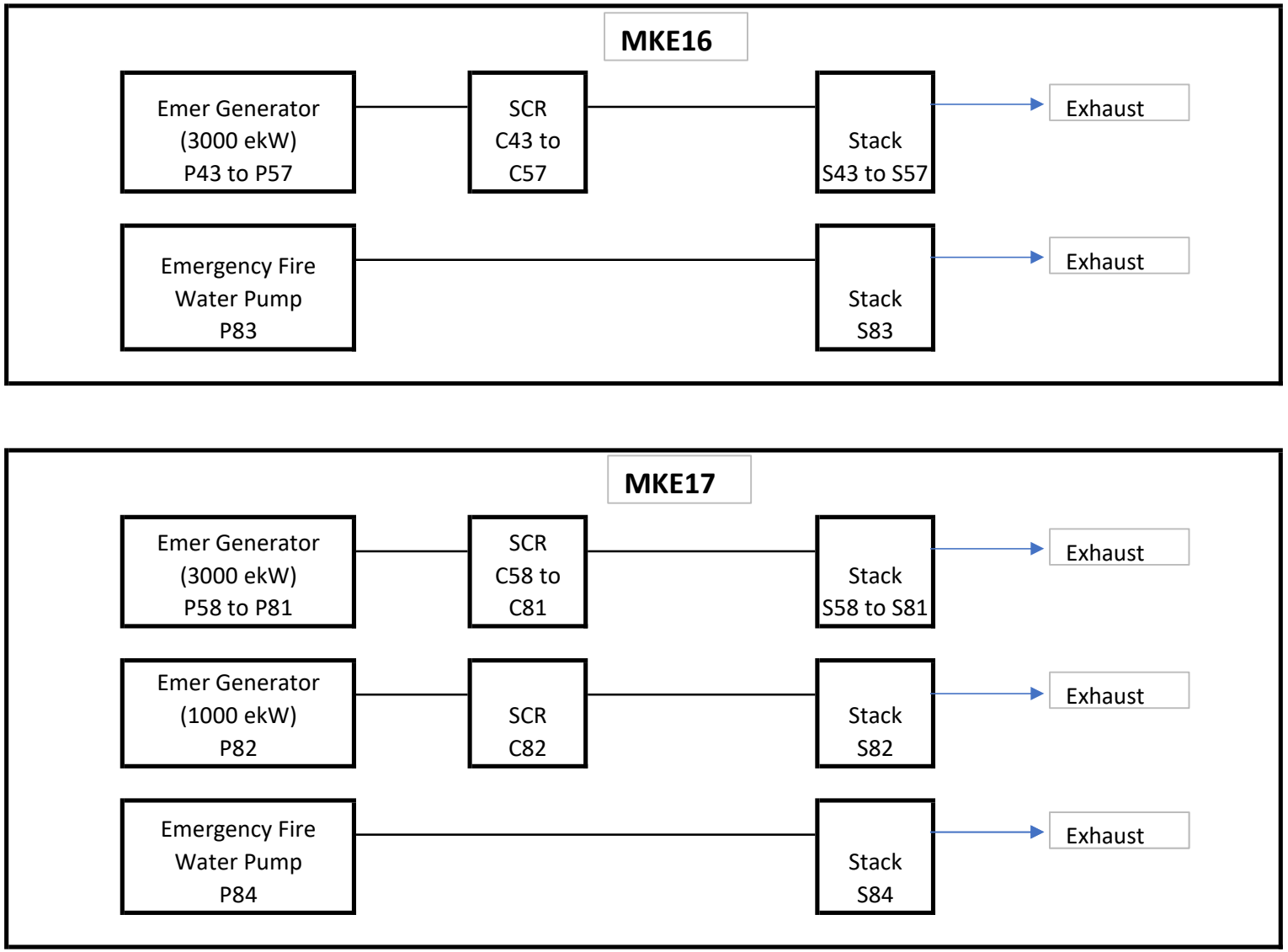
MKE17
E-C-00-0

DRAWING ISSUED AS PART OF LLE PACKAGE ONLY, NOT TO BE RELEASED FOR DESIGN / CONSTRUCTION SETS

MKE 3B Data Center Process Flow Diagram



MKE 16/17 Data Center Process Flow Diagram



State of Wisconsin
Department of Natural Resources
dnr.wi.gov

Source And Site Descriptions
Air Pollution Control Permit Application

Form 4530-102 (R 08/20) Information attached? ◯ Y ◯ N

Notice: Completion of this form is required for any air pollution control permit application filed pursuant to ss. 285.61, 285.62 or 285.66, Wis. Stats. The department will not consider or act upon an application unless this form is submitted and complete. Any personal information collected will be used for administrative purposes only and may be provided to requesters to the extent required by Wisconsin's Public Records Law [ss. 19.31-19.39, Wis. Stats.].

1. Briefly describe the proposed project or existing Unit(s) to be permitted. Attached supplemental forms as needed.

Microsoft Corporation (Microsoft) is proposing to construct two buildings located in Racine County, Wisconsin. The campus will be comprised of datac enters that will utilize internal compression emergency generators to provide emergency backup power. The proposed data center will have thirty nine (39) core internal compression emergency generatos rated at 3000 ekW and one (1) administrative internal compression emergency generator rated at 1000 ekW. The campus ill also have two (2) emergency firewater pumps rated at 130 HP.

For OP Renewal Applications:

2. Were any emissions units permanently removed from operation since the last operation permit issuance date?

◯ No.
◯ Yes. List the emissions units and the dates they were removed:

Process, Stack	Process Description	Date Removed

3. Were any new or modified emissions units installed/modified at the facility since the last operation permit issuance date?

◯ No. Proceed to form 4530-102A.
◯ Yes. Complete the following table:

4. Use the following table to briefly describe any new/modified emissions units installed at the facility since the last operation permit issuance date. List any department issued construction permit, construction permit exemption and/or operation permit number(s) for each new/modified unit. If operation permit application forms were submitted for new/modified unit(s), reference the date of that application OR complete and include applicable forms 4530-103 through 4530-135. Note: Forms 4530-118 through 4530-125 are applicable to Part 70 sources only. Attach supplemental forms as needed.

Process, Stack	Process Description	Construction permit or exemption number or "not applicable"	Operation permit number or "not applicable"	Date operation permit application submitted OR	Forms attached
					☐
					☐
					☐
					☐
					☐

5. Site Description

The MKE16/17 Data Center Project will be located on approximately 242 acres south of Braun Road, east of W. 105th Street, west of a Canadian Pacific Railroad line, and north of County KR (1st Street) in Mount Pleasant, Wisconsin. The Data Center will be located in Racine County which is classified as "nonattainment" area for Ozone. MKE16/17 will be adjacent to MKE 3B Data Center.

State of Wisconsin
Department of Natural Resources
dnr.wi.gov

Source Description - Supplemental
Air Pollution Control Permit Application

Form 4530-102A (R 087/20) Information attached? ◯ Y ◯ N

Notice: Completion of this form is required for any air pollution control permit application filed pursuant to ss. 285.61, 285.62 or 285.66, Wis. Stats. The department will not consider or act upon an application unless this form is completed and submitted. Any personal information collected will be used for administrative purposes only and may be provided to requesters to the extent required by Wisconsin's Public Records Law [ss. 19.31-19.39, Wis. Stats.].

1. List all significant existing or proposed air pollution emissions units, operations, and activities at the facility. Include a short description of each emissions unit (e.g., boiler, printing line, etc.) followed by equipment capacity. Identify and describe any control device(s). Include the date the unit was installed or last modified and the most recent construction permit or construction permit exemption for the unit. If the unit is not covered by a construction permit include "na". For Operation Permit Renewal Applications: Identify units that are new or modified since the current operation permit was issued by checking the appropriate box. For units that are new or modified since the current operation permit was issued identify the date the required application forms were submitted OR complete forms 4530-103 through 4530-133, as applicable. Note: forms 4530-118 through 4530-125 are required for Part 70 sources only.

							For OP Renewals Applications Only		
a. Process, Stack	b. Process Description	c. Capacity	d. Control Device(s)	e. Control Device Description(s)	f. Date Installed/ Last Modified	g. Construction Permit/exemption	h. New/modified since current OP issued?	i. For new/modified units: Date forms submitted OR	Forms attached
P01-P39, S01-S39	Emergency Generator	3000 ekW	C01-C39	SCR		Permitted Facility (23-DMM-104)	☐		☐
P40, S40	Emergency Generator	500 ekW	N/A	N/A		Permitted Facility (23-DMM-104)	☐		☐
P41-P42, S41-S42	Emergency Fire Water Pumps	130 HP	N/A	N/A		Permitted Facility (23-DMM-104)	☐		☐
P43-P81, S43-S81	Emergency Generator	3000 ekW	C43-C81	SCR		New Facility	☐		☐
P82, S82	Emergency Generator	1000 ekW	C82	SCR		New Facility	☐		☐
P83-P84, S83-S84	Emergency Fire Water Pumps	130 HP	N/A	N/A		New Facility	☐		☐
							☐		☐
							☐		☐
							☐		☐
							☐		☐

							For OP Renewals Applications Only		
a. Process, Stack	b. Process Description	c. Capacity	d. Control Device(s)	e. Control Device Description(s)	f. Date Installed/ Last Modified	g. Construction Permit/exemption	h. New/modified since current OP issued?	i. For new/modified units: Date forms submitted OR	Forms attached
							☐		☐
							☐		☐
							☐		☐
							☐		☐

State of Wisconsin
Department of Natural Resources
dnr.wi.gov

Source Description - Supplemental
Air Pollution Control Permit

Form 4530-102B (R 08/20) Information attached? ◯ Y ◯ N

Notice: Completion of this form is required for any air pollution control permit application filed pursuant to ss. 285.61, 285.62 or 285.66, Wis Stats. The department will not consider or act upon an application unless this form is completed and submitted. Any personal information collected will be used for administrative purposes only and may be provided to requesters to the extent required by Wisconsin's Public Records Law [ss. 19.31-19.39, Wis. Stats.].

1. Identify all insignificant existing or proposed air pollution emissions units, operations and activities at the facility. For unit, operation and activity types that are not specifically listed, provide a short description of the emissions unit or activity (e.g., boiler, printing line, etc.) followed by equipment specifications. For Operation Permit Renewal Applications, identify those that are new or modified since the current operation permit was issued by checking the appropriate box. (See instruction booklet for an example Unit description.)

	For OP Renewal Applications: Check if unit, operation or activity is new or modified since issuance of current operation permit:
☒ Maintenance of Grounds, Equipment, and Buildings (lawn care, painting, etc.)	☐
☐ Boiler, Turbine, and HVAC System Maintenance	☐
☒ Pollution Control Equipment Maintenance	☐
☐ Internal Combustion Engines Used for Warehousing and Material Transport	☐
☒ Fire Control Equipment	☐
☒ Janitorial Activities	☐
☒ Office Activities	☐
☐ Convenience Water Heating	☐
☐ Convenience Space Heating (< 5 million BTU/hr Burning Gas, Liquid, or Wood)	☐
☒ Fuel Oil Storage Tanks (< 10,000 gal.)	☐
☐ Stockpiled Contaminated Soils	☐
☐ Demineralization and Oxygen Scavenging of Water for Boilers	☐
☐ Purging of Natural Gas Lines	☐
☐ Sanitary Sewer and Plumbing Venting	☐
☐	☐

State of Wisconsin
Department of Natural Resources

STACK IDENTIFICATION
AIR POLLUTION CONTROL PERMIT APPLICATION
Form 4530-103 11-93 Information attached? __ (y/n)

SEE INSTRUCTIONS ON REVERSE SIDE

1. Facility name:	2. Facility identification number:	3. Stack identification number:
Microsoft Corporation - MKE3B Data Center	252302490	S01-S39

4. Exhausting Unit(s), use Unit identification number from appropriate Form(s) 4530-104, 106, 107, 108 and/or 109

4530-104 P01-P39 4530-106 4530-107 4530-108 4530-109

5. Identify this stack on the plot plan required on Form 4530-101

6. Indicate by checking:
☒ This stack has an actual exhaust point. ☐ This stack serves to identify fugitive emissions.

If this stack has an actual exhaust point, then provide the following stack parameters

7. Discharge height above ground level: 50 (feet)

8. Inside dimensions at outlet (check one and complete):

☒ Circular 2.5 (feet) ☐ rectangular ____ length (feet) ____ width (feet)

9. Exhaust flow rate:

Normal 23,220 (ACFM) Maximum 23,220 (ACFM)

10. Exhaust gas temperature (normal): 825 (°F)

11. Exhaust gas moisture content: Normal ____ volume percent Maximum ____ volume percent

12. Exhaust gas discharge direction: ☒ Up ☐ Down ☐ Horizontal

13. Is this stack equipped with a rainhat or any obstruction to the free flow of the exhaust gases from the stack? ☒ Yes ☐ No

***** Complete the appropriate Air Permit Application Forms(s) 4530-104, 106, 107, 108 or 109 for each Unit ***** exhausting through this stack.

State of Wisconsin
Department of Natural Resources

STACK IDENTIFICATION
AIR POLLUTION CONTROL PERMIT APPLICATION
Form 4530-103 11-93 Information attached? __ (y/n)

SEE INSTRUCTIONS ON REVERSE SIDE

1. Facility name:	2. Facility identification number:	3. Stack identification number:
Microsoft Corporation - MKE3B Data Center	252302490	S40

4. Exhausting Unit(s), use Unit identification number from appropriate Form(s) 4530-104, 106, 107, 108 and/or 109

4530-104 P40 4530-106 4530-107 4530-108 4530-109

5. Identify this stack on the plot plan required on Form 4530-101

6. Indicate by checking:
☒ This stack has an actual exhaust point. ☐ This stack serves to identify fugitive emissions.

If this stack has an actual exhaust point, then provide the following stack parameters

7. Discharge height above ground level: 25 (feet)

8. Inside dimensions at outlet (check one and complete):

☒ Circular 0.67 (feet) ☐ rectangular ____ length (feet) ____ width (feet)

9. Exhaust flow rate:

Normal 3625 (ACFM) Maximum 3625 (ACFM)

10. Exhaust gas temperature (normal): 901 (°F)

11. Exhaust gas moisture content: Normal ____ volume percent Maximum ____ volume percent

12. Exhaust gas discharge direction: ☒ Up ☐ Down ☐ Horizontal

13. Is this stack equipped with a rainhat or any obstruction to the free flow of the exhaust gases from the stack? ☒ Yes ☐ No

***** Complete the appropriate Air Permit Application Forms(s) 4530-104, 106, 107, 108 or 109 for each Unit ***** exhausting through this stack.

State of Wisconsin
Department of Natural Resources

STACK IDENTIFICATION
AIR POLLUTION CONTROL PERMIT APPLICATION
Form 4530-103 11-93 Information attached? __ (y/n)

SEE INSTRUCTIONS ON REVERSE SIDE

1. Facility name:	2. Facility identification number:	3. Stack identification number:
Microsoft Corporation - MKE3B Data Center	252302490	S41-S42

4. Exhausting Unit(s), use Unit identification number from appropriate Form(s) 4530-104, 106, 107, 108 and/or 109

4530-104 P41-P42 4530-106 4530-107 4530-108 4530-109

5. Identify this stack on the plot plan required on Form 4530-101

6. Indicate by checking:
☒ This stack has an actual exhaust point. ☐ This stack serves to identify fugitive emissions.

If this stack has an actual exhaust point, then provide the following stack parameters

7. Discharge height above ground level: 11 (feet)

8. Inside dimensions at outlet (check one and complete):

☒ Circular 0.5 (feet) ☐ rectangular ____ length (feet) ____ width (feet)

9. Exhaust flow rate:

Normal 1400 (ACFM) Maximum 1400 (ACFM)

10. Exhaust gas temperature (normal): 961 (°F)

11. Exhaust gas moisture content: Normal ____ volume percent Maximum ____ volume percent

12. Exhaust gas discharge direction: ☒ Up ☐ Down ☐ Horizontal

13. Is this stack equipped with a rainhat or any obstruction to the free flow of the exhaust gases from the stack? ☐ Yes ☒ No

***** Complete the appropriate Air Permit Application Forms(s) 4530-104, 106, 107, 108 or 109 for each Unit ***** exhausting through this stack.

State of Wisconsin
Department of Natural Resources

STACK IDENTIFICATION
AIR POLLUTION CONTROL PERMIT APPLICATION
Form 4530-103 11-93 Information attached? __ (y/n)

SEE INSTRUCTIONS ON REVERSE SIDE

1. Facility name:	2. Facility identification number:	3. Stack identification number:
Microsoft Corporation - MKE16/17 Data Center	New Facility	S43-S57

4. Exhausting Unit(s), use Unit identification number from appropriate Form(s) 4530-104, 106, 107, 108 and/or 109

4530-104 P43-P57 4530-106 4530-107 4530-108 4530-109

5. Identify this stack on the plot plan required on Form 4530-101

6. Indicate by checking:
☒ This stack has an actual exhaust point. ☐ This stack serves to identify fugitive emissions.

If this stack has an actual exhaust point, then provide the following stack parameters

7. Discharge height above ground level: 50 (feet)

8. Inside dimensions at outlet (check one and complete):

☒ Circular 2.5 (feet) ☐ rectangular ____ length (feet) ____ width (feet)

9. Exhaust flow rate:

Normal 23,220 (ACFM) Maximum _____ (ACFM)

10. Exhaust gas temperature (normal): 825 (°F)

11. Exhaust gas moisture content: Normal ____ volume percent Maximum ____ volume percent

12. Exhaust gas discharge direction: ☒ Up ☐ Down ☐ Horizontal

13. Is this stack equipped with a rainhat or any obstruction to the free flow of the exhaust gases from the stack? ☒ Yes ☐ No

***** Complete the appropriate Air Permit Application Forms(s) 4530-104, 106, 107, 108 or 109 for each Unit ***** exhausting through this stack.

State of Wisconsin
Department of Natural Resources

STACK IDENTIFICATION
AIR POLLUTION CONTROL PERMIT APPLICATION
Form 4530-103 11-93 Information attached? __ (y/n)

SEE INSTRUCTIONS ON REVERSE SIDE

1. Facility name:	2. Facility identification number:	3. Stack identification number:
Microsoft Corporation - MKE16/17 Data Center	New Facility	S58-S81

4. Exhausting Unit(s), use Unit identification number from appropriate Form(s) 4530-104, 106, 107, 108 and/or 109

4530-104 P58-P81 4530-106 4530-107 4530-108 4530-109

5. Identify this stack on the plot plan required on Form 4530-101

6. Indicate by checking:
☒ This stack has an actual exhaust point. ☐ This stack serves to identify fugitive emissions.

If this stack has an actual exhaust point, then provide the following stack parameters

7. Discharge height above ground level: 80 (feet)

8. Inside dimensions at outlet (check one and complete):

☒ Circular 2.5 (feet) ☐ rectangular ____ length (feet) ____ width (feet)

9. Exhaust flow rate:

Normal 23,220 (ACFM) Maximum _____ (ACFM)

10. Exhaust gas temperature (normal): 825 (°F)

11. Exhaust gas moisture content: Normal ____ volume percent Maximum ____ volume percent

12. Exhaust gas discharge direction: ☒ Up ☐ Down ☐ Horizontal

13. Is this stack equipped with a rainhat or any obstruction to the free flow of the exhaust gases from the stack? ☒ Yes ☐ No

***** Complete the appropriate Air Permit Application Forms(s) 4530-104, 106, 107, 108 or 109 for each Unit ***** exhausting through this stack.

State of Wisconsin
Department of Natural Resources

STACK IDENTIFICATION
AIR POLLUTION CONTROL PERMIT APPLICATION
Form 4530-103 11-93 Information attached? __ (y/n)

SEE INSTRUCTIONS ON REVERSE SIDE

1. Facility name:	2. Facility identification number:	3. Stack identification number:
Microsoft Corporation - MKE16/17 Data Center	New Facility	S82

4. Exhausting Unit(s), use Unit identification number from appropriate Form(s) 4530-104, 106, 107, 108 and/or 109

4530-104 P82 4530-106 4530-107 4530-108 4530-109

5. Identify this stack on the plot plan required on Form 4530-101

6. Indicate by checking:
☒ This stack has an actual exhaust point. ☐ This stack serves to identify fugitive emissions.

If this stack has an actual exhaust point, then provide the following stack parameters

7. Discharge height above ground level: 80 (feet)

8. Inside dimensions at outlet (check one and complete):

☒ Circular 1.67 (feet) ☐ rectangular ____ length (feet) ____ width (feet)

9. Exhaust flow rate:

Normal 7337 (ACFM) Maximum 7337 (ACFM)

10. Exhaust gas temperature (normal): 883 (°F)

11. Exhaust gas moisture content: Normal ____ volume percent Maximum ____ volume percent

12. Exhaust gas discharge direction: ☒ Up ☐ Down ☐ Horizontal

13. Is this stack equipped with a rainhat or any obstruction to the free flow of the exhaust gases from the stack? ☒ Yes ☐ No

***** Complete the appropriate Air Permit Application Forms(s) 4530-104, 106, 107, 108 or 109 for each Unit ***** exhausting through this stack.

State of Wisconsin
Department of Natural Resources

STACK IDENTIFICATION
AIR POLLUTION CONTROL PERMIT APPLICATION
Form 4530-103 11-93 Information attached? __ (y/n)

SEE INSTRUCTIONS ON REVERSE SIDE

1. Facility name:	2. Facility identification number:	3. Stack identification number:
Microsoft Corporation - MKE16/17 Data Center	New Facility	S83-S84

4. Exhausting Unit(s), use Unit identification number from appropriate Form(s) 4530-104, 106, 107, 108 and/or 109

4530-104 P83-P84 4530-106 4530-107 4530-108 4530-109

5. Identify this stack on the plot plan required on Form 4530-101

6. Indicate by checking:
☒ This stack has an actual exhaust point. ☐ This stack serves to identify fugitive emissions.

If this stack has an actual exhaust point, then provide the following stack parameters

7. Discharge height above ground level: 11 (feet)

8. Inside dimensions at outlet (check one and complete):

☒ Circular 0.5 (feet) ☐ rectangular ____ length (feet) ____ width (feet)

9. Exhaust flow rate:

Normal 1400 (ACFM) Maximum 1400 (ACFM)

10. Exhaust gas temperature (normal): 961 (°F)

11. Exhaust gas moisture content: Normal ____ volume percent Maximum ____ volume percent

12. Exhaust gas discharge direction: ☒ Up ☐ Down ☐ Horizontal

13. Is this stack equipped with a rainhat or any obstruction to the free flow of the exhaust gases from the stack? ☐ Yes ☒ No

***** Complete the appropriate Air Permit Application Forms(s) 4530-104, 106, 107, 108 or 109 for each Unit ***** exhausting through this stack.

State of Wisconsin
Department of Natural Resources
dnr.wi.gov

Stationary Reciprocating Internal Combustion Engine (RICE) Air Pollution Control Permit Application

Form 4530-104A (12/21)

SEE INSTRUCTIONS ON REVERSE SIDE

Information attached? ◯ Y / ◯ N

1. Facility name:	2. Facility identification number:
Microsoft Corporation - MKE 3B Data Center	252302490
3. Stack identification number:	4. RICE number:
S01-S39	

4a. Unit description:
P01 - P39 Emergency Generators

5. Indicate the RICE control technology status. ◯ Uncontrolled ◉ Controlled

If the RICE is controlled, enter the control device number(s) from the appropriate forms:

4530-110 _____ 4530-111 _____ 4530-112 _____ 4530-113 C01-C39

4530-114 _____ 4530-115 _____ 4530-116 _____ 4530-117 _____

6. Manufacturer:	7. Model number:
Cummins	C3000 D6e
8. Site rating (brake horsepower (HP)):	9. Electrical output rating (kW):
4308	3000 ekW
10. Heat input rating (mmBtu/hr):	11. Displacement (in liters/cylinder for CI engines or cc for SI engines):
28.5	5.96
12. Date engine was ordered:	13. Date of manufacture (from nameplate):
14. Date installed at site:	15. Engine tier (if known): Tier 2

16. If the stationary RICE was manufactured after July 1, 2007, is it a certified engine? ◉ Yes ◯ No ◯ Not Applicable

If stationary RICE is certified, attach a copy of the engine certification to the application.

Certification attached? ◉ Yes ◯ No ◯ Not Applicable

17. Stationary RICE type:

- ◉ Compression ignition
- ◯ Spark ignition:
  - ◯ 2-stroke lean burn
  - ◯ 4-stroke lean burn
  - ◯ 4-stroke rich burn
- ◯ Dual fuel

18. Fuel stationary RICE is capable of using (check all that apply):

- ☐ Natural gas
- ☒ Diesel
- ☐ Landfill gas
- ☐ Digester gas
- ☐ Gasoline
- ☐ Propane
- ☒ Other(s): Hydrotreated Vegetable Oil

19. Stationary RICE use:

- ☒ Emergency stationary RICE (used during power interruptions or to pump water in case of fire or flood, etc.)
- ☐ Black start stationary RICE (an engine whose only purpose is to start up a combustion turbine)
- ☐ Fire pump engine
- ☐ Non-emergency / non-black start stationary RICE
- ☐ Supply power to electric grid in emergency situations (emergency demand response)
- ☐ Limited use (a stationary RICE that operates less than 100 hours per year)
- ☐ Peaking unit (standby engine used during periods of high demand that are not emergencies)
- ☐ Other financial agreement(s)
- ☐ Other(s): _____

***** For this emissions unit, identify the method of compliance demonstration by completing Form 4530-118, ***** DESCRIPTION OF METHODS USED FOR DETERMINING COMPLIANCE. Attach Form 4530-118 and its attachment(s) to this form. This is not a requirement of non-Part 70 sources.

***** Complete the Air Pollution Control Permit Application Forms 4530-126 and 4530-128 for this Unit. *****

State of Wisconsin
Department of Natural Resources
dnr.wi.gov

Stationary Reciprocating Internal Combustion Engine (RICE) Air Pollution Control Permit Application

Form 4530-104A (12/21)

SEE INSTRUCTIONS ON REVERSE SIDE

Information attached? ◯ Y / ◯ N

1. Facility name:	2. Facility identification number:
Microsoft Corporation - MKE 3B Data Center	252302490
3. Stack identification number:	4. RICE number:
S40	

4a. Unit description:
P40 Emergency Generators

5. Indicate the RICE control technology status. ◉ Uncontrolled ◯ Controlled

If the RICE is controlled, enter the control device number(s) from the appropriate forms:

4530-110 _____ 4530-111 _____ 4530-112 _____ 4530-113 _____

4530-114 _____ 4530-115 _____ 4530-116 _____ 4530-117 _____

6. Manufacturer:	7. Model number:
Cummins	DFEK
8. Site rating (brake horsepower (HP)):	9. Electrical output rating (kW):
755	563 ekW
10. Heat input rating (mmBtu/hr):	11. Displacement (in liters/cylinder for CI engines or cc for SI engines):
4.75	2.5
12. Date engine was ordered:	13. Date of manufacture (from nameplate):
14. Date installed at site:	15. Engine tier (if known): Tier 2

16. If the stationary RICE was manufactured after July 1, 2007, is it a certified engine? ◉ Yes ◯ No ◯ Not Applicable

If stationary RICE is certified, attach a copy of the engine certification to the application.

Certification attached? ◉ Yes ◯ No ◯ Not Applicable

17. Stationary RICE type:

- ◉ Compression ignition
- ◯ Spark ignition:
  - ◯ 2-stroke lean burn
  - ◯ 4-stroke lean burn
  - ◯ 4-stroke rich burn
- ◯ Dual fuel

18. Fuel stationary RICE is capable of using (check all that apply):

- ☐ Natural gas
- ☒ Diesel
- ☐ Landfill gas
- ☐ Digester gas
- ☐ Gasoline
- ☐ Propane
- ☒ Other(s): Hydrotreated Vegetable Oil

19. Stationary RICE use:

- ☒ Emergency stationary RICE (used during power interruptions or to pump water in case of fire or flood, etc.)
- ☐ Black start stationary RICE (an engine whose only purpose is to start up a combustion turbine)
- ☐ Fire pump engine
- ☐ Non-emergency / non-black start stationary RICE
- ☐ Supply power to electric grid in emergency situations (emergency demand response)
- ☐ Limited use (a stationary RICE that operates less than 100 hours per year)
- ☐ Peaking unit (standby engine used during periods of high demand that are not emergencies)
- ☐ Other financial agreement(s)
- ☐ Other(s): _____

***** For this emissions unit, identify the method of compliance demonstration by completing Form 4530-118, ***** DESCRIPTION OF METHODS USED FOR DETERMINING COMPLIANCE. Attach Form 4530-118 and its attachment(s) to this form. This is not a requirement of non-Part 70 sources.

***** Complete the Air Pollution Control Permit Application Forms 4530-126 and 4530-128 for this Unit. *****

State of Wisconsin
Department of Natural Resources
dnr.wi.gov

Stationary Reciprocating Internal Combustion Engine (RICE) Air Pollution Control Permit Application

Form 4530-104A (12/21)

SEE INSTRUCTIONS ON REVERSE SIDE

Information attached? ◯ Y / ◯ N

1. Facility name:	2. Facility identification number:
Microsoft Corporation - MKE 3B Data Center	252302490
3. Stack identification number:	4. RICE number:
S41-S42	

4a. Unit description:
P41-P42 Emergency Fire Water Pump Engines

5. Indicate the RICE control technology status. ◉ Uncontrolled ◯ Controlled

If the RICE is controlled, enter the control device number(s) from the appropriate forms:

4530-110 _____ 4530-111 _____ 4530-112 _____ 4530-113 _____

4530-114 _____ 4530-115 _____ 4530-116 _____ 4530-117 _____

6. Manufacturer:	7. Model number:
TBD	TBD
8. Site rating (brake horsepower (HP)):	9. Electrical output rating (kW):
130	388 ekW
10. Heat input rating (mmBtu/hr):	11. Displacement (in liters/cylinder for CI engines or cc for SI engines):
0.84	Unknown
12. Date engine was ordered:	13. Date of manufacture (from nameplate):
14. Date installed at site:	15. Engine tier (if known):

16. If the stationary RICE was manufactured after July 1, 2007, is it a certified engine? ◯ Yes ◉ No ◯ Not Applicable

If stationary RICE is certified, attach a copy of the engine certification to the application.

Certification attached? ◯ Yes ◯ No ◯ Not Applicable

17. Stationary RICE type:

- ◉ Compression ignition
- ◯ Spark ignition:
  - ◯ 2-stroke lean burn
  - ◯ 4-stroke lean burn
  - ◯ 4-stroke rich burn
- ◯ Dual fuel

18. Fuel stationary RICE is capable of using (check all that apply):

- ☐ Natural gas
- ☒ Diesel
- ☐ Landfill gas
- ☐ Digester gas
- ☐ Gasoline
- ☐ Propane
- ☒ Other(s): Hydrotreated Vegetable Oil

19. Stationary RICE use:

- ☐ Emergency stationary RICE (used during power interruptions or to pump water in case of fire or flood, etc.)
- ☐ Black start stationary RICE (an engine whose only purpose is to start up a combustion turbine)
- ☒ Fire pump engine
- ☐ Non-emergency / non-black start stationary RICE
- ☐ Supply power to electric grid in emergency situations (emergency demand response)
- ☐ Limited use (a stationary RICE that operates less than 100 hours per year)
- ☐ Peaking unit (standby engine used during periods of high demand that are not emergencies)
- ☐ Other financial agreement(s)
- ☐ Other(s): _____

***** For this emissions unit, identify the method of compliance demonstration by completing Form 4530-118, ***** DESCRIPTION OF METHODS USED FOR DETERMINING COMPLIANCE. Attach Form 4530-118 and its attachment(s) to this form. This is not a requirement of non-Part 70 sources.

***** Complete the Air Pollution Control Permit Application Forms 4530-126 and 4530-128 for this Unit. *****

State of Wisconsin
Department of Natural Resources
dnr.wi.gov

Stationary Reciprocating Internal Combustion Engine (RICE) Air Pollution Control Permit Application

Form 4530-104A (12/21)

SEE INSTRUCTIONS ON REVERSE SIDE

Information attached? ◯ Y / ◯ N

1. Facility name:	2. Facility identification number:
Microsoft Corporation - MKE16/17 Data Center	New Facility
3. Stack identification number:	4. RICE number:
S43-S81	

4a. Unit description:
P43 - P81 Emergency Generators

5. Indicate the RICE control technology status. ◯ Uncontrolled ◉ Controlled

If the RICE is controlled, enter the control device number(s) from the appropriate forms:

4530-110 _____ 4530-111 _____ 4530-112 _____ 4530-113 C43-C81

4530-114 _____ 4530-115 _____ 4530-116 _____ 4530-117 _____

6. Manufacturer:	7. Model number:
Cummins	C3000 D6e
8. Site rating (brake horsepower (HP)):	9. Electrical output rating (kW):
4308	3000 ekW
10. Heat input rating (mmBtu/hr):	11. Displacement (in liters/cylinder for CI engines or cc for SI engines):
28.5	5.96
12. Date engine was ordered:	13. Date of manufacture (from nameplate):
14. Date installed at site:	15. Engine tier (if known): Tier 2

16. If the stationary RICE was manufactured after July 1, 2007, is it a certified engine? ◉ Yes ◯ No ◯ Not Applicable

If stationary RICE is certified, attach a copy of the engine certification to the application.

Certification attached? ◉ Yes ◯ No ◯ Not Applicable

17. Stationary RICE type:

- ◉ Compression ignition
- ◯ Spark ignition:
  - ◯ 2-stroke lean burn
  - ◯ 4-stroke lean burn
  - ◯ 4-stroke rich burn
- ◯ Dual fuel

18. Fuel stationary RICE is capable of using (check all that apply):

- ☐ Natural gas
- ☒ Diesel
- ☐ Landfill gas
- ☐ Digester gas
- ☐ Gasoline
- ☐ Propane
- ☒ Other(s): Hydrotreated Vegetable Oil

19. Stationary RICE use:

- ☒ Emergency stationary RICE (used during power interruptions or to pump water in case of fire or flood, etc.)
- ☐ Black start stationary RICE (an engine whose only purpose is to start up a combustion turbine)
- ☐ Fire pump engine
- ☐ Non-emergency / non-black start stationary RICE
- ☐ Supply power to electric grid in emergency situations (emergency demand response)
- ☐ Limited use (a stationary RICE that operates less than 100 hours per year)
- ☐ Peaking unit (standby engine used during periods of high demand that are not emergencies)
- ☐ Other financial agreement(s)
- ☐ Other(s): _____

***** For this emissions unit, identify the method of compliance demonstration by completing Form 4530-118, ***** DESCRIPTION OF METHODS USED FOR DETERMINING COMPLIANCE. Attach Form 4530-118 and its attachment(s) to this form. This is not a requirement of non-Part 70 sources.

***** Complete the Air Pollution Control Permit Application Forms 4530-126 and 4530-128 for this Unit. *****

State of Wisconsin
Department of Natural Resources
dnr.wi.gov

Stationary Reciprocating Internal Combustion Engine (RICE) Air Pollution Control Permit Application

Form 4530-104A (12/21)

SEE INSTRUCTIONS ON REVERSE SIDE

Information attached? ◯ Y / ◯ N

1. Facility name:	2. Facility identification number:
Microsoft Corporation - MKE16/17 Data Center	New Facility
3. Stack identification number:	4. RICE number:
S82	

4a. Unit description:
P82 Emergency Generators

5. Indicate the RICE control technology status. ◉ Uncontrolled ◯ Controlled

If the RICE is controlled, enter the control device number(s) from the appropriate forms:

4530-110 _____ 4530-111 _____ 4530-112 _____ 4530-113 _____

4530-114 _____ 4530-115 _____ 4530-116 _____ 4530-117 _____

6. Manufacturer:	7. Model number:
Cummins	1000DQFAD
8. Site rating (brake horsepower (HP)):	9. Electrical output rating (kW):
1482	1105.127ekW
10. Heat input rating (mmBtu/hr):	11. Displacement (in liters/cylinder for CI engines or cc for SI engines):
9.89	2.5
12. Date engine was ordered:	13. Date of manufacture (from nameplate):
14. Date installed at site:	15. Engine tier (if known): Tier 2

16. If the stationary RICE was manufactured after July 1, 2007, is it a certified engine? ◉ Yes ◯ No ◯ Not Applicable

If stationary RICE is certified, attach a copy of the engine certification to the application.

Certification attached? ◉ Yes ◯ No ◯ Not Applicable

17. Stationary RICE type:

- ◉ Compression ignition
- ◯ Spark ignition:
  - ◯ 2-stroke lean burn
  - ◯ 4-stroke lean burn
  - ◯ 4-stroke rich burn
- ◯ Dual fuel

18. Fuel stationary RICE is capable of using (check all that apply):

- ☐ Natural gas
- ☒ Diesel
- ☐ Landfill gas
- ☐ Digester gas
- ☐ Gasoline
- ☐ Propane
- ☒ Other(s): Hydrotreated Vegetable Oil

19. Stationary RICE use:

- ☒ Emergency stationary RICE (used during power interruptions or to pump water in case of fire or flood, etc.)
- ☐ Black start stationary RICE (an engine whose only purpose is to start up a combustion turbine)
- ☐ Fire pump engine
- ☐ Non-emergency / non-black start stationary RICE
- ☐ Supply power to electric grid in emergency situations (emergency demand response)
- ☐ Limited use (a stationary RICE that operates less than 100 hours per year)
- ☐ Peaking unit (standby engine used during periods of high demand that are not emergencies)
- ☐ Other financial agreement(s)
- ☐ Other(s): _____

***** For this emissions unit, identify the method of compliance demonstration by completing Form 4530-118, ***** DESCRIPTION OF METHODS USED FOR DETERMINING COMPLIANCE. Attach Form 4530-118 and its attachment(s) to this form. This is not a requirement of non-Part 70 sources.

***** Complete the Air Pollution Control Permit Application Forms 4530-126 and 4530-128 for this Unit. *****

State of Wisconsin
Department of Natural Resources
dnr.wi.gov

Stationary Reciprocating Internal Combustion Engine (RICE) Air Pollution Control Permit Application

Form 4530-104A (12/21)

SEE INSTRUCTIONS ON REVERSE SIDE

Information attached? ◯ Y / ◯ N

1. Facility name:	2. Facility identification number:
Microsoft Corporation - MKE16/17 Data Center	New Facility
3. Stack identification number:	4. RICE number:
S83-S84	

4a. Unit description:
P83-P84 Emergency Fire Water Pump Engines

5. Indicate the RICE control technology status. ◉ Uncontrolled ◯ Controlled

If the RICE is controlled, enter the control device number(s) from the appropriate forms:

4530-110 _____ 4530-111 _____ 4530-112 _____ 4530-113 _____

4530-114 _____ 4530-115 _____ 4530-116 _____ 4530-117 _____

6. Manufacturer:	7. Model number:
TBD	TBD
8. Site rating (brake horsepower (HP)):	9. Electrical output rating (kW):
130	388 ekW
10. Heat input rating (mmBtu/hr):	11. Displacement (in liters/cylinder for CI engines or cc for SI engines):
0.84	Unknown
12. Date engine was ordered:	13. Date of manufacture (from nameplate):
14. Date installed at site:	15. Engine tier (if known):

16. If the stationary RICE was manufactured after July 1, 2007, is it a certified engine? ◯ Yes ◉ No ◯ Not Applicable

If stationary RICE is certified, attach a copy of the engine certification to the application.

Certification attached? ◯ Yes ◯ No ◯ Not Applicable

17. Stationary RICE type:

- ◉ Compression ignition
- ◯ Spark ignition:
  - ◯ 2-stroke lean burn
  - ◯ 4-stroke lean burn
  - ◯ 4-stroke rich burn
- ◯ Dual fuel

18. Fuel stationary RICE is capable of using (check all that apply):

- ☐ Natural gas
- ☒ Diesel
- ☐ Landfill gas
- ☐ Digester gas
- ☐ Gasoline
- ☐ Propane
- ☒ Other(s): Hydrotreated Vegetable Oil

19. Stationary RICE use:

- ☐ Emergency stationary RICE (used during power interruptions or to pump water in case of fire or flood, etc.)
- ☐ Black start stationary RICE (an engine whose only purpose is to start up a combustion turbine)
- ☒ Fire pump engine
- ☐ Non-emergency / non-black start stationary RICE
- ☐ Supply power to electric grid in emergency situations (emergency demand response)
- ☐ Limited use (a stationary RICE that operates less than 100 hours per year)
- ☐ Peaking unit (standby engine used during periods of high demand that are not emergencies)
- ☐ Other financial agreement(s)
- ☐ Other(s): _____

***** For this emissions unit, identify the method of compliance demonstration by completing Form 4530-118, ***** DESCRIPTION OF METHODS USED FOR DETERMINING COMPLIANCE. Attach Form 4530-118 and its attachment(s) to this form. This is not a requirement of non-Part 70 sources.

***** Complete the Air Pollution Control Permit Application Forms 4530-126 and 4530-128 for this Unit. *****

State of Wisconsin
Department of Natural Resources

CONTROL EQUIPMENT-CATALYTIC OR THERMAL OXIDATION
AIR POLLUTION CONTROL PERMIT APPLICATION
Form 4530-113 11-93 Information attached? __ (y/n)

SEE INSTRUCTIONS ON REVERSE SIDE

Section A

1. Facility name: Microsoft Corporation - MKE3B Data Center
2. Facility identification number: 252302490
3. Stack identification number: S01-S39
4. Unit identification number: P01-P39
5. Control device number: C01-C39
6. Manufacturer and model number: Miratech (M3BZ-80-70-J-22120031-R4)
7. Date of installation: TBD
8. Describe in detail the oxidation system. Attach a blueprint or diagram of the system. Attached? YES

Selective Catalytic Reduction (SCR)

9. List the pollutants to be controlled by this equipment and the expected control efficiency for each pollutant on the table below.
☒ Documentation is attached

Pollutant	Inlet pollutant concentration		Outlet pollutant concentration		Efficiency (%)	
	gr/acf	ppmv	gr/acf	ppmv	hood capture	pollutant destruction
NOx		648		43	100%	93.4%

10: Check one: ☒ Catalytic ☐ Thermal oxidizer

11. Discuss how the spent catalyst will be handled for reuse or disposal.

Spent Catalyst will be disposed off-site in accordance with all applicable local, state and federal regulations

12. Prepare a malfunction prevention and abatement plan (if required under s. NR 439.11) for this pollution control system. Please include the following:
    a. Identification of the individuals(s), by title, responsible for inspecting, maintaining and repairing this device.
    b. Operation variables such as temperature that will be monitored in order to detect a malfunction or breakthrough, the correct operating range of these variables, and a detailed description of monitoring or surveillance procedures that will be used to show compliance.
    c. An inspection schedule and items or conditions that will be inspected. For catalytic oxidizers, discuss the replacement and/or regeneration schedule for the bed and steps you have taken to ensure the bed's proper functioning throughout its expected lifetime.
    d. A listing of materials and spare parts that will be maintained in inventory.
    e. Is this plan available for review? Yes, Included SCR Operation and Maintenance Plan

Section B

The following questions must be answered by sources installing new equipment or existing Units which cannot document control efficiency of this device by other means. (Catalytic/Thermal dependent on item 10)

Catalytic oxidation	Thermal oxidation
13a. Operating temperature (°F): Max 977 Min 572	b. Operating temperature (°F): Max ____ Min
14a. Catalyst bed volume (ft^3): 50	b. Combustion chamber volume (ft^3):
15a. Gas volumetric flow rate at combustion conditions (ACFM): 23220	b. Maximum gas velocity through the device (ft./min):
16a. Type of fuel used: HVO	b. Type of fuel used:
17a. Maximum fuel use: 208 gal/hr	b. Maximum fuel used:
18a. Type of catalyst used and volume of catalyst used (ft^3): Urea and 50 ft3	
19a. Residence time (seconds): 0.3	b. Residence time (seconds):

State of Wisconsin
Department of Natural Resources

CONTROL EQUIPMENT-CATALYTIC OR THERMAL OXIDATION
AIR POLLUTION CONTROL PERMIT APPLICATION
Form 4530-113 11-93 Information attached? __ (y/n)

SEE INSTRUCTIONS ON REVERSE SIDE

Section A

1. Facility name: Microsoft Corporation - MKE16/17 Data Center
2. Facility identification number: New Facility
3. Stack identification number: S43-S81
4. Unit identification number: P43-P81
5. Control device number: C43-C81
6. Manufacturer and model number: Miratech (M3BZ-80-70-J-22120031-R4)
7. Date of installation: TBD
8. Describe in detail the oxidation system. Attach a blueprint or diagram of the system. Attached? YES

Selective Catalytic Reduction (SCR)

9. List the pollutants to be controlled by this equipment and the expected control efficiency for each pollutant on the table below.
☒ Documentation is attached

Pollutant	Inlet pollutant concentration gr/acf	Inlet pollutant concentration ppmv	Outlet pollutant concentration gr/acf	Outlet pollutant concentration ppmv	Efficiency (%) hood capture	Efficiency (%) pollutant destruction
NOx		648		43	100%	93.4%

10: Check one: ☒ Catalytic ☐ Thermal oxidizer

11. Discuss how the spent catalyst will be handled for reuse or disposal.

Spent Catalyst will be disposed off-site in accordance with all applicable local, state and federal regulations

12. Prepare a malfunction prevention and abatement plan (if required under s. NR 439.11) for this pollution control system. Please include the following:
    a. Identification of the individuals(s), by title, responsible for inspecting, maintaining and repairing this device.
    b. Operation variables such as temperature that will be monitored in order to detect a malfunction or breakthrough, the correct operating range of these variables, and a detailed description of monitoring or surveillance procedures that will be used to show compliance.
    c. An inspection schedule and items or conditions that will be inspected. For catalytic oxidizers, discuss the replacement and/or regeneration schedule for the bed and steps you have taken to ensure the bed's proper functioning throughout its expected lifetime.
    d. A listing of materials and spare parts that will be maintained in inventory.
    e. Is this plan available for review? Yes, Included SCR Operation and Maintenance Plan

Section B

The following questions must be answered by sources installing new equipment or existing Units which cannot document control efficiency of this device by other means. (Catalytic/Thermal dependent on item 10)

Catalytic oxidation	Thermal oxidation
13a. Operating temperature (°F): Max 977 Min 572	b. Operating temperature (°F): Max ____ Min
14a. Catalyst bed volume (ft^3): 50	b. Combustion chamber volume (ft^3):
15a. Gas volumetric flow rate at combustion conditions (ACFM): 23220	b. Maximum gas velocity through the device (ft./min):
16a. Type of fuel used: HVO	b. Type of fuel used:
17a. Maximum fuel use: 208 gal/hr	b. Maximum fuel used:
18a. Type of catalyst used and volume of catalyst used (ft^3): Urea and 50 ft3	
19a. Residence time (seconds): 0.3	b. Residence time (seconds):

State of Wisconsin
Department of Natural Resources

CONTROL EQUIPMENT-CATALYTIC OR THERMAL OXIDATION
AIR POLLUTION CONTROL PERMIT APPLICATION
Form 4530-113 11-93 Information attached? __ (y/n)

SEE INSTRUCTIONS ON REVERSE SIDE

Section A

1. Facility name: Microsoft Corporation - MKE16/17 Data Center
2. Facility identification number: New Facility
3. Stack identification number: S82
4. Unit identification number: P82
5. Control device number: C82
6. Manufacturer and model number: Miratech (M3BZ-24-24-J-TBD)
7. Date of installation: TBD
8. Describe in detail the oxidation system. Attach a blueprint or diagram of the system. Attached? YES

Selective Catalytic Reduction (SCR)

9. List the pollutants to be controlled by this equipment and the expected control efficiency for each pollutant on the table below.
☒ Documentation is attached

Pollutant	Inlet pollutant concentration		Outlet pollutant concentration		Efficiency (%)	
	gr/acf	ppmv	gr/acf	ppmv	hood capture	pollutant destruction
NOx		1064		87	100%	91.9%

10: Check one: ☒ Catalytic ☐ Thermal oxidizer

11. Discuss how the spent catalyst will be handled for reuse or disposal.

Spent Catalyst will be disposed off-site in accordance with all applicable local, state and federal regulations

12. Prepare a malfunction prevention and abatement plan (if required under s. NR 439.11) for this pollution control system. Please include the following:
    a. Identification of the individuals(s), by title, responsible for inspecting, maintaining and repairing this device.
    b. Operation variables such as temperature that will be monitored in order to detect a malfunction or breakthrough, the correct operating range of these variables, and a detailed description of monitoring or surveillance procedures that will be used to show compliance.
    c. An inspection schedule and items or conditions that will be inspected. For catalytic oxidizers, discuss the replacement and/or regeneration schedule for the bed and steps you have taken to ensure the bed's proper functioning throughout its expected lifetime.
    d. A listing of materials and spare parts that will be maintained in inventory.
    e. Is this plan available for review? Yes, Included SCR Operation and Maintenance Plan

Section B

The following questions must be answered by sources installing new equipment or existing Units which cannot document control efficiency of this device by other means. (Catalytic/Thermal dependent on item 10)

Catalytic oxidation	Thermal oxidation
13a. Operating temperature (°F): Max 977 Min 572	b. Operating temperature (°F): Max ____ Min
14a. Catalyst bed volume (ft^3): 17	b. Combustion chamber volume (ft^3):
15a. Gas volumetric flow rate at combustion conditions (ACFM): 7337	b. Maximum gas velocity through the device (ft./min):
16a. Type of fuel used: HVO	b. Type of fuel used:
17a. Maximum fuel use: 72.2 gal/hr	b. Maximum fuel used:
18a. Type of catalyst used and volume of catalyst used (ft^3): Urea and 17 ft3	
19a. Residence time (seconds): 0.3	b. Residence time (seconds):

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Emission Unit Hazardous Air Pollutant Summary
Air Pollution Control Permit Application

Form 4530-126 (R 08/20)

Information attached? ◯ Y ◯ N

SEE INSTRUCTIONS ON REVERSE SIDE

1. Facility name:	2. Facility identification number:
Microsoft Corporation - MKE 16/17 Data Center	NEW FACILITY
3. Stack identification number:	4. Unit identification number:
S43-S84	P43-P84

5. Description of materials used:
Diesel Fuel, HVO

6. Provide a summary of the MTE and PTE for each hazardous air pollutant regulated by sec. 112 of the Clean Air Act and each hazardous air contaminant regulated by ch. NR 445, Wis. Adm. Code, emitted by the unit, by either (check one):

◯ Completing the table on this form

◉ Attaching an emission summary table (include Form 4530-126 and the unit identification number in the table heading)

◯ Check here if this emissions unit does not emit any hazardous air pollutants regulated by sec. 112 of the CAA or any hazardous air contaminants regulated by ch. NR 445, Wis. Adm. Code.

7. Attach sample calculations, emission factor references, information used to calculate emissions (e.g. SDSs).

☒ Attached (include Form 4530-126 and the unit identification number in the attachment heading)

Pollutant (CAS)	Maximum theoretical emissions (MTE)		Potential to emit (PTE)		
	lbs/hr	tpy	lbs/hr	lbs/yr	tpy

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Facility Hazardous Air Pollutant Summary
Air Pollution Control Permit Application

Form 4530-127 (R 08/20) Information attached? ◯ Y ◯ N

SEE INSTRUCTIONS ON REVERSE SIDE

1. Facility name:	2. Facility identification number:
Microsoft Corporation - MKE16/17 Data Center	NEW FACILITY

3. Provide a summary of the MTE and PTE for each hazardous air pollutant regulated by sec. 112 of the Clean Air Act and each hazardous air contaminant regulated by ch. NR 445, Wis. Adm. Code, emitted by the facility, by either:

- ◯ Completing the table on this form
- ◉ Attaching an emission summary table (include Form 4530-127 in the table heading)
- ◯ Check here if this facility does not emit any hazardous air pollutants regulated by sec. 112 of the CAA or any hazardous air contaminants regulated by ch. NR 445, Wis. Adm. Code.

4. Attach descriptions of restrictions that limit facility wide PTE and calculations showing how facility wide PTE is determined.

- ◉ Attached (include Form 4530-127 in the attachment heading)
- ◯ Not applicable

Pollutant (CAS)	Federal HAP (f), State Hap (s)	Maximum theoretical emissions (MTE)		Potential to emit (PTE)		
	(f,s)	lbs/hr	tpy	lbs/hr	lbs/yr	tpy
TOTAL of all HAPs regulated by s. 112 of the CAA ==> (identified with an "f" in the second column)						

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Criteria Pollutant Emission Unit Summary
Air Pollution Control Permit Application

Form 4530-128 (R 03/21) Information attached? ◯ Y ◯ N

SEE INSTRUCTIONS ON REVERSE SIDE

1. Facility name:	2. Facility identification number:
Microsoft Corporation - MKE16/17 Data Center	NEW FACILITY
3. Stack identification number:	4. Unit identification number:
S43-S84	P43-P84

5. Provide a summary of the MTE and PTE for each pollutant emitted by the unit, by either (check one):

◯ Completing the table on this form

◉ Attaching an emission summary table (include Form 4530-128 and the unit identification number in the table heading)

◯ Check here if this emissions unit does not emit any regulated criteria air pollutants. (Emissions of hazardous air pollutants regulated by sec. 112 of the CAA and hazardous air contaminants regulated by ch. NR 445, Wis. Adm. Code should be reported on forms 4530-126 and 4530-127.)

6. Attach sample calculations and emission factor references.

☑ Attached (include "Form 4530-128" and the unit identification number in the attachment heading)

Air pollutant	Maximum theoretical emissions (MTE)		Potential to emit (PTE)	
	lbs/hr	tpy	lbs/hr	tpy
Particulate matter emissions				
PM_{10}				
$PM_{2.5}$				
Sulfur dioxide (SO_2)				
Nitrogen oxides (NO_x)				
Carbon monoxide (CO)				
Volatile organic compounds (VOC)				
Lead (Pb)				
Greenhouse gases (as CO_2 equivalents)				

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Facility Criteria Pollutant Emission Summary
Air Pollution Control Permit Application

Form 4530-129 (R 08/20) Information attached? ◯ Y ◯ N

SEE INSTRUCTIONS ON REVERSE SIDE

1. Facility name:	2. Facility identification number:
Microsoft Corporation - MKE16/17 Data Center	NEW FACILITY

3. Provide a summary of the MTE and PTE for each pollutant emitted by the facility, by either (check one):

- ◯ Completing the table on this form
- ◉ Attaching an emission summary table (include Form 4530-129 in the table heading)
- ◯ Check here if this facility does not emit any regulated criteria air pollutants. (Emissions of hazardous air pollutants regulated by sec. 112 of the CAA and hazardous air contaminants regulated by ch. NR 445, Wis. Adm. Code should be reported on forms 4530-126 and 4530-127.)

4. Attach descriptions of restrictions that limit facility wide PTE and calculations showing how facility wide PTE is determined.

- ◉ Attached (include Form 4530-129 in the attachment heading)
- ◯ Not applicable

Air pollutant	Maximum theoretical emissions (MTE)	Potential to emit (PTE)
	tpy	tpy
Particulate matter emissions		
PM_{10}		
$PM_{2.5}$		
Sulfur dioxide (SO_2)		
Nitrogen oxides (NO_x)		
Carbon monoxide (CO)		
Volatile organic compounds (VOC)		
Lead (Pb)		
Greenhouse gases (as CO_2 equivalents)		

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Current Emissions Requirements And Status of Unit
Air Pollution Control Permit Application

Form 4530-130 (R 08/20) Information attached? ◯ Y ◯ N

SEE INSTRUCTIONS ON REVERSE SIDE

1. Facility name:	2. Facility identification number:
Microsoft Corporation - MKE16/17 Data Center	NEW FACILITY
3. Stack identification number:	4. Unit identification number:
S43-S84	P43-P84

5. Identify all applicable requirements and identify the compliance status of the source with each requirement, by either:

◉ Completing the table on this form; OR

◯ Attaching supplemental information showing each applicable requirement and identifying the source's compliance status which each requirement (include "Form 4530-130" and the unit identification number in the heading of any supplemental information)

6. Pollutant	7. Citation of Applicable Requirements (e.g. Wis. Adm. Code, Wis. Stats., 40 CFR)	8. State Only	9. Limitation/Requirement	10. Compliance Status (in or out)
PM, PM10, PM2.5	NR 415.05		0.40 pounds of particulate matter per 1,000 pounds of gas	
Opacity	NR 431.05		20 % Opacity	
Sulfur Dioxide	NR 417.03		General Limitation	
VOC	NR 419.0		General Limitation	
Carbon Monoxide	NR 426.03		General Limitation	
Nitrogen Oxides	NR 428.03		General Limitation	
Nitrogen Oxides	NR 428.21 (2m)(b)		Certified Engine	
WI HAP	NR 445.07		Table A thresholds	
NOx, NMHC, CO, PM	40 CFR part 60, subpart IIII		Certified Engine	

11. Other requirements (e.g., work practice standards, malfunction reporting, special operating conditions from an existing permit, etc.)	State Only	Compliance Status (in or out)

REMINDERS:

1. **Part 70 sources** using add-on control devices to comply with an emission limitation or standard may have **Compliance Assurance Monitoring (CAM) requirements** under 40 CFR Part 64. These sources must submit a CAM plan with the Title V renewal

application. Refer to the CAM Technical Guidance for information on the rule and how to prepare a CAM plan for submittal with the Title V renewal application.

2. Some applicable requirements (such as **National Emission Standards for Hazardous Air Pollutants (NESHAP) and New Source Performance Standards (NSPS)**) may have been updated since the facility's current permit was issued. Identify the updated applicable requirements as they apply to the facility. Refer to the federal standards.

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Emission Unit Compliance Plan And Schedule
Air Pollution Control Permit Application

Form 4530-131 (R 08/20) Information attached? ◯ Y ◯ N

SEE INSTRUCTIONS ON REVERSE SIDE

1. Facility name:	**2.** Facility identification number:
Microsoft Corporation - MKE 16/17 Data Center	NEW FACILITY
3. Stack identification number:	**4.** Unit identification number:
S43-S84	P43-P84

5. For units presently in compliance with all applicable requirements, complete the following:

☐ We will continue to operate and maintain this unit in compliance with all applicable requirements.

☐ Form 4530-130 includes new requirements that apply or will apply to this unit during the term of the permit. We will meet such requirements on a timely basis.

6. For units not presently fully in compliance with all applicable requirements, complete the following.

☐ This unit is in compliance with all applicable requirements except for those indicated below. We will achieve compliance according to the following schedule:

Applicable Requirement	Corrective Actions	Deadline
1.		
2.		
3.		
4.		

Progress reports will be submitted:

Start date: _____ and every six (6) months thereafter

Appendix B

EMISSION CALCULATIONS

Microsoft Corporation
MKE3B and MKE16-17 Data Center
Load Comparison

Emission Factors: Cummins C3000 D6e (3,000 ekW)												
Engine operation	***Full Standby***			***3/4 Standby***			***1/2 Standby***			***1/4 Standby***		
Power *(bhp)*	4,308			3,225			2,185			1,145		
Fuel consumption *(gal/hr)*	208.0			159.0			117.0			67.0		
Operating Hours (PTE) per engine *(hr/year)*	438			438			438			438		
Estimated Startup Time *(hr/year)*	8.3			8.3			8.3			8.3		
Number of Engines	78.0			78.0			78.0			78.0		
Pollutant	***(g/bhp-hr)***	***(lb/hr)***	***(lb/gal)***	***(g/bhp-hr)***	***(lb/hr)***	***(lb/gal)***	***(g/bhp-hr)***	***(lb/hr)***	***(lb/gal)***	***(g/bhp-hr)***	***(lb/hr)***	***(lb/gal)***
VOC	0.07	0.66	3.20E-03	0.10	0.71	4.47E-03	0.18	0.87	7.41E-03	0.30	0.76	1.13E-02
CO	0.20	1.90	9.13E-03	0.10	0.71	4.47E-03	0.20	0.96	8.23E-03	0.50	1.26	1.88E-02
PM	4.00E-03	0.04	1.83E-04	0.06	0.43	2.68E-03	0.10	0.48	4.12E-03	0.21	0.53	7.91E-03
PM10	4.00E-03	0.04	1.83E-04	0.06	0.43	2.68E-03	0.10	0.48	4.12E-03	0.21	0.53	7.91E-03
SO2	5.50E-03	0.05	2.51E-04	5.50E-03	3.91E-02	2.46E-04	5.50E-03	2.65E-02	2.27E-04	5.50E-03	1.39E-02	2.07E-04

The 3MW engines will include SCR after treatment to meet Tier 4 emission standards for NOx. The engines will be set to reach NOx emissions compliance with Tier 4 standards within 10 minutes from the time of emergency start. For calculation purposes, assumed the engine will have pre-treatment emissions for 10 mins (50 startups/yr for maintenance)

Operation Mode	Uncontrolled *(g/bhp-hr)*	Uncontrolled *(lb/hr)*	Controlled *(g/bhp-hr)*	Controlled *(lb/hr)*	*Total (lbs/hr) per engine*	*Total (tons/yr) per engine*	*Total (tons/yr) for all engines*
Full Standby	5.2	49.39	0.5	4.75	54.1	1.2260	95.62
3/4 Standby	4.2	29.9	0.5	3.6	33.4	0.8881	69.3
1/2 Standby	3.3	15.9	0.5	2.4	18.3	0.5837	45.5
1/4 Standby	3.4	8.6	0.5	1.3	9.8	0.3069	23.9

Emission Factors: Cummins 500 DFEK (500 ekW)												
Engine operation	***Full Standby***			***3/4 Standby***			***1/2 Standby***			***1/4 Standby***		
Power *(bhp)*	755			555			379			202		
Fuel consumption *(gal/hr)*	34.7			25.8			18.7			11.3		
Operating Hours (PTE) per engine *(hr/year)*	438.0			438.0			438.0			438.0		
Number of Engines	1.0			1.0			1.0			1.0		
Pollutant	***(g/bhp-hr)***	***(lb/hr)***	***(lb/gal)***	***(g/bhp-hr)***	***(lb/hr)***	***(lb/gal)***	***(g/bhp-hr)***	***(lb/hr)***	***(lb/gal)***	***(g/bhp-hr)***	***(lb/hr)***	***(lb/gal)***
VOC	0.14	0.23	6.72E-03	0.07	0.09	3.32E-03	0.09	0.08	4.02E-03	0.24	0.11	9.46E-03
NO_x	4.43	7.37	2.12E-01	4.64	5.68	2.20E-01	3.65	3.05	1.63E-01	3.24	1.44	1.28E-01
CO	0.39	0.65	1.87E-02	0.40	0.49	1.90E-02	0.34	0.28	1.52E-02	0.57	0.25	2.25E-02
PM	2.00E-02	0.03	9.59E-04	0.05	0.06	2.37E-03	0.05	0.04	2.23E-03	0.09	0.04	3.55E-03
PM10	2.00E-02	0.03	9.59E-04	0.05	0.06	2.37E-03	0.05	0.04	2.23E-03	0.09	0.04	3.55E-03
SO2	5.50E-03	0.01	2.64E-04	5.50E-03	0.01	2.61E-04	5.50E-03	0.00	2.46E-04	5.50E-03	0.00	2.17E-04

Emission Factors: Cummins 1000DQFAD (1000 ekW)												
Engine operation	***Full Standby***			***3/4 Standby***			***1/2 Standby***			***1/4 Standby***		
Power *(bhp)*	1,482			1,112			741			371		
Fuel consumption *(gal/hr)*	72.2			54.1			35.8			19.1		
Operating Hours (PTE) per engine *(hr/year)*	438.0			438.0			438.0			438.0		
Number of Engines	1.0			1.0			1.0			1.0		
Pollutant	***(g/bhp-hr)***	***(lb/hr)***	***(lb/gal)***	***(g/bhp-hr)***	***(lb/hr)***	***(lb/gal)***	***(g/bhp-hr)***	***(lb/hr)***	***(lb/gal)***	***(g/bhp-hr)***	***(lb/hr)***	***(lb/gal)***
VOC	0.07	0.12	3.36E-03	0.08	0.10	3.79E-03	0.10	0.08	4.47E-03	0.12	0.05	4.73E-03
CO	0.66	1.10	3.17E-02	0.48	0.59	2.28E-02	0.36	0.30	1.61E-02	0.66	0.29	2.60E-02
PM	1.10E-01	0.18	5.28E-03	0.12	0.15	5.69E-03	0.15	0.13	6.70E-03	0.19	0.08	7.49E-03
PM10	1.10E-01	0.18	5.28E-03	0.12	0.15	5.69E-03	0.15	0.13	6.70E-03	0.19	0.08	7.49E-03
SO2	5.50E-03	0.01	2.64E-04	5.50E-03	0.01	2.61E-04	5.50E-03	0.00	2.46E-04	5.50E-03	0.00	2.17E-04

The 1MW engines will include SCR after treatment to meet Tier 4 emission standards for NOx. The engines will be set to reach NOx emissions compliance with Tier 4 standards within 10 minutes from the time of emergency start. For calculation purposes, assumed the engine will have pre-treatment emissions for 10 mins (50 startups/yr for maintenance)

Operation Mode	Uncontrolled *(g/bhp-hr)*	Uncontrolled *(lb/hr)*	Controlled *(g/bhp-hr)*	Controlled *(lb/hr)*	*Total (lbs/hr) per engine*	*Total (tons/yr) per engine*	*Total (tons/yr) for all engines*
Full Standby	4.0	12.91	0.5	1.63	14.5	0.4047	0.40
3/4 Standby	3.9	9.5	0.5	1.2	10.7	0.3029	0.3
1/2 Standby	5.2	8.5	0.5	0.8	9.3	0.2109	0.2
1/4 Standby	4.2	3.4	0.5	0.4	3.8	0.1021	0.1

Emissions:	**Cummins C3000 D6e (3,000 ekW)**			
Pollutant	***Maximum Emission Factor***	***Requested Combined Annual Fuel Throughput***	***Maximum Emissions***	
	(lb/gal)	***(gal/yr)***	***(lbs/hr)***	***(tons/yr)***
CO	0.01884	7,106,112	1.90	66.93
PM	0.00791		0.53	28.11
PM10	0.00791		0.53	28.11
SO2	0.00025		0.05	0.89
VOC	0.01130		0.87	40.16
NOx			54.14	95.62

Emissions:	**Cummins 500 DFEK (500 ekW)**			
Pollutant	***Maximum Emission Factor***	***Requested Combined Annual Fuel Throughput***	***Maximum Emissions***	
	(lb/gal)	***(gal/yr)***	***(lbs/hr)***	***(tons/yr)***
CO	0.02246	15,199	0.65	0.17
PM	0.00355		0.06	0.03
PM10	0.00355		0.06	0.03
SO2	0.00026		0.01	0.00
VOC	0.00946		0.23	0.07
NOx	0.22005		7.37	1.67

Emissions:	**Cummins 1000DQFAD (1000 ekW)**			
Pollutant	***Maximum Emission Factor***	***Requested Combined Annual Fuel Throughput***	***Maximum Emissions***	
	(lb/gal)	***(gal/yr)***	***(lbs/hr)***	***(tons/yr)***
CO	0.03166	31,624	0.28	0.24
PM	0.00749		0.04	0.06
PM10	0.00749		0.04	0.06
SO2	0.00026		0.00	0.00
VOC	0.00473		0.11	0.04
NOx			12.91	0.40

1. Power (bhp) and fuel consumption (gal/hr) for 3/4 standby, 1/2 standby and 1/4 standby was obtained from Exhaust Emission Data Sheet (C3000 D6e and 500DFEK)
2. Emission factors for VOC, NOx, CO, PM, PM10 for different loads was obtained from Exhaust Emission Data Sheet (C3000 D6e and 500DFEK)
3. SOx emission factor is 0.809 * S (where S is the % sulfur in fuel oil). Emission calculations include sulfur content of 15 PPM or 0.0015 wt %

Total Emissions (Using Worst Case Emission Factors)	
	Project PTE
Criteria Pollutants	TPY
CO	67.3
NO_x	97.7
PM_{10}	28.2
$PM_{2.5}$	28.2
SO_2	0.9
VOC	40.3

4. PTE for the pollutants in the table above are not greater than the major source threshold

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Form 4530-127 and 4530-129

	Form 4530-129			
	Project MTE		Project Limited PTE	
Criteria Pollutants	lb/hr	TPY	lb/hr	TPY
CO	154.1	38.5	154.1	33.3
NO_x	3,875.9	969.0	965.0	98.0
PM_{10}	30.3	7.6	30.3	6.6
$PM_{2.5}$	30.3	7.6	30.3	6.6
SO_2	4.1	1.0	4.1	0.9
VOC	53.5	13.4	53.5	11.7
Methane	370.5	92.6	370.5	80.8
CO_2	365,347.2	91,336.8	365,347.2	79,657.8
N_2O	883.2	220.8	883.2	192.6
CO_{2e}	366,600.9	91,650.2	366,600.9	79,931.2
SHAP - Benzene	1.7	0.435	1.7	0.4
THAP	3.6	0.905	3.6	0.8

	Form 4530 -127								
	Project MTE			Project PTE			NR 445 Compliant?	NR 445 Table A	
Pollutant	lbs/hr	tpy	lb/yr	lbs/hr	tpy	lb/yr	(Yes/No)	lb/hr	lb/yr
Benzene	1.739	0.437	873.483	0.037	0.008	6.457	Yes	N/A	936
Toluene	0.630	0.158	316.419	0.013	0.003	2.442	Yes	39.3	292,000
Xylenes	0.433	0.109	217.334	0.009	0.002	1.683	Yes	90.6	
Formaldehyde	0.180	0.045	90.625	0.007	0.002	2.245	Yes		562
Acetaldehyde	0.059	0.015	29.597	0.004	0.001	1.288	Yes	10.7	3,318
Acrolein	0.018	0.005	9.009	0.001	0.000	0.187	Yes	0.0545	
1,3 Butadiene	0.088	0.022	43.999	0.002	0.000	0.314			
Naphthalene	0.291	0.073	146.211	0.006	0.001	0.977	Yes	10.9	
POM/PAH (w/Naphthalene)	0.474	0.119	237.962	0.001	0.000	0.246			
SHAP - Benzene	1.739	0.437	873.483	0.037	0.008	6.457			
THAP	3.438	0.863	1,726.676	0.079	0.017	15.593			

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Form 4530-128, Units P01-P39, P43-P81

Diesel-Fired Emergency Generator Emissions - Aggregated
3-MW Emergency Diesel Generator

Project Design

MKE3B (Permitted)	**39**	(24 at MKE04 + 15 at MKE03)
MKE16	**15**	15 at MKE16
MKE17	**24**	24 at MKE17
	78 engines	Total number of engines for MKE3B and MKE 16-17
	3,212.5 kW per engine	
	250,575 kW design capacity for project	
	250.575 MW design capacity for project	

Maximum Power	4,308	bhp per engine	28.50 MMBtu/hr
Maximum Fuel Input	0.208	1000 gal/hr per engine	Cummins Gen Set 3000 kW
Operating Hours (MTE)[7]	500	hours/year	
Estimated Startup Time [6]	8.3333	hours/year	10 minutes for startup to achieve after treatment emission standard (50 startups/year)

Requested Permit Fuel Usage Limit:	**7,106,112**	**gallon/yr**	**592,176 gallons per month on a 12-month rolling average basis**
Operating Hours (PTE) per engine	438	hours/year	

Criteria Pollutant Operating Emissions for Engine

	Form 4530-128							Form 4530-128										
	Maximum Theoretical Emissions (MTE)							Controlled Limited Operation Emissions without startup emissions							Hourly Emissions for All Engines			Startup Emissions[6]	
	Pre Treatment			Potential to Emit Single Engine		Potential to Emit All Engines		After Treatment (SCR)			Potential to Emit Single Engine		Potential to Emit All Engines		50 minutes lb/hr Controlled Emissions for all engines	10 minutes lb/hr Uncontrolled Emissions for all engines		Potential to Emit All Engines	Total PTE
Pollutant	Emission Factor	unit	Reference	lbs/hour	tons/year	lbs/hour	tons/year	Emission Factor	unit	Reference	lbs/hour	tons/year	lbs/hour	tons/year			Total lb/hr for all engines	tons/year	tons/year
CO	0.20	g/hp-hr	1	1.90	0.47	148.16	37.04	0.20	g/hp-hr	1	1.90	0.41	148.16	31.83	123.47	24.69	148.16	0.62	32.45
NO_x	5.20	g/hp-hr	1	49.39	12.35	3852.15	963.04	0.50	g/hp-hr	3	4.75	1.02	370.40	79.57	308.67	642.03	950.69	16.05	95.62
PM_{10}	0.04	g/hp-hr	1	0.38	0.09	29.63	7.41	0.04	g/hp-hr	1	0.38	0.08	29.63	6.37	24.69	4.94	29.63	0.12	6.49
$PM_{2.5}$	0.04	g/hp-hr	1	0.38	0.09	29.63	7.41	0.04	g/hp-hr	1	0.38	0.08	29.63	6.37	24.69	4.94	29.63	0.12	6.49
SO_2	0.006	g/hp-hr	4	0.05	0.01	4.08	1.02	0.005	g/hp-hr	4	0.05	0.01	4.02	0.86	3.35	0.68	4.03	0.02	0.88
VOC	0.07	g/hp-hr	1	0.66	0.17	51.86	12.96	0.07	g/hp-hr	1	0.66	0.14	51.86	11.14	43.21	8.64	51.86	0.22	11.36
GHGs:																			
CH_4	0.165	lb/MMBtu	2	4.71	1.18	367.51	91.88	0.165	lb/MMBtu	2	4.71	1.01	367.51	78.95	306.26	61.25	367.51	1.53	80.48
CO_2	163.05	lb/MMBtu	2	4,646.34	1,161.58	362,414.20	90,603.55	163.05	lb/MMBtu	2	4,646.34	998.19	362,414.20	77,858.65	302,011.84	60,402.37	362,414.20	1,510.06	79,368.71
N_2O	0.39	lb/MMBtu	2	11.23	2.81	876.14	219.04	0.39	lb/MMBtu	2	11.23	2.41	876.14	188.23	730.12	146.02	876.14	3.65	191.88
CO_{2e}				4,662	1,166	363,658	90,914				4,662	1,002	363,658	78,126	303,048.22	60,609.64	363,657.86	1,515.24	79,641.07

Notes:
1) Cummins Exhaust Emission Data, EPA Tier 2 (Full Standby) for C3000 D6e
2) GHG EF from 40 CFR Part 98, Subpart C. CO_2e EF calculated based on Global Warming Potential (GWP) as follows:

GHG Pollutant	GWP	Mass EF	Mass EF	CO_2e EF
CO_2	1	73.96 kg/MMBtu	163.05 lb/MMBtu	163.05 lb/MMBtu
CH_4	25	3.00E-03 kg/MMBtu	6.61E-03 lb/MMBtu	1.65E-01 lb/MMBtu
N2O	298	6.00E-04 kg/MMBtu	1.32E-03 lb/MMBtu	3.94E-01 lb/MMBtu
CO_2e	---	---	---	163.61 lb/MMBtu

Conversion factors: 2000 lb/ton 2.2046 lb/kg

3) Tier 4 emission standards - Engines above 560 kW, 40 CFR Part 1039 (post SCR treatment expected exhaust emissions)
4) SO_2 emission factor is 0.00809 * S (where S is the % sulfur in fuel oil). Emission calculations include sulfur content of 15 PPM or 0.0015 wt %
5) Engines will only be used in emergency situations
6) The engine will be set to reach NOx emissions compliance with Tier 4 standards within 10 minutes from the time of emergency start. For calculation purposes, assumed the engine will have pre-treatment emissions for 10 mins (50 startups/yr for maintenance)
7) The emergency engine is subject to the EPA September 6, 1995, “Calculating Potential to Emit (PTE) for Emergency Generators" memorandum from John Seitz to the Directors of EPA Regions I-X. Therefore, maximum theoretical emissions are based on 500 hours per year.

Microsoft Corporation
MKE3B and MKE16-17 Data Center
Form 4530-126, Units P01-P39, P43-P81
3-MW Emergency Diesel Generator

Project Design

78	engines	
3,212.5	kW per engine	
250,575	kW design capacity for project	

Maximum Power	4,308	bhp ea.	28.50 MMBtu/hr ea.
Maximum Heat Input	0.208	1000 gal/hr	Cummins Gen Set 3000 kW
Operating Hours (MTE)[3]	500	hours/year	

Requested Permit Fuel Usage Limit:	**7,106,112**	**gallons/yr**	**592,176**	**gallons per month on a 12-month rolling average basis**
Operating Hours (PTE) per engine	438	Back Calculated from Fuel Usage		

Hazardous Air Pollutant Operating Emissions

				Form 4530-126 Maximum Theoretical Emissions (MTE)					Form 4530-126 Limited Operation Emissions (PTE)							
				MTE Single Engine		MTE All Engines			PTE Single Engine		PTE All Engines			NR 445 Compliant?	NR 445 Table A Thresholds	
Pollutant	Emission Factor		Reference	lbs/hour	tons/year	lbs/hour	tons/year	lb/yr	lbs/hour	tons/year	lbs/hour	tons/year	lb/yr	(Yes/No)	lb/hr	lb/yr
Benzene	7.76E-04	lb/MMBtu	1	0.022	0.006	1.725	0.431	862.403	0.022	0.005	1.725	0.378	755.465	Yes	N/A	936
Toluene	2.81E-04	lb/MMBtu	1	0.008	0.002	0.625	0.156	312.288	0.008	0.002	0.625	0.137	273.564	Yes	39.3	292,000
Xylenes	1.93E-04	lb/MMBtu	1	0.005	0.001	0.429	0.107	214.489	0.005	0.001	0.429	0.094	187.893	Yes	90.6	
Formaldehyde	7.89E-05	lb/MMBtu	1	0.002	0.001	0.175	0.044	87.685	0.002	0.000	0.175	0.038	76.812	Yes		562
Acetaldehyde	2.52E-05	lb/MMBtu	1	0.001	0.0002	0.056	0.014	28.006	0.001	0.0002	0.056	0.012	24.533	Yes	10.7	3,318
Acrolein	7.88E-06	lb/MMBtu	1	0.0002	0.0001	0.018	0.004	8.757	0.0002	0.0000	0.018	0.004	7.671	Yes	0.0545	
1,3-Butadiene	3.91E-05	lb/MMBtu	1	0.0011	0.0003	0.087	0.022	43.454	0.0011	0.0002	0.087	0.019	38.065	Yes	N/A	6.35
Naphthalene	1.30E-04	lb/MMBtu	1	0.004	0.001	0.289	0.072	144.475	0.004	0.001	0.289	0.063	126.560	Yes	10.9	
POM/PAH (w/Naphthalene)	2.12E-04	lb/MMBtu	1	0.006	0.002	0.470	0.118	235.086	0.006	0.001	0.470	0.103	205.935			
Total Federal HAPs				0.05	0.01	3.58	0.90	1,792.17	0.05	0.01	3.58	0.78	1,569.94			
Maximum Single Federal HAP (Benzene)				0.02	0.01	1.72	0.43	862.40	0.02	0.00	1.72	0.38	755.46			

Notes:
1) Emission Factors from US EPA AP-42 Table 3.4-3 & 3.4-4 (Oct 1996). The fuel intended to be used in the engines will be hydrotreated vegetable oil (HVO). A statement from the vendor states that emissions from engines running on HVO fuel should be comparable, if not lower, to that of the same engine model running on a pertroleum diesel. Diesel HAP AP-42 emission factors were used since HAP emission factors for HVO is unavailable.
2) Engines will only be used in emergency situations
3) The emergency engine is subject to the EPA September 6, 1995, “Calculating Potential to Emit (PTE) for Emergency Generators" memorandum from John Seitz to the Directors of EPA Regions I-X. Therefore, maximum potential emissions are based on 500 hours per year.

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		

Performance Data	1/4 Standby	1/2 Standby	3/4 Standby	Full Standby	Full Prime	Full Continuous
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)
Exhaust Emission Data						
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)

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Form 4530-128, Units P82

Diesel-Fired Emergency Generator Emissions - Aggregated
1-MW Emergency Diesel Generator

Project Design

1		(1 MKE17)
1	engines	Total number of engines for MKE3B and MKE 16-17
1105.1	kW per engine	
1,105	kW design capacity for project	
1.105127	MW design capacity for project	

Maximum Power	1,482	bhp per engine	9.89 MMBtu/hr
Maximum Fuel Input	0.072	1000 gal/hr per engine	Cummins 1000DQFAD
Operating Hours (MTE)[7]	500	hours/year	
Estimated Startup Time [6]	8.3333	hours/year	10 minutes for startup to achieve after treatment emission standard (50 startups/year)

Requested Permit Fuel Usage Limit:	**31,624**	**gallon/yr**	**2,635 gallons per month on a 12-month rolling average basis**
Operating Hours (PTE) per engine	438	hours/year	

Criteria Pollutant Operating Emissions for Engine

	Form 4530-128							Form 4530-128										
	Maximum Theoretical Emissions (MTE)							Controlled Limited Operation Emissions without startup emissions							Hourly Emissions for All Engines			Startup Emissions[6]	
	Pre Treatment			Potential to Emit Single Engine		Potential to Emit All Engines		After Treatment (SCR)			Potential to Emit Single Engine		Potential to Emit All Engines		50 minutes lb/hr Controlled Emissions for all engines	10 minutes lb/hr Uncontrolled Emissions for all engines		Potential to Emit All Engines	Total PTE
Pollutant	Emission Factor	unit	Reference	lbs/hour	tons/year	lbs/hour	tons/year	Emission Factor	unit	Reference	lbs/hour	tons/year	lbs/hour	tons/year			Total lb/hr for all engines	tons/year	tons/year
CO	0.66	g/hp-hr	1	2.16	0.54	2.16	0.54	0.66	g/hp-hr	1	2.16	0.46	2.16	0.46	1.80	0.36	2.16	0.01	0.47
NO_x	3.95	g/hp-hr	1	12.91	3.23	12.91	3.23	0.50	g/hp-hr	3	1.63	0.35	1.63	0.35	1.36	2.15	3.51	0.05	0.40
PM_{10}	0.11	g/hp-hr	1	0.36	0.09	0.36	0.09	0.11	g/hp-hr	1	0.36	0.08	0.36	0.08	0.30	0.06	0.36	0.00	0.08
$PM_{2.5}$	0.11	g/hp-hr	1	0.36	0.09	0.36	0.09	0.11	g/hp-hr	1	0.36	0.08	0.36	0.08	0.30	0.06	0.36	0.00	0.08
SO_2	0.006	g/hp-hr	4	0.02	0.00	0.02	0.00	0.006	g/hp-hr	4	0.02	0.00	0.02	0.00	0.01	0.00	0.02	0.00	0.00
VOC	0.07	g/hp-hr	1	0.23	0.06	0.23	0.06	0.07	g/hp-hr	1	0.23	0.05	0.23	0.05	0.19	0.04	0.23	0.00	0.05
GHGs:																			
CH_4	0.165	lb/MMBtu	2	1.64	0.41	1.64	0.41	0.165	lb/MMBtu	2	1.64	0.35	1.64	0.35	1.36	0.27	1.64	0.01	0.36
CO_2	163.05	lb/MMBtu	2	1,612.81	403.20	1,612.81	403.20	163.05	lb/MMBtu	2	1,612.81	346.49	1,612.81	346.49	1,344.01	268.80	1,612.81	6.72	353.21
N_2O	0.39	lb/MMBtu	2	3.90	0.97	3.90	0.97	0.39	lb/MMBtu	2	3.90	0.84	3.90	0.84	3.25	0.65	3.90	0.02	0.85
CO_{2e}				1,618	405	1,618	405				1,618	348	1,618	348	1,348.62	269.72	1,618.35	6.74	354.42

Notes:
1) Cummins Exhaust Emission Data, EPA Tier 2. (Full Standby) for 1000DQFAD
2) GHG EF from 40 CFR Part 98, Subpart C. CO_2e EF calculated based on Global Warming Potential (GWP) as follows:

GHG Pollutant	GWP	Mass EF	Mass EF	CO_2e EF
CO_2	1	73.96 kg/MMBtu	163.05 lb/MMBtu	163.05 lb/MMBtu
CH_4	25	3.00E-03 kg/MMBtu	6.61E-03 lb/MMBtu	1.65E-01 lb/MMBtu
N2O	298	6.00E-04 kg/MMBtu	1.32E-03 lb/MMBtu	3.94E-01 lb/MMBtu
CO_2e	---	---	---	163.61 lb/MMBtu

Conversion factors: 2000 lb/ton 2.2046 lb/kg

3) Tier 4 emission standards - Engines above 560 kW, 40 CFR Part 1039 (post SCR treatment expected exhaust emissions)
4) SO_2 emission factor is 0.00809 * S (where S is the % sulfur in fuel oil). Emission calculations include sulfur content of 15 PPM or 0.0015 wt %
5) Engines will only be used in emergency situations
6) The engine will be set to reach NOx emissions compliance with Tier 4 standards within 10 minutes from the time of emergency start. For calculation purposes, assumed the engine will have pre-treatment emissions for 10 mins (50 startups/yr for maintenance)
7) The emergency engine is subject to the EPA September 6, 1995, "Calculating Potential to Emit (PTE) for Emergency Generators" memorandum from John Seitz to the Directors of EPA Regions I-X. Therefore, maximum theoretical emissions are based on 500 hours per year.

Microsoft Corporation
MKE3B and MKE16-17 Data Center
Form 4530-126, Units P82

1-MW Emergency Diesel Generator

Project Design	1	engine
	1105.127	kW per engine
	1,105	kW design capacity for project

Maximum Power	1,482	bhp ea.	9.89 MMBtu/hr ea.
Maximum Heat Input	0.072	1000 gal/hr	
Operating Hours (MTE)[3]	500	hours/year	

Requested Permit Fuel Usage Limit:	**15,199**	**gallons/yr**	**1,267**	**gallons per month on a 12-month rolling average basis**
Operating Hours (PTE)	438	Back Calculated from Fuel Usage		

Hazardous Air Pollutant Operating Emissions

			Form 4530-126 Maximum Theoretical Emissions (MTE)					Form 4530-126 Limited Operation Emissions (PTE)							
			MTE Single Engine		MTE All Engines			PTE Single Engine		PTE All Engines			NR 445 Compliant?	NR 445 Table A Thresholds	
Pollutant	Emission Factor	Reference	lbs/hour	tons/year	lbs/hour	tons/year	lb/yr	lbs/hour	tons/year	lbs/hour	tons/year	lb/yr	(Yes/No)	lb/hr	lb/yr
Benzene	7.76E-04 lb/MMBtu	1	0.0077	0.0019	0.00768	0.00192	3.838	0.0077	0.0017	0.00768	0.00168	3.362	Yes	N/A	936
Toluene	2.81E-04 lb/MMBtu	1	0.0028	0.0007	0.00278	0.00069	1.390	0.0028	0.0006	0.00278	0.00061	1.217	Yes	39.3	292,000
Xylenes	1.93E-04 lb/MMBtu	1	0.0019	0.0005	0.00191	0.00048	0.955	0.0019	0.0004	0.00191	0.00042	0.836	Yes	90.6	
Formaldehyde	7.89E-05 lb/MMBtu	1	0.0008	0.0002	0.00078	0.00020	0.390	0.0008	0.0002	0.00078	0.00017	0.342	Yes		562
Acetaldehyde	2.52E-05 lb/MMBtu	1	0.0002	0.00006	0.00025	0.00006	0.125	0.0002	0.00005	0.00025	0.00005	0.109	Yes	10.7	3,318
Acrolein	7.88E-06 lb/MMBtu	1	0.00008	0.00002	0.00008	0.00002	0.039	0.00008	0.00002	0.00008	0.00002	0.034	Yes	0.0545	
1,3-Butadiene	3.91E-05 lb/MMBtu	1	0.00039	0.00010	0.00039	0.00010	0.193	0.00039	0.00008	0.00039	0.00008	0.169	Yes	N/A	6.35
Naphthalene	1.30E-04 lb/MMBtu	1	0.0013	0.0003	0.00129	0.00032	0.643	0.0013	0.0003	0.00129	0.00028	0.563	Yes	10.9	
POM/PAH (w/Naphthalene)	2.12E-04 lb/MMBtu	1	0.0021	0.0005	0.00209	0.00052	1.046	0.0021	0.0005	0.00209	0.00046	0.916			
Total Federal HAPs			0.02	0.00	0.02	0.0040	7.9755	0.02	0.00	0.02	0.0035	6.9867			
Maximum Single Federal HAP (Benzene)			0.01	0.00	0.01	0.0019	3.8379	0.01	0.00	0.01	0.0017	3.3621			

Notes:

1) Emission Factors from US EPA AP-42 Table 3.4-3 & 3.4-4 (Oct 1996). The fuel intended to be used in the engines will be hydrotreated vegetable oil (HVO). A statement from the vendor states that emissions from engines running on HVO fuel should be comparable, if not lower, to that of the same engine model running on a pertroleum diesel. Diesel HAP AP-42 emission factors were used since HAP emission factors for HVO is unavailable.
2) Engines will only be used in emergency situations
3) The emergency engine is subject to the EPA September 6, 1995, “Calculating Potential to Emit (PTE) for Emergency Generators" memorandum from John Seitz to the Directors of EPA Regions I-X. Therefore, maximum potential emissions are based on 500 hours per year.

Exhaust emission data sheet 1000DQFAD

60 Hz Diesel generator set

Engine information:			
Model:	Cummins Inc. QST30-G5 NR2	Bore:	5.51 in. (139 mm)
Type:	4 Cycle, 50° V, 12 cylinder diesel	Stroke:	6.5 in. (165 mm)
Aspiration:	Turbocharged and low temperature after-cooled	Displacement:	1860 cu. in. (30.4 liters)
Compression ratio:	14.7:1		
Emission control device:	After-cooled (air-to-air)		

Performance data	1/4 Standby	1/2 Standby	3/4 Standby	Full Standby	Full Prime
BHP @ 1800 RPM (60 Hz)	371	741	1112	1482	1322
Fuel consumption (gal/Hr)	19.1	35.8	54.1	72.2	63.9
Exhaust gas flow (CFM)	2780	4500	6370	7540	6950
Exhaust gas temperature (°F)	620	760	814	890	873
Exhaust emission data					
HC (Total unburned hydrocarbons)	0.12	0.10	0.08	0.07	0.08
NOx (Oxides of nitrogen as NO2)	4.17	5.20	3.87	3.95	4.00
CO (Carbon monoxide)	0.66	0.36	0.48	0.66	0.58
PM (Particular matter)	0.19	0.15	0.12	0.11	0.11
SO2 (Sulfur dioxide)	0.11	0.10	0.10	0.11	0.10
Smoke (Bosch)	0.88	0.80	0.79	0.73	0.75

All values are Grams/HP-Hour, Smoke is Bosch #

Microsoft Corporation
MKE3B and MKE16-17 Data Center
Form 4530-128, Units P40

Diesel-Fired Emergency Generator Emissions - Aggregated
0.5-MW Emergency Diesel Generator

Project Design

1	(1 MKE04)	
1	engine	Total number of engines for MKE3B and MKE 16-17
563	kW per engine	
563	kW design capacity for project	
0.563	MW design capacity for project	

Maximum Power	755	bhp per engine	4.75 MMBtu/hr
Maximum Fuel Input	0.035	1000 gal/hr per engine	Cummins Gen Set 500 kW
Operating Hours (MTE)[5]	500	hours/year	

Requested Permit Fuel Usage Limit:	**15,199**	**gallons/yr**	**1,267**	**gallons per month on a 12-month rolling average basis**
Operating Hours (PTE) per engine	438	Back Calculated from Fuel Usage		

Criteria Pollutant Operating Emissions for Engine

	Form 4530-128 Maximum Theoretical Emissions (MTE)							Form 4530-128 Limited Operation Emissions (PTE)						
				Single Engine		All Engines					Single Engine		All Engines	
Pollutant	Emission Factor	unit	Reference	lbs/hour	tons/year	lbs/hour	tons/year	Emission Factor	unit	Reference	lbs/hour	tons/year	lbs/hour	tons/year
CO	0.39	g/hp-hr	1	0.65	0.16	0.65	0.16	0.39	g/hp-hr	1	0.65	0.14	0.65	0.14
NO_x	4.43	g/hp-hr	1	7.37	1.84	7.37	1.84	4.43	g/hp-hr	1	7.37	1.61	7.37	1.61
PM_{10}	0.02	g/hp-hr	1	0.03	0.01	0.03	0.01	0.02	g/hp-hr	1	0.03	0.01	0.03	0.01
$PM_{2.5}$	0.02	g/hp-hr	1	0.03	0.01	0.03	0.01	0.02	g/hp-hr	1	0.03	0.01	0.03	0.01
SO_2	0.006	g/hp-hr	4	0.01	0.00	0.01	0.00	0.006	g/hp-hr	4	0.01	0.00	0.01	0.00
VOC	0.14	g/hp-hr	1	0.23	0.06	0.23	0.06	0.14	g/hp-hr	1	0.23	0.05	0.23	0.05
GHGs:														
CH_4	0.165	lb/MMBtu	2	0.79	0.20	0.79	0.20	0.165	lb/MMBtu	2	0.79	0.17	0.79	0.17
CO_2	163.05	lb/MMBtu	2	775	194	775	194	163.05	lb/MMBtu	2	775	170	775	169.76
N2O	0.39	lb/MMBtu	2	2	0	2	0	0.39	lb/MMBtu	2	2	0	2	0.41
CO_{2e}				778	194	778	194				778	170	778	170.34

Notes:
1) Cummins Exhaust Emission Data, EPA Tier 2 (Full Standby) for 500DFEK
2) GHG EF from 40 CFR Part 98, Subpart C. CO_2e EF calculated based on Global Warming Potential (GWP) as follows:

GHG Pollutant	**GWP**	**Mass EF**	**Mass EF**	**CO_2e EF**
CO_2	1	73.96 kg/MMBtu	163.05 lb/MMBtu	163.05 lb/MMBtu
CH_4	25	3.00E-03 kg/MMBtu	6.61E-03 lb/MMBtu	1.65E-01 lb/MMBtu
N2O	298	6.00E-04 kg/MMBtu	1.32E-03 lb/MMBtu	3.94E-01 lb/MMBtu
CO_2e	---	---	---	163.61 lb/MMBtu
Conversion factors:		2000 lb/ton	2.2046 lb/kg	

3) SO_2 emission factor is 0.00809 * S (where S is the % sulfur in fuel oil). Emission calculations include sulfur content of 15 PPM or 0.0015 wt %
4) Engines will only be used in emergency situations
5) The emergency engine is subject to the EPA September 6, 1995, “Calculating Potential to Emit (PTE) for Emergency Generators" memorandum from John Seitz to the Directors of EPA Regions I-X. Therefore, maximum theoretical emissions are based on 500 hours per year.

Microsoft Corporation
MKE3B and MKE16-17 Data Center
Form 4530-126, Units P40

0.5-MW Emergency Diesel Generator

Project Design	1 engine	
	563 kW per engine	
	563 kW design capacity for project	
Maximum Power	755 bhp ea.	4.75 MMBtu/hr ea.
Maximum Heat Input	0.035 1000 gal/hr	
Operating Hours (MTE)[3]	500 hours/year	

Requested Permit Fuel Usage Limit: 15,199 gallons/yr 1,267 gallons per month on a 12-month rolling average basis

Operating Hours (PTE) 438 Back Calculated from Fuel Usage

Hazardous Air Pollutant Operating Emissions

			Form 4530-126 Maximum Theoretical Emissions (MTE)					Form 4530-126 Limited Operation Emissions (PTE)						
			MTE Single Engine		MTE All Engines			PTE Single Engine		PTE All Engines			NR 445	NR 445 Table A Thresholds	
Pollutant	Emission Factor	Reference	lbs/hour	tons/year	lbs/hour	tons/year	lb/yr	lbs/hour	tons/year	lbs/hour	tons/year	lb/yr	Compliant? (Yes/No)	lb/hr	lb/yr
Benzene	7.76E-04 lb/MMBtu	1	0.0037	0.0009	0.00369	0.00092	1.845	0.0037	0.0008	0.00369	0.00081	1.616	Yes	N/A	936
Toluene	2.81E-04 lb/MMBtu	1	0.0013	0.0003	0.00134	0.00033	0.668	0.0013	0.0003	0.00134	0.00029	0.585	Yes	39.3	292,000
Xylenes	1.93E-04 lb/MMBtu	1	0.0009	0.0002	0.00092	0.00023	0.459	0.0009	0.0002	0.00092	0.00020	0.402	Yes	90.6	
Formaldehyde	7.89E-05 lb/MMBtu	1	0.0004	0.0001	0.00038	0.00009	0.188	0.0004	0.0001	0.00038	0.00008	0.164	Yes		562
Acetaldehyde	2.52E-05 lb/MMBtu	1	0.0001	0.00003	0.00012	0.00003	0.060	0.0001	0.00003	0.00012	0.00003	0.052	Yes	10.7	3,318
Acrolein	7.88E-06 lb/MMBtu	1	0.00004	0.00001	0.00004	0.00001	0.019	0.00004	0.00001	0.00004	0.00001	0.016	Yes	0.0545	
1,3-Butadiene	3.91E-05 lb/MMBtu	1	0.00019	0.00005	0.00019	0.00005	0.093	0.00019	0.00004	0.00019	0.00004	0.081	Yes	N/A	6.35
Naphthalene	1.30E-04 lb/MMBtu	1	0.0006	0.0002	0.00062	0.00015	0.309	0.0006	0.0001	0.00062	0.00014	0.271	Yes	10.9	
POM/PAH (w/Naphthalene)	2.12E-04 lb/MMBtu	1	0.0010	0.0003	0.00101	0.00025	0.503	0.0010	0.0002	0.00101	0.00022	0.440			
Total Federal HAPs			0.01	0.00	0.01	0.0019	3.8331	0.01	0.00	0.01	0.0017	3.3579			
Maximum Single Federal HAP (Benzene)			0.00	0.00	0.00	0.0009	1.8445	0.00	0.00	0.00	0.0008	1.6158			

Notes:

1) Emission Factors from US EPA AP-42 Table 3.4-3 & 3.4-4 (Oct 1996). The fuel intended to be used in the engines will be hydrotreated vegetable oil (HVO). A statement from the vendor states that emissions from engines running on HVO fuel should be comparable, if not lower, to that of the same engine model running on a pertroleum diesel. Diesel HAP AP-42 emission factors were used since HAP emission factors for HVO is unavailable.
2) Engines will only be used in emergency situations
3) The emergency engine is subject to the EPA September 6, 1995, “Calculating Potential to Emit (PTE) for Emergency Generators" memorandum from John Seitz to the Directors of EPA Regions I-X. Therefore, maximum potential emissions are based on 500 hours per year.

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		

Performance Data	1/4 Standby	1/2 Standby	3/4 Standby	Full Standby	Full Prime
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
Exhaust Emission Data					
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

Microsoft Corporation
MKE3B and MKE16-17 Data Center
Form 4530-128, Units P41, P42, P83, P84

Project Design

4	engines (1 engine per building)	
97	kw per engine	
388	kw design capacity for project	
0.388	MW design capacity for project	

Maximum Power	130	bhp per engine	0.84 MMBtu/hr
Maximum Fuel Input	0.006	1000 gal/hr per engine	
Operating Hours (MTE)[5]	500	hours/year	

Requested Permit Fuel Usage Limit: 10,687 gallons/yr 891 gallons per month on a 12-month rolling average basis

Operating Hours (PTE) per engine 438 Back Calculated from Fuel Usage

Criteria Pollutant Operating Emissions for Engine

				Form 4530-128 Maximum Theoretical Emissions (MTE)				Form 4530-128 Limited Operation Emissions (PTE)			
				Single Engine		All Engines		Single Engine		All Engines	
Pollutant	Emission Factor		Reference	lbs/hour	tons/year	lbs/hour	tons/year	lbs/hour	tons/year	lbs/hour	tons/year
CO	0.95	lb/MMBtu	2	0.79	0.20	3.2	0.79	0.79	0.17	3.2	0.70
NO_x	3.00	g/hp-hr	1	0.86	0.22	3.4	0.86	0.86	0.19	3.4	0.75
PM_{10}	0.22	g/hp-hr	1	0.06	0.02	0.25	0.06	0.06	0.01	0.3	0.06
$PM_{2.5}$	0.22	g/hp-hr	1	0.06	0.02	0.25	0.06	0.06	0.01	0.3	0.06
SO_2	0.006	lb/MMBtu	3	0.00	0.00	0.02	0.00	0.00	0.00	0.0	0.00
VOC	0.35	lb/MMBtu	2	0.29	0.07	1.17	0.29	0.29	0.06	1.2	0.26
GHGs:											
CH_4	0.165	lb/MMBtu	4	0.14	0.03	0.55	0.14	0.14	0.03	0.6	0.12
CO_2	163.05	lb/MMBtu	4	136	34	545	136.26	136	29.84	545.0	119.36
N_2O	0.39	lb/MMBtu	4	0.33	0.08	1.32	0.33	0.33	0.07	1.3	0.29
CO_{2e}				137	34	547	137	137	29.94	546.9	119.77

Notes:

1) EPA Emission Standards for Stationary Fire Pump Engines

2) Emission Factors from US EPA AP-42 Table 3.3-1 (Oct 1996)

3) SO_2 emission factor is 0.00809 * S (where S is the % sulfur in fuel oil). Emission calculations include sulfur content of 15 PPM or 0.0015 wt %

4) GHG EF from 40 CFR Part 98, Subpart C. CO_2e EF calculated based on Global Warming Potential (GWP) as follows:

GHG Pollutant	GWP	Mass EF	Mass EF	CO_2e EF
CO_2	1	73.96 kg/MMBtu	163.05 lb/MMBtu	163.05 lb/MMBtu
CH_4	25	3.00E-03 kg/MMBtu	6.61E-03 lb/MMBtu	1.65E-01 lb/MMBtu
N2O	298	6.00E-04 kg/MMBtu	1.32E-03 lb/MMBtu	3.94E-01 lb/MMBtu
CO_2e	---	---	---	163.61 lb/MMBtu
Conversion factors:		2000 lb/ton	2.2046 lb/kg	

5) The emergency engine is subject to the EPA September 6, 1995, “Calculating Potential to Emit (PTE) for Emergency Generators" memorandum from John Seitz to the Directors of EPA Regions I-X. Therefore, maximum theoretical emissions are based on 500 hours per year.

Microsoft Corporation
MKE3B and MKE16-17 Data Center
Form 4530-126, Units P41, P42, P83, P84

Project Design	4	engines (1 engine per building)
	97	kw per engine
	388	kw design capacity for project

Maximum Power	130	bhp ea.	0.84 MMBtu/hr ea.
Maximum Heat Input	0.006	1000 gal/hr	
Operating Hours (MTE)[2]	500	hours/year	

Requested Permit Fuel Usage Limit:	**10,687**	**gallons/yr**	**891**	**gallons per month on a 12-month rolling average basis**
Operating Hours (PTE)	438	Back Calculated from Fuel Usage		

Hazardous Air Pollutant Operating Emissions

				Form 4530-126 Maximum Theoretical Emissions (MTE)					Form 4530-126 Limited Operation Emissions (PTE)					NR 445	NR 445 Table A Thresholds	
				Single Engine		All Engines			Single Engine		All Engines			Compliant?		
Pollutant	Emission Factor		Reference	lbs/hour	tons/year	lbs/hour	tons/year	lb/yr	lbs/hour	tons/year	lbs/hour	tons/year	lb/yr	(Yes/No)	lb/hr	lb/yr
Benzene	9.33E-04	lb/MMBtu	1	0.00078	0.00019	0.00312	0.00078	1.559	0.00078	0.000171	0.00312	0.00068	1.366	Yes	N/A	936
Toluene	4.09E-04	lb/MMBtu	1	0.00034	0.00009	0.00137	0.00034	0.684	0.00034	0.000075	0.00137	0.00030	0.599	Yes	39.3	292,000
Xylenes	2.85E-04	lb/MMBtu	1	0.00024	0.00006	0.00095	0.00024	0.476	0.00024	0.000052	0.00095	0.00021	0.417	Yes	90.6	
Formaldehyde	1.18E-03	lb/MMBtu	1	0.00099	0.00025	0.00394	0.00099	1.972	0.00099	0.000216	0.00394	0.00086	1.728	Yes		562
Acetaldehyde	7.67E-04	lb/MMBtu	1	0.00064	0.00016	0.00256	0.00064	1.282	0.00064	0.000140	0.00256	0.00056	1.123	Yes	10.7	3,318
Acrolein	9.25E-05	lb/MMBtu	1	0.00008	0.00002	0.00031	0.00008	0.155	0.00008	0.000017	0.00031	0.00007	0.135	Yes	0.0545	
1,3-Butadiene	3.91E-05	lb/MMBtu	1	0.00003	0.00001	0.00013	0.00003	0.065	0.00003	0.000007	0.00013	0.00003	0.057	Yes	N/A	6.35
Naphthalene	8.48E-05	lb/MMBtu	1	0.00007	0.00002	0.00028	0.00007	0.142	0.00007	0.000016	0.00028	0.00006	0.124	Yes	10.9	
POM/PAH (w/Naphthalene)	1.68E-04	lb/MMBtu	1	0.00014	0.00004	0.00056	0.00014	0.281	0.00014	0.000031	0.00056	0.00012	0.246			
Total Federal HAPs				0.00	0.00	0.01	0.0032	6.4743	0.00	0.00	0.01	0.0028	5.6714			
Maximum Single Federal HAP (Formaldehyde)				0.00	0.00	0.00	0.0010	1.9723	0.00	0.00	0.00	0.0009	1.7277			

Notes:
1) Emission Factors from US EPA AP-42 Table 3.4-3 & 3.4-4 (Oct 1996). The fuel intended to be used in the engines will be hydrotreated vegetable oil (HVO). A statement from the vendor states that emissions from engines running on HVO fuel should be comparable, if not lower, to that of the same engine model running on a pertroleum diesel. Diesel HAP AP-42 emission factors were used since HAP emission factors for HVO is unavailable.
2) The emergency engine is subject to the EPA September 6, 1995, “Calculating Potential to Emit (PTE) for Emergency Generators" memorandum from John Seitz to the Directors of EPA Regions I-X. Therefore, maximum potential emissions are based on 500 hours per year.

Appen□i□ C

HIGHLIGHTED NESHAP □□□□ AND NSPS IIII

Title 40 —Protection of Environment
Chapter I —Environmental Protection Agency
Subchapter C —Air Programs
Part 60 —Standards of Performance for New Stationary Sources

Authority: 42 U.S.C. 7401 *et seq.*

Source: 36 FR 24877, Dec. 23, 1971, unless otherwise noted.

40 CFR pat 60, subpart IIII applicable to emergency generators at MKE16/17 Data Center

Subpart IIII Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

Subpart IIII—Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

Source: 71 FR 39172, July 11, 2006, unless otherwise noted.

WHAT THIS SUBPART COVERS

§ 60.4200 Am I subject to this subpart?

(a) The provisions of this subpart are applicable to manufacturers, owners, and operators of stationary compression ignition (CI) internal combustion engines (ICE) and other persons as specified in paragraphs (a)(1) through (4) of this section. For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator.

(1) Manufacturers of stationary CI ICE with a displacement of less than 30 liters per cylinder where the model year is:

(i) 2007 or later, for engines that are not fire pump engines;

(ii) The model year listed in Table 3 to this subpart or later model year, for fire pump engines.

(2) Owners and operators of stationary CI ICE that commence construction after July 11, 2005, where the stationary CI ICE are:

(i) Manufactured after April 1, 2006, and are not fire pump engines, or

(ii) Manufactured as a certified National Fire Protection Association (NFPA) fire pump engine after July 1, 2006.

(3) Owners and operators of any stationary CI ICE that are modified or reconstructed after July 11, 2005 and any person that modifies or reconstructs any stationary CI ICE after July 11, 2005.

(4) The provisions of § 60.4208 of this subpart are applicable to all owners and operators of stationary CI ICE that commence construction after July 11, 2005.

(b) The provisions of this subpart are not applicable to stationary CI ICE being tested at a stationary CI ICE test cell/stand.

(c) If you are an owner or operator of an area source subject to this subpart, you are exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71, provided you are not required to obtain a permit under 40 CFR 70.3(a) or 40 CFR 71.3(a) for a reason other than your status as an area source under this subpart. Notwithstanding the previous sentence, you must continue to comply with the provisions of this subpart applicable to area sources.

(d) Stationary CI ICE may be eligible for exemption from the requirements of this subpart as described in 40 CFR part 1068, subpart C, except that owners and operators, as well as manufacturers, may be eligible to request an exemption for national security.

(e) Owners and operators of facilities with CI ICE that are acting as temporary replacement units and that are located at a stationary source for less than 1 year and that have been properly certified as meeting the standards that would be applicable to such engine under the appropriate nonroad engine provisions, are not required to meet any other provisions under this subpart with regard to such engines.

[71 FR 39172, July 11, 2006, as amended at 76 FR 37967, June 28, 2011; 86 FR 34357, June 29, 2021]

EMISSION STANDARDS FOR MANUFACTURERS

§ 60.4201 What emission standards must I meet for non-emergency engines if I am a stationary

CI internal combustion engine manufacturer?

(a) Stationary CI internal combustion engine manufacturers must certify their 2007 model year and later non-emergency stationary CI ICE with a maximum engine power less than or equal to 2,237 kilowatt (KW) (3,000 horsepower (HP)) and a displacement of less than 10 liters per cylinder to the certification emission standards for new nonroad CI engines in 40 CFR 1039.101, 1039.102, 1039.104, 1039.105, 1039.107, and 1039.115 and 40 CFR part 1039, appendix I, as applicable, for all pollutants, for the same model year and maximum engine power.

(b) Stationary CI internal combustion engine manufacturers must certify their 2007 through 2010 model year non-emergency stationary CI ICE with a maximum engine power greater than 2,237 KW (3,000 HP) and a displacement of less than 10 liters per cylinder to the emission standards in table 1 to this subpart, for all pollutants, for the same maximum engine power.

(c) Stationary CI internal combustion engine manufacturers must certify their 2011 model year and later non-emergency stationary CI ICE with a maximum engine power greater than 2,237 KW (3,000 HP) and a displacement of less than 10 liters per cylinder to the certification emission standards for new nonroad CI engines in 40 CFR 1039.101, 40 CFR 1039.102, 40 CFR 1039.104, 40 CFR 1039.105, 40 CFR 1039.107, and 40 CFR 1039.115, as applicable, for all pollutants, for the same maximum engine power.

(d) Stationary CI internal combustion engine manufacturers must certify the following non-emergency stationary CI ICE to the appropriate Tier 2 emission standards for new marine CI engines as described in 40 CFR part 1042, appendix I, for all pollutants, for the same displacement and rated power:

(1) Their 2007 model year through 2012 non-emergency stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder;

(2) Their 2013 model year non-emergency stationary CI ICE with a maximum engine power greater than or equal to 3,700 KW (4,958 HP) and a displacement of greater than or equal to 10 liters per cylinder and less than 15 liters per cylinder; and

(3) Their 2013 model year non-emergency stationary CI ICE with a displacement of greater than or equal to 15 liters per cylinder and less than 30 liters per cylinder.

(e) Stationary CI internal combustion engine manufacturers must certify the following non-emergency stationary CI ICE to the certification emission standards and other requirements for new marine CI engines in 40 CFR 1042.101, 40 CFR 1042.107, 40 CFR 1042.110, 40 CFR 1042.115, 40 CFR 1042.120, and 40 CFR 1042.145, as applicable, for all pollutants, for the same displacement and maximum engine power:

(1) Their 2013 model year non-emergency stationary CI ICE with a maximum engine power less than 3,700 KW (4,958 HP) and a displacement of greater than or equal to 10 liters per cylinder and less than 15 liters per cylinder; and

(2) Their 2014 model year and later non-emergency stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder.

(f) Notwithstanding the requirements in paragraphs (a) through (c) of this section, stationary non-emergency CI ICE identified in paragraphs (a) and (c) of this section may be certified to the provisions of 40 CFR part 1042 for commercial engines that are applicable for the engine's model year, displacement, power density, and maximum engine power if the engines will be used solely in either or both of the following locations:

(1) Remote areas of Alaska; and

(2) Marine offshore installations.

(g) Notwithstanding the requirements in paragraphs (a) through (f) of this section, stationary CI internal combustion engine manufacturers are not required to certify reconstructed engines; however manufacturers may elect to do so. The reconstructed engine must be certified to the emission standards specified in paragraphs (a) through (e) of this section that are applicable to the model year, maximum engine power, and displacement of the reconstructed stationary CI ICE.

(h) Stationary CI ICE certified to the standards in 40 CFR part 1039 and equipped with auxiliary emission control devices (AECDs) as specified in 40 CFR 1039.665 must meet the Tier 1 certification emission standards for new nonroad CI engines in 40 CFR part 1039, appendix I, while the AECD is activated during a qualified emergency situation. A qualified emergency situation is defined in 40 CFR 1039.665. When the qualified emergency situation has ended and the AECD is deactivated, the engine must resume meeting the otherwise applicable emission standard specified in this section.

[71 FR 39172, July 11, 2006, as amended at 76 FR 37967, June 28, 2011; 81 FR 44219, July 7, 2016; 86 FR 34357, June 29, 2021]

§ 60.4202 What emission standards must I meet for emergency engines if I am a stationary CI internal combustion engine manufacturer?

(a) Stationary CI internal combustion engine manufacturers must certify their 2007 model year and later emergency stationary CI ICE with a maximum engine power less than or equal to 2,237 KW (3,000 HP) and a displacement of less than 10 liters per cylinder that are not fire pump engines to the emission standards specified in paragraphs (a)(1) through (2) of this section.

(1) For engines with a maximum engine power less than 37 KW (50 HP):

(i) The Tier 2 emission standards for new nonroad CI engines for the appropriate rated power as described in 40 CFR part 1039, appendix I, for all pollutants and the smoke standards as specified in 40 CFR 1039.105 for model year 2007 engines; and

(ii) The certification emission standards for new nonroad CI engines in 40 CFR 1039.104, 40 CFR 1039.105, 40 CFR 1039.107, 40 CFR 1039.115, and table 2 to this subpart, for 2008 model year and later engines.

(2) For engines with a rated power greater than or equal to 37 KW (50 HP), the Tier 2 or Tier 3 emission standards for new nonroad CI engines for the same rated power as described in 40 CFR part 1039, appendix I, for all pollutants and the smoke standards as specified in 40 CFR 1039.105 beginning in model year 2007.

(b) Stationary CI internal combustion engine manufacturers must certify their 2007 model year and later emergency stationary CI ICE with a maximum engine power greater than 2,237 KW (3,000 HP) and a displacement of less than 10 liters per cylinder that are not fire pump engines to the emission standards specified in paragraphs (b)(1) through (2) of this section.

(1) For 2007 through 2010 model years, the emission standards in table 1 to this subpart, for all pollutants, for the same maximum engine power.

(2) For 2011 model year and later, the Tier 2 emission standards as described in 40 CFR part 1039, appendix I, for all pollutants and the smoke standards as specified in 40 CFR 1039.105.

(c) [Reserved]

(d) Beginning with the model years in table 3 to this subpart, stationary CI internal combustion engine manufacturers must certify their fire pump stationary CI ICE to the emission standards in table 4 to this subpart, for all pollutants, for the same model year and NFPA nameplate power.

(e) Stationary CI internal combustion engine manufacturers must certify the following emergency stationary CI ICE that are not fire pump engines to the appropriate Tier 2 emission standards for new marine CI engines as described in 40 CFR part 1042, appendix I, for all pollutants, for the same displacement and rated power:

(1) Their 2007 model year through 2012 emergency stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder;

(2) Their 2013 model year and later emergency stationary CI ICE with a maximum engine power greater than or equal to 3,700 KW (4,958 HP) and a displacement of greater than or equal to 10 liters per cylinder and less than 15 liters per cylinder;

(3) Their 2013 model year emergency stationary CI ICE with a displacement of greater than or equal to 15 liters per cylinder and less than 30 liters per cylinder; and

(4) Their 2014 model year and later emergency stationary CI ICE with a maximum engine power greater than or equal to 2,000 KW (2,682 HP) and a displacement of greater than or equal to 15 liters per cylinder and less than 30 liters per cylinder.

(f) Stationary CI internal combustion engine manufacturers must certify the following emergency stationary CI ICE to the certification emission standards and other requirements applicable to Tier 3 new marine CI engines in 40 CFR 1042.101, 40 CFR 1042.107, 40 CFR 1042.115, 40 CFR 1042.120, and 40 CFR 1042.145, for all pollutants, for the same displacement and maximum engine power:

(1) Their 2013 model year and later emergency stationary CI ICE with a maximum engine power less than 3,700 KW (4,958 HP) and a displacement of greater than or equal to 10 liters per cylinder and less than 15 liters per cylinder; and

(2) Their 2014 model year and later emergency stationary CI ICE with a maximum engine power less than 2,000 KW (2,682 HP) and a displacement of greater than or equal to 15 liters per cylinder and less than 30 liters per cylinder.

(g) Notwithstanding the requirements in paragraphs (a) through (d) of this section, stationary emergency CI ICE identified in paragraphs (a) and (c) of this section may be certified to the provisions of 40 CFR part 1042 for commercial engines that are applicable for the engine's model year, displacement, power density, and maximum engine power if the engines will be used solely in either or both of the locations identified in paragraphs (g)(1) and (2) of this section. Engines that would be subject to the Tier 4 standards in 40 CFR part 1042 that are used solely in either or both of the locations identified in paragraphs (g)(1) and (2) of this section may instead continue to be certified to the previous tier of standards in 40 CFR part 1042. The previous tier is Tier 3 in most cases; however, the previous tier is Tier 2 if there are no Tier 3 standards specified for engines of a certain size or power rating.

(1) Remote areas of Alaska; and

(2) Marine offshore installations.

(h) Notwithstanding the requirements in paragraphs (a) through (f) of this section, stationary CI internal combustion engine manufacturers are not required to certify reconstructed engines; however manufacturers may elect to do so. The reconstructed engine must be certified to the emission standards specified in paragraphs (a) through (f) of this section that are applicable to the model year, maximum engine power and displacement of the reconstructed emergency stationary CI ICE.

[71 FR 39172, July 11, 2006, as amended at 76 FR 37968, June 28, 2011; 81 FR 44219, July 7, 2016; 86 FR 34358, June 29, 2021; 88 FR 4471, Jan. 24, 2023]

§ 60.4203 How long must my engines meet the emission standards if I am a manufacturer of stationary CI internal combustion engines?

Engines manufactured by stationary CI internal combustion engine manufacturers must meet the emission standards as required in §§ 60.4201 and 60.4202 during the certified emissions life of the engines.

[76 FR 37968, June 28, 2011]

EMISSION STANDARDS FOR OWNERS AND OPERATORS

§ 60.4204 What emission standards must I meet for non-emergency engines if I am an owner or operator of a stationary CI internal combustion engine?

(a) Owners and operators of pre-2007 model year non-emergency stationary CI ICE with a displacement of less than 10 liters per cylinder must comply with the emission standards in table 1 to this subpart. Owners and operators of pre-2007 model year non-emergency stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder must comply with the Tier 1 emission standards in 40 CFR part 1042, appendix I.

(b) Owners and operators of 2007 model year and later non-emergency stationary CI ICE with a displacement of less than 30 liters per cylinder must comply with the emission standards for new CI engines in § 60.4201 for their 2007 model year and later stationary CI ICE, as applicable.

(c) Owners and operators of non-emergency stationary CI engines with a displacement of greater than or equal to 30 liters per cylinder must meet the following requirements:

(1) For engines installed prior to January 1, 2012, limit the emissions of NO_X in the stationary CI internal combustion engine exhaust to the following:

(i) 17.0 grams per kilowatt-hour (g/KW-hr) (12.7 grams per horsepower-hr (g/HP-hr)) when maximum engine speed is less than 130 revolutions per minute (rpm);

(ii) $45 \cdot n^{-0.2}$ g/KW-hr ($34 \cdot n^{-0.2}$ g/HP-hr) when maximum engine speed is 130 or more but less than 2,000 rpm, where n is maximum engine speed; and

(iii) 9.8 g/KW-hr (7.3 g/HP-hr) when maximum engine speed is 2,000 rpm or more.

(2) For engines installed on or after January 1, 2012 and before January 1, 2016, limit the emissions of NO_X in the stationary CI internal combustion engine exhaust to the following:

(i) 14.4 g/KW-hr (10.7 g/HP-hr) when maximum engine speed is less than 130 rpm;

(ii) $44 \cdot n^{-0.23}$ g/KW-hr ($33 \cdot n^{-0.23}$ g/HP-hr) when maximum engine speed is greater than or equal to 130 but less than 2,000 rpm and where n is maximum engine speed; and

(iii) 7.7 g/KW-hr (5.7 g/HP-hr) when maximum engine speed is greater than or equal to 2,000 rpm.

(3) For engines installed on or after January 1, 2016, limit the emissions of NO_X in the stationary CI internal combustion engine exhaust to the following:

(i) 3.4 g/KW-hr (2.5 g/HP-hr) when maximum engine speed is less than 130 rpm;

(ii) $9.0 \cdot n^{-0.20}$ g/KW-hr ($6.7 \cdot n^{-0.20}$ g/HP-hr) where n (maximum engine speed) is 130 or more but less than 2,000 rpm; and

(iii) 2.0 g/KW-hr (1.5 g/HP-hr) where maximum engine speed is greater than or equal to 2,000 rpm.

(4) Reduce particulate matter (PM) emissions by 60 percent or more, or limit the emissions of PM in the stationary CI internal combustion engine exhaust to 0.15 g/KW-hr (0.11 g/HP-hr).

(d) Owners and operators of non-emergency stationary CI ICE with a displacement of less than 30 liters per cylinder who conduct performance tests in-use must meet the not-to-exceed (NTE) standards as indicated in § 60.4212.

(e) Owners and operators of any modified or reconstructed non-emergency stationary CI ICE subject to this subpart must meet the emission standards applicable to the model year, maximum engine power, and displacement of the modified or reconstructed non-emergency stationary CI ICE that are specified in paragraphs (a) through (d) of this section.

(f) Owners and operators of stationary CI ICE certified to the standards in 40 CFR part 1039 and equipped with AECDs as specified in 40 CFR 1039.665 must meet the Tier 1 certification emission standards for new nonroad CI engines in 40 CFR part 1039, appendix I, while the AECD is activated during a qualified emergency situation. A qualified emergency situation is defined in 40 CFR 1039.665. When the qualified emergency situation has ended and the AECD is deactivated, the engine must resume meeting the otherwise applicable emission standard specified in this section.

[71 FR 39172, July 11, 2006, as amended at 76 FR 37968, June 28, 2011; 81 FR 44219, July 7, 2016; 86 FR 34358, June 29, 2021]

§ 60.4205 What emission standards must I meet for emergency engines if I am an owner or operator of a stationary CI internal combustion engine?

(a) Owners and operators of pre-2007 model year emergency stationary CI ICE with a displacement of less than 10 liters per cylinder that are not fire pump engines must comply with the emission standards in Table 1 to this subpart. Owners and operators of pre-2007 model year emergency stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder that are not fire pump engines must comply with the Tier 1 emission standards in 40 CFR part 1042, appendix I.

(b) Owners and operators of 2007 model year and later emergency stationary CI ICE with a displacement of less than 30 liters per cylinder that are not fire pump engines must comply with the emission standards for new nonroad CI engines in § 60.4202, for all pollutants, for the same model year and maximum engine power for their 2007 model year and later emergency stationary CI ICE.

(c) Owners and operators of fire pump engines with a displacement of less than 30 liters per cylinder must comply with the emission standards in table 4 to this subpart, for all pollutants.

(d) Owners and operators of emergency stationary CI engines with a displacement of greater than or equal to 30 liters per cylinder must meet the requirements in this section.

(1) For engines installed prior to January 1, 2012, limit the emissions of NO_X in the stationary CI internal combustion engine exhaust to the following:

(i) 17.0 g/KW-hr (12.7 g/HP-hr) when maximum engine speed is less than 130 rpm;

(ii) $45 \cdot n^{-0.2}$ g/KW-hr ($34 \cdot n^{-0.2}$ g/HP-hr) when maximum engine speed is 130 or more but less than 2,000 rpm, where n is maximum engine speed; and

(iii) 9.8 g/kW-hr (7.3 g/HP-hr) when maximum engine speed is 2,000 rpm or more.

(2) For engines installed on or after January 1, 2012, limit the emissions of NO_X in the stationary CI internal combustion engine exhaust to the following:

(i) 14.4 g/KW-hr (10.7 g/HP-hr) when maximum engine speed is less than 130 rpm;

(ii) $44 \cdot n^{-0.23}$ g/KW-hr ($33 \cdot n^{-0.23}$ g/HP-hr) when maximum engine speed is greater than or equal to 130 but less than 2,000 rpm and where n is maximum engine speed; and

(iii) 7.7 g/KW-hr (5.7 g/HP-hr) when maximum engine speed is greater than or equal to 2,000 rpm.

(3) Limit the emissions of PM in the stationary CI internal combustion engine exhaust to 0.40 g/KW-hr (0.30 g/HP-hr).

(e) Owners and operators of emergency stationary CI ICE with a displacement of less than 30 liters per cylinder who conduct performance tests in-use must meet the NTE standards as indicated in § 60.4212.

(f) Owners and operators of any modified or reconstructed emergency stationary CI ICE subject to this subpart must meet the emission standards applicable to the model year, maximum engine power, and displacement of the modified or reconstructed CI ICE that are specified in paragraphs (a) through (e) of this section.

[71 FR 39172, July 11, 2006, as amended at 76 FR 37969, June 28, 2011; 86 FR 34358, June 29, 2021]

§ 60.4206 How long must I meet the emission standards if I am an owner or operator of a stationary CI internal combustion engine?

Owners and operators of stationary CI ICE must operate and maintain stationary CI ICE that achieve the emission standards as required in §§ 60.4204 and 60.4205 over the entire life of the engine.

[76 FR 37969, June 28, 2011]

Fuel Requirements for Owners and Operators

§ 60.4207 What fuel requirements must I meet if I am an owner or operator of a stationary CI internal combustion engine subject to this subpart?

(a) [Reserved]

(b) Beginning October 1, 2010, owners and operators of stationary CI ICE subject to this subpart with a displacement of less than 30 liters per cylinder that use diesel fuel must use diesel fuel that meets the requirements of 40 CFR 1090.305 for nonroad diesel fuel, except that any existing diesel fuel purchased (or otherwise obtained) prior to October 1, 2010, may be used until depleted.

(c) [Reserved]

(d) Beginning June 1, 2012, owners and operators of stationary CI ICE subject to this subpart with a displacement of greater than or equal to 30 liters per cylinder must use diesel fuel that meets a maximum per-gallon sulfur content of 1,000 parts per million (ppm).

(e) Stationary CI ICE that have a national security exemption under § 60.4200(d) are also exempt from the fuel requirements in this section.

[71 FR 39172, July 11, 2006, as amended at 76 FR 37969, June 28, 2011; 78 FR 6695, Jan. 30, 2013; 85 FR 78463, Dec. 4, 2020]

OTHER REQUIREMENTS FOR OWNERS AND OPERATORS

§ 60.4208 What is the deadline for importing or installing stationary CI ICE produced in previous model years?

(a) After December 31, 2008, owners and operators may not install stationary CI ICE (excluding fire pump engines) that do not meet the applicable requirements for 2007 model year engines.

(b) After December 31, 2009, owners and operators may not install stationary CI ICE with a maximum engine power of less than 19 KW (25 HP) (excluding fire pump engines) that do not meet the applicable requirements for 2008 model year engines.

(c) After December 31, 2014, owners and operators may not install non-emergency stationary CI ICE with a maximum engine power of greater than or equal to 19 KW (25 HP) and less than 56 KW (75 HP) that do not meet the applicable requirements for 2013 model year non-emergency engines.

(d) After December 31, 2013, owners and operators may not install non-emergency stationary CI ICE with a maximum engine power of greater than or equal to 56 KW (75 HP) and less than 130 KW (175 HP) that do not meet the applicable requirements for 2012 model year non-emergency engines.

(e) After December 31, 2012, owners and operators may not install non-emergency stationary CI ICE with a maximum engine power of greater than or equal to 130 KW (175 HP), including those above 560 KW (750 HP), that do not meet the applicable requirements for 2011 model year non-emergency engines.

(f) After December 31, 2016, owners and operators may not install non-emergency stationary CI ICE with a maximum engine power of greater than or equal to 560 KW (750 HP) that do not meet the applicable requirements for 2015 model year non-emergency engines.

(g) After December 31, 2018, owners and operators may not install non-emergency stationary CI ICE with a maximum engine power greater than or equal to 600 KW (804 HP) and less than 2,000 KW (2,680 HP) and a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder that do not meet the applicable requirements for 2017 model year non-emergency engines.

(h) In addition to the requirements specified in §§ 60.4201, 60.4202, 60.4204, and 60.4205, it is prohibited to import stationary CI ICE with a displacement of less than 30 liters per cylinder that do not meet the applicable requirements specified in paragraphs (a) through (g) of this section after the dates specified in paragraphs (a) through (g) of this section.

(i) The requirements of this section do not apply to owners or operators of stationary CI ICE that have been modified, reconstructed, and do not apply to engines that were removed from one existing location and reinstalled at a new location.

[71 FR 39172, July 11, 2006, as amended at 76 FR 37969, June 28, 2011]

§ 60.4209 What are the monitoring requirements if I am an owner or operator of a stationary CI internal combustion engine?

If you are an owner or operator, you must meet the monitoring requirements of this section. In addition, you must also meet the monitoring requirements specified in § 60.4211.

(a) If you are an owner or operator of an emergency stationary CI internal combustion engine that does not meet the standards applicable to non-emergency engines, you must install a non-resettable hour meter prior to startup of the engine.

(b) If you are an owner or operator of a stationary CI internal combustion engine equipped with a diesel particulate filter to comply with the emission standards in § 60.4204, the diesel particulate filter must be installed with a backpressure monitor that notifies the owner or operator when the high backpressure limit of the engine is approached.

[71 FR 39172, July 11, 2006, as amended at 76 FR 37969, June 28, 2011]

Compliance Requirements

§ 60.4210 What are my compliance requirements if I am a stationary CI internal combustion engine manufacturer?

(a) Stationary CI internal combustion engine manufacturers must certify their stationary CI ICE with a displacement of less than 10 liters per cylinder to the emission standards specified in §§ 60.4201(a) through (c) and 60.4202(a), (b), and (d) using the certification procedures required in 40 CFR part 1039, subpart C, and must test their engines as specified in 40 CFR part 1039. For the purposes of this subpart, engines certified to the standards in Table 1 to this subpart shall be subject to the same certification procedures required for engines certified to the Tier 1 standards in 40 CFR part 1039, appendix I. For the purposes of this subpart, engines certified to the standards in Table 4 to this subpart shall be subject to the same certification procedures required for engines certified to the Tier 1 standards in 40 CFR part 1039, appendix I, except that engines with NFPA nameplate power of less than 37 KW (50 HP) certified to model year 2011 or later standards shall be subject to the same requirements as engines certified to the standards in 40 CFR part 1039.

(b) Stationary CI internal combustion engine manufacturers must certify their stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder to the emission standards specified in §§ 60.4201(d) and (e) and 60.4202(e) and (f) using the certification procedures required in 40 CFR part 1042, subpart C, and must test their engines as specified in 40 CFR part 1042.

(c) Stationary CI internal combustion engine manufacturers must meet the requirements of 40 CFR 1039.120, 1039.125, 1039.130, and 1039.135 and 40 CFR part 1068 for engines that are certified to the emission standards in 40 CFR part 1039. Stationary CI internal combustion engine manufacturers must meet the corresponding provisions of 40 CFR part 1042 for engines that would be covered by that part if they were nonroad (including marine) engines. Labels on such engines must refer to stationary engines, rather than or in addition to nonroad or marine engines, as appropriate. Stationary CI internal combustion engine manufacturers must label their engines according to paragraphs (c)(1) through (3) of this section.

(1) Stationary CI internal combustion engines manufactured from January 1, 2006 to March 31, 2006 (January 1, 2006 to June 30, 2006 for fire pump engines), other than those that are part of certified engine families under the nonroad CI engine regulations, must be labeled according to 40 CFR 1039.20.

(2) Stationary CI internal combustion engines manufactured from April 1, 2006 to December 31, 2006 (or, for fire pump engines, July 1, 2006 to December 31 of the year preceding the year listed in table 3 to this subpart) must be labeled according to paragraphs (c)(2)(i) through (iii) of this section:

(i) Stationary CI internal combustion engines that are part of certified engine families under the nonroad regulations must meet the labeling requirements for nonroad CI engines, but do not have to meet the labeling requirements in 40 CFR 1039.20.

(ii) Stationary CI internal combustion engines that meet Tier 1 requirements (or requirements for fire pumps) under this subpart, but do not meet the requirements applicable to nonroad CI engines must be labeled according to 40 CFR 1039.20. The engine manufacturer may add language to the label clarifying that the engine meets Tier 1 requirements (or requirements for fire pumps) of this subpart.

(iii) Stationary CI internal combustion engines manufactured after April 1, 2006 that do not meet Tier 1 requirements of this subpart, or fire pumps engines manufactured after July 1, 2006 that do not meet the requirements for fire pumps under this subpart, may not be used in the U.S. If any such engines are manufactured in the U.S. after April 1, 2006 (July 1, 2006 for fire pump engines), they must be exported or must be brought into compliance with the appropriate standards prior to initial operation. The export provisions of 40 CFR 1068.230 would apply to engines for export and the manufacturers must label such engines according to 40 CFR 1068.230.

(3) Stationary CI internal combustion engines manufactured after January 1, 2007 (for fire pump engines, after January 1 of the year listed in table 3 to this subpart, as applicable) must be labeled according to paragraphs (c)(3)(i) through (iii) of this section.

(i) Stationary CI internal combustion engines that meet the requirements of this subpart and the corresponding requirements for nonroad (including marine) engines of the same model year and HP must be labeled according to the provisions in 40 CFR part 1039 or 1042, as appropriate.

(ii) Stationary CI internal combustion engines that meet the requirements of this subpart, but are not certified to the standards applicable to nonroad (including marine) engines of the same model year and HP must be labeled according to the provisions in 40 CFR part 1039 or 1042, as appropriate, but the words “stationary” must be included instead of “nonroad” or “marine” on the label. In addition, such engines must be labeled according to 40 CFR 1039.20.

(iii) Stationary CI internal combustion engines that do not meet the requirements of this subpart must be labeled according to 40 CFR 1068.230 and must be exported under the provisions of 40 CFR 1068.230.

(d) An engine manufacturer certifying an engine family or families to standards under this subpart that are identical to standards applicable under 40 CFR part 1039 or 1042 for that model year may certify any such family that contains both nonroad (including marine) and stationary engines as a single engine family and/or may include any such family containing stationary engines in the averaging, banking, and trading provisions applicable for such engines under those parts.

(e) Manufacturers of engine families discussed in paragraph (d) of this section may meet the labeling requirements referred to in paragraph (c) of this section for stationary CI ICE by either adding a separate label containing the information required in paragraph (c) of this section or by adding the words “and stationary” after the word “nonroad” or “marine,” as appropriate, to the label.

(f) Starting with the model years shown in table 5 to this subpart, stationary CI internal combustion engine manufacturers must add a permanent label stating that the engine is for stationary emergency use only to each new emergency stationary CI internal combustion engine greater than or equal to 19 KW (25 HP) that meets all the emission standards for emergency engines in § 60.4202 but does not meet all the emission standards for non-emergency engines in § 60.4201. The label must be added according to the labeling requirements specified in 40 CFR 1039.135(b). Engine manufacturers must specify in the owner's manual that operation of emergency engines is limited to emergency operations and required maintenance and testing.

(g) Manufacturers of fire pump engines may use the test cycle in table 6 to this subpart for testing fire pump engines and may test at the NFPA certified nameplate HP, provided that the engine is labeled as “Fire Pump Applications Only”.

(h) Engine manufacturers, including importers, may introduce into commerce uncertified engines or engines certified to earlier standards that were manufactured before the new or changed standards took effect until inventories are depleted, as long as such engines are part of normal inventory. For example, if the engine manufacturers' normal industry practice is to keep on hand a one-month supply of engines based on its projected sales, and a new tier of standards starts to apply for the 2009 model year, the engine manufacturer may manufacture engines based on the normal inventory requirements late in the 2008 model year, and sell those engines for installation. The engine manufacturer may not circumvent the provisions of § 60.4201 or § 60.4202 by stockpiling engines that are built before new or changed standards take effect. Stockpiling of such engines beyond normal industry practice is a violation of this subpart.

(i) The replacement engine provisions of 40 CFR 1068.240 are applicable to stationary CI engines replacing existing equipment that is less than 15 years old.

(j) Stationary CI ICE manufacturers may equip their stationary CI internal combustion engines certified to the emission standards in 40 CFR part 1039 with AECDs for qualified emergency situations according to the requirements of 40 CFR 1039.665. Manufacturers of stationary CI ICE equipped with AECDs as allowed by 40 CFR 1039.665 must meet all the requirements in 40 CFR 1039.665 that apply to manufacturers.

Manufacturers must document that the engine complies with the Tier 1 standard in 40 CFR part 1039, appendix I, when the AECD is activated. Manufacturers must provide any relevant testing, engineering analysis, or other information in sufficient detail to support such statement when applying for certification (including amending an existing certificate) of an engine equipped with an AECD as allowed by 40 CFR 1039.665.

(k) Manufacturers of any size may certify their emergency stationary CI internal combustion engines under this section using assigned deterioration factors established by EPA, consistent with 40 CFR 1039.240 and 1042.240.

[71 FR 39172, July 11, 2006, as amended at 76 FR 37969, June 28, 2011; 81 FR 44219, July 7, 2016; 86 FR 34358, June 29, 2021]

§ 60.4211 What are my compliance requirements if I am an owner or operator of a stationary CI internal combustion engine?

(a) If you are an owner or operator and must comply with the emission standards specified in this subpart, you must do all of the following, except as permitted under paragraph (g) of this section:

(1) Operate and maintain the stationary CI internal combustion engine and control device according to the manufacturer's emission-related written instructions;

(2) Change only those emission-related settings that are permitted by the manufacturer; and

(3) Meet the requirements of 40 CFR part 1068, as they apply to you.

(b) If you are an owner or operator of a pre-2007 model year stationary CI internal combustion engine and must comply with the emission standards specified in § 60.4204(a) or § 60.4205(a), or if you are an owner or operator of a CI fire pump engine that is manufactured prior to the model years in table 3 to this subpart and must comply with the emission standards specified in § 60.4205(c), you must demonstrate compliance according to one of the methods specified in paragraphs (b)(1) through (5) of this section.

(1) Purchasing an engine certified to emission standards for the same model year and maximum engine power as described in 40 CFR parts 1039 and 1042, as applicable. The engine must be installed and configured according to the manufacturer's specifications.

(2) Keeping records of performance test results for each pollutant for a test conducted on a similar engine. The test must have been conducted using the same methods specified in this subpart and these methods must have been followed correctly.

(3) Keeping records of engine manufacturer data indicating compliance with the standards.

(4) Keeping records of control device vendor data indicating compliance with the standards.

(5) Conducting an initial performance test to demonstrate compliance with the emission standards according to the requirements specified in § 60.4212, as applicable.

(c) If you are an owner or operator of a 2007 model year and later stationary CI internal combustion engine and must comply with the emission standards specified in § 60.4204(b) or § 60.4205(b), or if you are an owner or operator of a CI fire pump engine that is manufactured during or after the model year that applies to your fire pump engine power rating in table 3 to this subpart and must comply with the emission standards specified in § 60.4205(c), you must comply by purchasing an engine certified to the emission standards in § 60.4204(b), or § 60.4205(b) or (c), as applicable, for the same model year and

maximum (or in the case of fire pumps, NFPA nameplate) engine power. The engine must be installed and configured according to the manufacturer's emission-related specifications, except as permitted in paragraph (g) of this section.

(d) If you are an owner or operator and must comply with the emission standards specified in § 60.4204(c) or § 60.4205(d), you must demonstrate compliance according to the requirements specified in paragraphs (d)(1) through (3) of this section.

(1) Conducting an initial performance test to demonstrate initial compliance with the emission standards as specified in § 60.4213.

(2) Establishing operating parameters to be monitored continuously to ensure the stationary internal combustion engine continues to meet the emission standards. The owner or operator must petition the Administrator for approval of operating parameters to be monitored continuously. The petition must include the information described in paragraphs (d)(2)(i) through (v) of this section.

(i) Identification of the specific parameters you propose to monitor continuously;

(ii) A discussion of the relationship between these parameters and NO_X and PM emissions, identifying how the emissions of these pollutants change with changes in these parameters, and how limitations on these parameters will serve to limit NO_X and PM emissions;

(iii) A discussion of how you will establish the upper and/or lower values for these parameters which will establish the limits on these parameters in the operating limitations;

(iv) A discussion identifying the methods and the instruments you will use to monitor these parameters, as well as the relative accuracy and precision of these methods and instruments; and

(v) A discussion identifying the frequency and methods for recalibrating the instruments you will use for monitoring these parameters.

(3) For non-emergency engines with a displacement of greater than or equal to 30 liters per cylinder, conducting annual performance tests to demonstrate continuous compliance with the emission standards as specified in § 60.4213.

(e) If you are an owner or operator of a modified or reconstructed stationary CI internal combustion engine and must comply with the emission standards specified in § 60.4204(e) or § 60.4205(f), you must demonstrate compliance according to one of the methods specified in paragraphs (e)(1) or (2) of this section.

(1) Purchasing, or otherwise owning or operating, an engine certified to the emission standards in § 60.4204(e) or § 60.4205(f), as applicable.

(2) Conducting a performance test to demonstrate initial compliance with the emission standards according to the requirements specified in § 60.4212 or § 60.4213, as appropriate. The test must be conducted within 60 days after the engine commences operation after the modification or reconstruction.

(f) If you own or operate an emergency stationary ICE, you must operate the emergency stationary ICE according to the requirements in paragraphs (f)(1) through (3) of this section. In order for the engine to be considered an emergency stationary ICE under this subpart, any operation other than emergency operation, maintenance and testing, and operation in non-emergency situations for 50 hours per year, as

described in paragraphs (f)(1) through (3), is prohibited. If you do not operate the engine according to the requirements in paragraphs (f)(1) through (3), the engine will not be considered an emergency engine under this subpart and must meet all requirements for non-emergency engines.

(1) There is no time limit on the use of emergency stationary ICE in emergency situations.

(2) You may operate your emergency stationary ICE for the purpose specified in paragraph (f)(2)(i) of this section for a maximum of 100 hours per calendar year. Any operation for non-emergency situations as allowed by paragraph (f)(3) of this section counts as part of the 100 hours per calendar year allowed by this paragraph (f)(2).

(i) Emergency stationary ICE may be operated for maintenance checks and readiness testing, provided that the tests are recommended by federal, state or local government, the manufacturer, the vendor, the regional transmission organization or equivalent balancing authority and transmission operator, or the insurance company associated with the engine. The owner or operator may petition the Administrator for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the owner or operator maintains records indicating that federal, state, or local standards require maintenance and testing of emergency ICE beyond 100 hours per calendar year.

(ii)–(iii) [Reserved]

(3) Emergency stationary ICE may be operated for up to 50 hours per calendar year in non-emergency situations. The 50 hours of operation in non-emergency situations are counted as part of the 100 hours per calendar year for maintenance and testing provided in paragraph (f)(2) of this section. Except as provided in paragraph (f)(3)(i) of this section, the 50 hours per calendar year for non-emergency situations cannot be used for peak shaving or non-emergency demand response, or to generate income for a facility to an electric grid or otherwise supply power as part of a financial arrangement with another entity.

(i) The 50 hours per year for non-emergency situations can be used to supply power as part of a financial arrangement with another entity if all of the following conditions are met:

(A) The engine is dispatched by the local balancing authority or local transmission and distribution system operator;

(B) The dispatch is intended to mitigate local transmission and/or distribution limitations so as to avert potential voltage collapse or line overloads that could lead to the interruption of power supply in a local area or region.

(C) The dispatch follows reliability, emergency operation or similar protocols that follow specific NERC, regional, state, public utility commission or local standards or guidelines.

(D) The power is provided only to the facility itself or to support the local transmission and distribution system.

(E) The owner or operator identifies and records the entity that dispatches the engine and the specific NERC, regional, state, public utility commission or local standards or guidelines that are being followed for dispatching the engine. The local balancing authority or local transmission and distribution system operator may keep these records on behalf of the engine owner or operator.

(ii) [Reserved]

(g) If you do not install, configure, operate, and maintain your engine and control device according to the manufacturer's emission-related written instructions, or you change emission-related settings in a way that is not permitted by the manufacturer, you must demonstrate compliance as follows:

(1) If you are an owner or operator of a stationary CI internal combustion engine with maximum engine power less than 100 HP, you must keep a maintenance plan and records of conducted maintenance to demonstrate compliance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, if you do not install and configure the engine and control device according to the manufacturer's emission-related written instructions, or you change the emission-related settings in a way that is not permitted by the manufacturer, you must conduct an initial performance test to demonstrate compliance with the applicable emission standards within 1 year of such action.

(2) If you are an owner or operator of a stationary CI internal combustion engine greater than or equal to 100 HP and less than or equal to 500 HP, you must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, you must conduct an initial performance test to demonstrate compliance with the applicable emission standards within 1 year of startup, or within 1 year after an engine and control device is no longer installed, configured, operated, and maintained in accordance with the manufacturer's emission-related written instructions, or within 1 year after you change emission-related settings in a way that is not permitted by the manufacturer.

(3) If you are an owner or operator of a stationary CI internal combustion engine greater than 500 HP, you must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, you must conduct an initial performance test to demonstrate compliance with the applicable emission standards within 1 year of startup, or within 1 year after an engine and control device is no longer installed, configured, operated, and maintained in accordance with the manufacturer's emission-related written instructions, or within 1 year after you change emission-related settings in a way that is not permitted by the manufacturer. You must conduct subsequent performance testing every 8,760 hours of engine operation or 3 years, whichever comes first, thereafter to demonstrate compliance with the applicable emission standards.

(h) The requirements for operators and prohibited acts specified in 40 CFR 1039.665 apply to owners or operators of stationary CI ICE equipped with AECDs for qualified emergency situations as allowed by 40 CFR 1039.665.

[71 FR 39172, July 11, 2006, as amended at 76 FR 37970, June 28, 2011; 78 FR 6695, Jan. 30, 2013; 81 FR 44219, July 7, 2016; 86 FR 34359, June 29, 2021; 87 FR 48605, Aug. 10, 2022]

Testing Requirements for Owners and Operators

§ 60.4212 What test methods and other procedures must I use if I am an owner or operator of a stationary CI internal combustion engine with a displacement of less than 30 liters per cylinder?

Owners and operators of stationary CI ICE with a displacement of less than 30 liters per cylinder who conduct performance tests pursuant to this subpart must do so according to paragraphs (a) through (e) of this section.

(a) The performance test must be conducted according to the in-use testing procedures in 40 CFR part 1039, subpart F, for stationary CI ICE with a displacement of less than 10 liters per cylinder, and according to 40 CFR part 1042, subpart F, for stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder. Alternatively, stationary CI ICE that are complying with Tier 2 or Tier 3 emission standards as described in 40 CFR part 1039, appendix I, or with Tier 2 emission standards as described in 40 CFR part 1042, appendix I, may follow the testing procedures specified in § 60.4213, as appropriate.

(b) Exhaust emissions from stationary CI ICE that are complying with the emission standards for new CI engines in 40 CFR part 1039 must not exceed the not-to-exceed (NTE) standards for the same model year and maximum engine power as required in 40 CFR 1039.101(e) and 40 CFR 1039.102(g)(1), except as specified in 40 CFR 1039.104(d). This requirement starts when NTE requirements take effect for nonroad diesel engines under 40 CFR part 1039.

(c) Exhaust emissions from stationary CI ICE subject to Tier 2 or Tier 3 emission standards as described in 40 CFR part 1039, appendix I, or Tier 2 emission standards as described in 40 CFR part 1042, appendix I, must not exceed the NTE numerical requirements, rounded to the same number of decimal places as the applicable standard, determined from the following equation:

$$\text{NTE requirement for each pollutant} = (1.25) \times (\text{STD}) \quad \text{(Eq. 1)}$$

Where:

STD = The standard specified for that pollutant in 40 CFR part 1039 or 1042, as applicable.

(d) Exhaust emissions from stationary CI ICE that are complying with the emission standards for pre-2007 model year engines in § 60.4204(a), § 60.4205(a), or § 60.4205(c) must not exceed the NTE numerical requirements, rounded to the same number of decimal places as the applicable standard in § 60.4204(a), § 60.4205(a), or § 60.4205(c), determined from the equation in paragraph (c) of this section.

Where:

STD = The standard specified for that pollutant in § 60.4204(a), § 60.4205(a), or § 60.4205(c).

Alternatively, stationary CI ICE that are complying with the emission standards for pre-2007 model year engines in § 60.4204(a), § 60.4205(a), or § 60.4205(c) may follow the testing procedures specified in § 60.4213, as appropriate.

(e) Exhaust emissions from stationary CI ICE that are complying with the emission standards for new CI engines in 40 CFR part 1042 must not exceed the NTE standards for the same model year and maximum engine power as required in 40 CFR 1042.101(c).

[71 FR 39172, July 11, 2006, as amended at 76 FR 37971, June 28, 2011; 86 FR 34359, June 29, 2021]

§ 60.4213 What test methods and other procedures must I use if I am an owner or operator of a stationary CI internal combustion engine with a displacement of greater than or equal to 30 liters per cylinder?

Owners and operators of stationary CI ICE with a displacement of greater than or equal to 30 liters per cylinder must conduct performance tests according to paragraphs (a) through (f) of this section.

(a) Each performance test must be conducted according to the requirements in § 60.8 and under the specific conditions that this subpart specifies in table 7. The test must be conducted within 10 percent of 100 percent peak (or the highest achievable) load.

(b) You may not conduct performance tests during periods of startup, shutdown, or malfunction, as specified in § 60.8(c).

(c) You must conduct three separate test runs for each performance test required in this section, as specified in § 60.8(f). Each test run must last at least 1 hour.

(d) To determine compliance with the percent reduction requirement, you must follow the requirements as specified in paragraphs (d)(1) through (3) of this section.

(1) You must use Equation 2 of this section to determine compliance with the percent reduction requirement:

$$\frac{C_i - C_o}{C_i} \times 100 = R \qquad \text{(Eq. 2)}$$

Where:

C_i = concentration of NO_X or PM at the control device inlet,

C_o = concentration of NO_X or PM at the control device outlet, and

R = percent reduction of NO_X or PM emissions.

(2) You must normalize the NO_X or PM concentrations at the inlet and outlet of the control device to a dry basis and to 15 percent oxygen (O_2) using Equation 3 of this section, or an equivalent percent carbon dioxide (CO_2) using the procedures described in paragraph (d)(3) of this section.

$$C_{adj} = C_d \frac{5.9}{20.9 - \%\ O_2} \qquad \text{(Eq. 3)}$$

Where:

C_{adj} = Calculated NO_X or PM concentration adjusted to 15 percent O_2.

C_d = Measured concentration of NO_X or PM, uncorrected.

5.9 = 20.9 percent O_2–15 percent O_2, the defined O_2 correction value, percent.

$\%O_2$ = Measured O_2 concentration, dry basis, percent.

(3) If pollutant concentrations are to be corrected to 15 percent O_2 and CO_2 concentration is measured in lieu of O_2 concentration measurement, a CO_2 correction factor is needed. Calculate the CO_2 correction factor as described in paragraphs (d)(3)(i) through (iii) of this section.

(i) Calculate the fuel-specific F_o value for the fuel burned during the test using values obtained from Method 19, Section 5.2, and the following equation:

$$F_o = \frac{0.209_{F_d}}{F_c} \qquad \text{(Eq. 4)}$$

Where:

F_o = Fuel factor based on the ratio of O_2 volume to the ultimate CO_2 volume produced by the fuel at zero percent excess air.

0.209 = Fraction of air that is O_2, percent/100.

F_d = Ratio of the volume of dry effluent gas to the gross calorific value of the fuel from Method 19, dsm^3/J ($dscf/10^6$ Btu).

F_c = Ratio of the volume of CO_2 produced to the gross calorific value of the fuel from Method 19, dsm^3/J ($dscf/10^6$ Btu).

(ii) Calculate the CO_2 correction factor for correcting measurement data to 15 percent O_2, as follows:

$$X_{CO_2} = \frac{5.9}{F_o} \qquad \text{(Eq. 5)}$$

Where:

X_{CO2} = CO_2 correction factor, percent.

5.9 = 20.9 percent O_2–15 percent O_2, the defined O_2 correction value, percent.

(iii) Calculate the NO_X and PM gas concentrations adjusted to 15 percent O_2 using CO_2 as follows:

$$C_{adj} = C_d \frac{X_{CO_2}}{\%CO_2} \qquad \text{(Eq. 6)}$$

Where:

C_{adj} = Calculated NO_X or PM concentration adjusted to 15 percent O_2.

C_d = Measured concentration of NO_X or PM, uncorrected.

$\%CO_2$ = Measured CO_2 concentration, dry basis, percent.

(e) To determine compliance with the NO_X mass per unit output emission limitation, convert the concentration of NO_X in the engine exhaust using Equation 7 of this section:

$$ER = \frac{C_d \times 1.912 \times 10^{-3} \times Q \times T}{KW\text{-hour}} \quad \text{(Eq. 7)}$$

Where:

ER = Emission rate in grams per KW-hour.

C_d = Measured NO_X concentration in ppm.

$1.912x10^{-3}$ = Conversion constant for ppm NO_X to grams per standard cubic meter at 25 degrees Celsius.

Q = Stack gas volumetric flow rate, in standard cubic meter per hour.

T = Time of test run, in hours.

KW-hour = Brake work of the engine, in KW-hour.

(f) To determine compliance with the PM mass per unit output emission limitation, convert the concentration of PM in the engine exhaust using Equation 8 of this section:

$$ER = \frac{C_{adj} \times Q \times T}{KW\text{-hour}} \quad \text{(Eq. 8)}$$

Where:

ER = Emission rate in grams per KW-hour.

C_{adj} = Calculated PM concentration in grams per standard cubic meter.

Q = Stack gas volumetric flow rate, in standard cubic meter per hour.

T = Time of test run, in hours.

KW-hour = Energy output of the engine, in KW.

[71 FR 39172, July 11, 2006, as amended at 76 FR 37971, June 28, 2011]

Notification, Reports, and Records for Owners and Operators

§ 60.4214 What are my notification, reporting, and recordkeeping requirements if I am an owner or operator of a stationary CI internal combustion engine?

(a) Owners and operators of non-emergency stationary CI ICE that are greater than 2,237 KW (3,000 HP), or have a displacement of greater than or equal to 10 liters per cylinder, or are pre-2007 model year engines that are greater than 130 KW (175 HP) and not certified, must meet the requirements of paragraphs (a)(1) and (2) of this section.

(1) Submit an initial notification as required in § 60.7(a)(1). The notification must include the information in paragraphs (a)(1)(i) through (v) of this section.

(i) Name and address of the owner or operator;

(ii) The address of the affected source;

(iii) Engine information including make, model, engine family, serial number, model year, maximum engine power, and engine displacement;

(iv) Emission control equipment; and

(v) Fuel used.

(2) Keep records of the information in paragraphs (a)(2)(i) through (iv) of this section.

(i) All notifications submitted to comply with this subpart and all documentation supporting any notification.

(ii) Maintenance conducted on the engine.

(iii) If the stationary CI internal combustion is a certified engine, documentation from the manufacturer that the engine is certified to meet the emission standards.

(iv) If the stationary CI internal combustion is not a certified engine, documentation that the engine meets the emission standards.

(b) If the stationary CI internal combustion engine is an emergency stationary internal combustion engine, the owner or operator is not required to submit an initial notification. Starting with the model years in table 5 to this subpart, if the emergency engine does not meet the standards applicable to non-emergency engines in the applicable model year, the owner or operator must keep records of the operation of the engine in emergency and non-emergency service that are recorded through the non-resettable hour meter. The owner must record the time of operation of the engine and the reason the engine was in operation during that time.

(c) If the stationary CI internal combustion engine is equipped with a diesel particulate filter, the owner or operator must keep records of any corrective action taken after the backpressure monitor has notified the owner or operator that the high backpressure limit of the engine is approached.

(d) If you own or operate an emergency stationary CI ICE with a maximum engine power more than 100 HP that operates for the purpose specified in § 60.4211(f)(3)(i), you must submit an annual report according to the requirements in paragraphs (d)(1) through (3) of this section.

(1) The report must contain the following information:

(i) Company name and address where the engine is located.

(ii) Date of the report and beginning and ending dates of the reporting period.

(iii) Engine site rating and model year.

(iv) Latitude and longitude of the engine in decimal degrees reported to the fifth decimal place.

(v)–(vi) [Reserved]

(vii) Hours spent for operation for the purposes specified in § 60.4211(f)(3)(i), including the date, start time, and end time for engine operation for the purposes specified in § 60.4211(f)(3)(i). The report must also identify the entity that dispatched the engine and the situation that necessitated the dispatch of the engine.

(2) The first annual report must cover the calendar year 2015 and must be submitted no later than March 31, 2016. Subsequent annual reports for each calendar year must be submitted no later than March 31 of the following calendar year.

(3) The annual report must be submitted electronically using the subpart specific reporting form in the Compliance and Emissions Data Reporting Interface (CEDRI) that is accessed through EPA's Central Data Exchange (CDX) (*www.epa.gov/cdx*). However, if the reporting form specific to this subpart is not available in CEDRI at the time that the report is due, the written report must be submitted to the Administrator at the appropriate address listed in § 60.4.

(e) Owners or operators of stationary CI ICE equipped with AECDs pursuant to the requirements of 40 CFR 1039.665 must report the use of AECDs as required by 40 CFR 1039.665(e).

[71 FR 39172, July 11, 2006, as amended at 78 FR 6696, Jan. 30, 2013; 81 FR 44219, July 7, 2016; 87 FR 48606, Aug. 10, 2022]

Special Requirements

§ 60.4215 What requirements must I meet for engines used in Guam, American Samoa, or the Commonwealth of the Northern Mariana Islands?

(a) Stationary CI ICE with a displacement of less than 30 liters per cylinder that are used in Guam, American Samoa, or the Commonwealth of the Northern Mariana Islands are required to meet the applicable emission standards in §§ 60.4202 and 60.4205.

(b) Stationary CI ICE that are used in Guam, American Samoa, or the Commonwealth of the Northern Mariana Islands are not required to meet the fuel requirements in § 60.4207.

(c) Stationary CI ICE with a displacement of greater than or equal to 30 liters per cylinder that are used in Guam, American Samoa, or the Commonwealth of the Northern Mariana Islands are required to meet the following emission standards:

(1) For engines installed prior to January 1, 2012, limit the emissions of NO_X in the stationary CI internal combustion engine exhaust to the following:

(i) 17.0 g/KW-hr (12.7 g/HP-hr) when maximum engine speed is less than 130 rpm;

(ii) $45 \cdot n^{-0.2}$ g/KW-hr ($34 \cdot n^{-0.2}$ g/HP-hr) when maximum engine speed is 130 or more but less than 2,000 rpm, where n is maximum engine speed; and

(iii) 9.8 g/KW-hr (7.3 g/HP-hr) when maximum engine speed is 2,000 rpm or more.

(2) For engines installed on or after January 1, 2012, limit the emissions of NO_X in the stationary CI internal combustion engine exhaust to the following:

(i) 14.4 g/KW-hr (10.7 g/HP-hr) when maximum engine speed is less than 130 rpm;

(ii) $44 \cdot n^{-0.23}$ g/KW-hr ($33 \cdot n^{-0.23}$ g/HP-hr) when maximum engine speed is greater than or equal to 130 but less than 2,000 rpm and where n is maximum engine speed; and

(iii) 7.7 g/KW-hr (5.7 g/HP-hr) when maximum engine speed is greater than or equal to 2,000 rpm.

(3) Limit the emissions of PM in the stationary CI internal combustion engine exhaust to 0.40 g/KW-hr (0.30 g/HP-hr).

[71 FR 39172, July 11, 2006, as amended at 76 FR 37971, June 28, 2011]

§ 60.4216 What requirements must I meet for engines used in Alaska?

(a) Prior to December 1, 2010, owners and operators of stationary CI ICE with a displacement of less than 30 liters per cylinder located in areas of Alaska not accessible by the FAHS should refer to 40 CFR part 69 to determine the diesel fuel requirements applicable to such engines.

(b) Except as indicated in paragraph (c) of this section, manufacturers, owners and operators of stationary CI ICE with a displacement of less than 10 liters per cylinder located in remote areas of Alaska may meet the requirements of this subpart by manufacturing and installing engines meeting the Tier 2 or Tier 3 emission standards described in 40 CFR part 1042 for the same model year, displacement, and maximum engine power, as appropriate, rather than the otherwise applicable requirements of 40 CFR part 1039, as indicated in §§ 60.4201(f) and 60.4202(g).

(c) Manufacturers, owners, and operators of stationary CI ICE that are located in remote areas of Alaska may choose to meet the applicable emission standards for emergency engines in §§ 60.4202 and 60.4205, and not those for non-emergency engines in §§ 60.4201 and 60.4204, except that for 2014 model year and later nonemergency CI ICE, the owner or operator of any such engine must have that engine certified as meeting at least the Tier 3 PM standards identified in appendix I of 40 CFR part 1039 or in 40 CFR 1042.101.

(d) The provisions of § 60.4207 do not apply to owners and operators of pre-2014 model year stationary CI ICE subject to this subpart that are located in remote areas of Alaska.

(e) The provisions of § 60.4208(a) do not apply to owners and operators of stationary CI ICE subject to this subpart that are located in areas of Alaska not accessible by the FAHS until after December 31, 2009.

(f) The provisions of this section and § 60.4207 do not prevent owners and operators of stationary CI ICE subject to this subpart that are located in remote areas of Alaska from using fuels mixed with used lubricating oil, in volumes of up to 1.75 percent of the total fuel. The sulfur content of the used lubricating oil must be less than 200 parts per million. The used lubricating oil must meet the on-specification levels and properties for used oil in 40 CFR 279.11.

[76 FR 37971, June 28, 2011, as amended at 81 FR 44219, July 7, 2016; 86 FR 34359, June 29, 2021]

§ 60.4217 What emission standards must I meet if I am an owner or operator of a stationary internal combustion engine using special fuels?

Owners and operators of stationary CI ICE that do not use diesel fuel may petition the Administrator for approval of alternative emission standards, if they can demonstrate that they use a fuel that is not the fuel on which the manufacturer of the engine certified the engine and that the engine cannot meet the applicable standards required in § 60.4204 or § 60.4205 using such fuels and that use of such fuel is appropriate and reasonably necessary, considering cost, energy, technical feasibility, human health and environmental, and other factors, for the operation of the engine.

[76 FR 37972, June 28, 2011]

General Provisions

§ 60.4218 What General Provisions and confidential information provisions apply to me?

(a) Table 8 to this subpart shows which parts of the General Provisions in §§ 60.1 through 60.19 apply to you.

(b) The provisions of 40 CFR 1068.10 and 1068.11 apply for engine manufacturers. For others, the general confidential business information (CBI) provisions apply as described in 40 CFR part 2.

[88 FR 4471, Jan. 24, 2023]

Definitions

§ 60.4219 What definitions apply to this subpart?

As used in this subpart, all terms not defined herein shall have the meaning given them in the CAA and in subpart A of this part.

Alaska Railbelt Grid means the service areas of the six regulated public utilities that extend from Fairbanks to Anchorage and the Kenai Peninsula. These utilities are Golden Valley Electric Association; Chugach Electric Association; Matanuska Electric Association; Homer Electric Association; Anchorage Municipal Light & Power; and the City of Seward Electric System.

Certified emissions life means the period during which the engine is designed to properly function in terms of reliability and fuel consumption, without being remanufactured, specified as a number of hours of operation or calendar years, whichever comes first. The values for certified emissions life for stationary CI ICE with a displacement of less than 10 liters per cylinder are given in 40 CFR 1039.101(g). The values for certified emissions life for stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder are given in 40 CFR 1042.101(e).

Combustion turbine means all equipment, including but not limited to the turbine, the fuel, air, lubrication and exhaust gas systems, control systems (except emissions control equipment), and any ancillary components and sub-components comprising any simple cycle combustion turbine, any regenerative/recuperative cycle combustion turbine, the combustion turbine portion of any cogeneration cycle combustion system, or the combustion turbine portion of any combined cycle steam/electric generating system.

Compression ignition means relating to a type of stationary internal combustion engine that is not a spark ignition engine.

Date of manufacture means one of the following things:

(1) For freshly manufactured engines and modified engines, date of manufacture means the date the engine is originally produced.

(2) For reconstructed engines, date of manufacture means the date the engine was originally produced, except as specified in paragraph (3) of this definition.

(3) Reconstructed engines are assigned a new date of manufacture if the fixed capital cost of the new and refurbished components exceeds 75 percent of the fixed capital cost of a comparable entirely new facility. An engine that is produced from a previously used engine block does not retain the date of manufacture of the engine in which the engine block was previously used if the engine is produced using all new components except for the engine block. In these cases, the date of manufacture is the date of reconstruction or the date the new engine is produced.

Diesel fuel means any liquid obtained from the distillation of petroleum with a boiling point of approximately 150 to 360 degrees Celsius. One commonly used form is number 2 distillate oil.

Diesel particulate filter means an emission control technology that reduces PM emissions by trapping the particles in a flow filter substrate and periodically removes the collected particles by either physical action or by oxidizing (burning off) the particles in a process called regeneration.

Emergency stationary internal combustion engine means any stationary reciprocating internal combustion engine that meets all of the criteria in paragraphs (1) through (3) of this definition. All emergency stationary ICE must comply with the requirements specified in § 60.4211(f) in order to be considered emergency stationary ICE. If the engine does not comply with the requirements specified in § 60.4211(f), then it is not considered to be an emergency stationary ICE under this subpart.

(1) The stationary ICE is operated to provide electrical power or mechanical work during an emergency situation. Examples include stationary ICE used to produce power for critical networks or equipment (including power supplied to portions of a facility) when electric power from the local utility (or the normal power source, if the facility runs on its own power production) is interrupted, or stationary ICE used to pump water in the case of fire or flood, etc.

(2) The stationary ICE is operated under limited circumstances for situations not included in paragraph (1) of this definition, as specified in § 60.4211(f).

(3) The stationary ICE operates as part of a financial arrangement with another entity in situations not included in paragraph (1) of this definition only as allowed in § 60.4211(f)(3)(i).

Engine manufacturer means the manufacturer of the engine. See the definition of "manufacturer" in this section.

Fire pump engine means an emergency stationary internal combustion engine certified to NFPA requirements that is used to provide power to pump water for fire suppression or protection.

Freshly manufactured engine means an engine that has not been placed into service. An engine becomes freshly manufactured when it is originally produced.

Installed means the engine is placed and secured at the location where it is intended to be operated.

Manufacturer has the meaning given in section 216(1) of the Act. In general, this term includes any person who manufactures a stationary engine for sale in the United States or otherwise introduces a new stationary engine into commerce in the United States. This includes importers who import stationary engines for sale or resale.

Maximum engine power means maximum engine power as defined in 40 CFR 1039.801.

Model year means the calendar year in which an engine is manufactured (see "date of manufacture"), except as follows:

(1) Model year means the annual new model production period of the engine manufacturer in which an engine is manufactured (see "date of manufacture"), if the annual new model production period is different than the calendar year and includes January 1 of the calendar year for which the model year is named. It may not begin before January 2 of the previous calendar year and it must end by December 31 of the named calendar year.

(2) For an engine that is converted to a stationary engine after being placed into service as a nonroad or other non-stationary engine, model year means the calendar year or new model production period in which the engine was manufactured (see "date of manufacture").

Other internal combustion engine means any internal combustion engine, except combustion turbines, which is not a reciprocating internal combustion engine or rotary internal combustion engine.

Reciprocating internal combustion engine means any internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work.

Remote areas of Alaska means areas of Alaska that meet either paragraph (1) or (2) of this definition.

(1) Areas of Alaska that are not accessible by the Federal Aid Highway System (FAHS).

(2) Areas of Alaska that meet all of the following criteria:

(i) The only connection to the FAHS is through the Alaska Marine Highway System, or the stationary CI ICE operation is within an isolated grid in Alaska that is not connected to the statewide electrical grid referred to as the Alaska Railbelt Grid.

(ii) At least 10 percent of the power generated by the stationary CI ICE on an annual basis is used for residential purposes.

(iii) The generating capacity of the source is less than 12 megawatts, or the stationary CI ICE is used exclusively for backup power for renewable energy.

Rotary internal combustion engine means any internal combustion engine which uses rotary motion to convert heat energy into mechanical work.

Spark ignition means relating to a gasoline, natural gas, or liquefied petroleum gas fueled engine or any other type of engine with a spark plug (or other sparking device) and with operating characteristics significantly similar to the theoretical Otto combustion cycle. Spark ignition engines usually use a throttle to regulate intake air flow to control power during normal operation. Dual-fuel engines in which a liquid fuel (typically diesel fuel) is used for CI and gaseous fuel (typically natural gas) is used as the primary fuel at an annual average ratio of less than 2 parts diesel fuel to 100 parts total fuel on an energy equivalent basis are spark ignition engines.

Stationary internal combustion engine means any internal combustion engine, except combustion turbines, that converts heat energy into mechanical work and is not mobile. Stationary ICE differ from mobile ICE in that a stationary internal combustion engine is not a nonroad engine as defined at 40 CFR 1068.30 (excluding paragraph (2)(ii) of that definition), and is not used to propel a motor vehicle, aircraft, or a vehicle used solely for competition. Stationary ICE include reciprocating ICE, rotary ICE, and other ICE, except combustion turbines.

Subpart means 40 CFR part 60, subpart IIII.

[71 FR 39172, July 11, 2006, as amended at 76 FR 37972, June 28, 2011; 78 FR 6696, Jan. 30, 2013; 81 FR 44219, July 7, 2016; 86 FR 34360, June 29, 2021; 87 FR 48606, Aug. 10, 2022]

Table 1 to Subpart IIII of Part 60—Emission Standards for Stationary Pre-2007 Model Year Engines With a Displacement of <10 Liters per Cylinder and 2007–2010 Model Year Engines >2,237 KW (3,000 HP) and With a Displacement of <10 Liters per Cylinder

[As stated in §§ 60.4201(b), 60.4202(b), 60.4204(a), and 60.4205(a), you must comply with the following emission standards]

Maximum engine power	Emission standards for stationary pre-2007 model year engines with a displacement of <10 liters per cylinder and 2007–2010 model year engines >2,237 KW (3,000 HP) and with a displacement of <10 liters per cylinder in g/KW-hr (g/HP-hr)				
	NMHC + NO_X	HC	NO_X	CO	PM
KW<8 (HP<11)	10.5 (7.8)			8.0 (6.0)	1.0 (0.75)
8≤KW<19 (11≤HP<25)	9.5 (7.1)			6.6 (4.9)	0.80 (0.60)
19≤KW<37 (25≤HP<50)	9.5 (7.1)			5.5 (4.1)	0.80 (0.60)
37≤KW<56 (50≤HP<75)			9.2 (6.9)		
56≤KW<75 (75≤HP<100)			9.2 (6.9)		
75≤KW<130 (100≤HP<175)			9.2 (6.9)		
130≤KW<225 (175≤HP<300)		1.3 (1.0)	9.2 (6.9)	11.4 (8.5)	0.54 (0.40)
225≤KW<450 (300≤HP<600)		1.3 (1.0)	9.2 (6.9)	11.4 (8.5)	0.54 (0.40)
450≤KW≤560 (600≤HP≤750)		1.3 (1.0)	9.2 (6.9)	11.4 (8.5)	0.54 (0.40)
KW>560 (HP>750)		1.3 (1.0)	9.2 (6.9)	11.4 (8.5)	0.54 (0.40)

Table 2 to Subpart IIII of Part 60—Emission Standards for 2008 Model Year and Later Emergency Stationary CI ICE <37 KW (50 HP) With a Displacement of <10 Liters per Cylinder

[As stated in § 60.4202(a)(1), you must comply with the following emission standards]

Engine power	Emission standards for 2008 model year and later emergency stationary CI ICE <37 KW (50 HP) with a displacement of <10 liters per cylinder in g/KW-hr (g/HP-hr)			
	Model year(s)	NO_X + NMHC	CO	PM
KW<8 (HP<11)	2008 +	7.5 (5.6)	8.0 (6.0)	0.40 (0.30)
8≤KW<19 (11≤HP<25)	2008 +	7.5 (5.6)	6.6 (4.9)	0.40 (0.30)

Engine power	Emission standards for 2008 model year and later emergency stationary CI ICE <37 KW (50 HP) with a displacement of <10 liters per cylinder in g/KW-hr (g/HP-hr)			
	Model year(s)	NO_X + NMHC	CO	PM
19≤KW<37 (25≤HP<50)	2008 +	7.5 (5.6)	5.5 (4.1)	0.30 (0.22)

Table 3 to Subpart IIII of Part 60—Certification Requirements for Stationary Fire Pump Engines

As stated in § 60.4202(d), you must certify new stationary fire pump engines beginning with the following model years:

Engine power	Starting model year engine manufacturers must certify new stationary fire pump engines according to § 60.4202(d)[1]
KW<75 (HP<100)	2011
75≤KW<130 (100≤HP<175)	2010
130≤KW≤560 (175≤HP≤750)	2009
KW>560 (HP>750)	2008

[1]Manufacturers of fire pump stationary CI ICE with a maximum engine power greater than or equal to 37 kW (50 HP) and less than 450 KW (600 HP) and a rated speed of greater than 2,650 revolutions per minute (rpm) are not required to certify such engines until three model years following the model year indicated in this Table 3 for engines in the applicable engine power category.

[71 FR 39172, July 11, 2006, as amended at 76 FR 37972, June 28, 2011]

Table 4 to Subpart IIII of Part 60—Emission Standards for Stationary Fire Pump Engines

[As stated in §§ 60.4202(d) and 60.4205(c), you must comply with the following emission standards for stationary fire pump engines]

Maximum engine power	Model year(s)	NMHC + NO_X	CO	PM
KW<8 (HP<11)	2010 and earlier	10.5 (7.8)	8.0 (6.0)	1.0 (0.75)
	2011 +	7.5 (5.6)		0.40 (0.30)
8≤KW<19 (11≤HP<25)	2010 and earlier	9.5 (7.1)	6.6 (4.9)	0.80 (0.60)
	2011 +	7.5 (5.6)		0.40 (0.30)

Maximum engine power	Model year(s)	NMHC + NO_X	CO	PM
19≤KW<37 (25≤HP<50)	2010 and earlier	9.5 (7.1)	5.5 (4.1)	0.80 (0.60)
	2011 +	7.5 (5.6)		0.30 (0.22)
37≤KW<56 (50≤HP<75)	2010 and earlier	10.5 (7.8)	5.0 (3.7)	0.80 (0.60)
	2011 +[1]	4.7 (3.5)		0.40 (0.30)
56≤KW<75 (75≤HP<100)	2010 and earlier	10.5 (7.8)	5.0 (3.7)	0.80 (0.60)
	2011 +[1]	4.7 (3.5)		0.40 (0.30)
75≤KW<130 (100≤HP<175)	2009 and earlier	10.5 (7.8)	5.0 (3.7)	0.80 (0.60)
	2010 +[2]	4.0 (3.0)		0.30 (0.22)
130≤KW<225 (175≤HP<300)	2008 and earlier	10.5 (7.8)	3.5 (2.6)	0.54 (0.40)
	2009 +[3]	4.0 (3.0)		0.20 (0.15)
225≤KW<450 (300≤HP<600)	2008 and earlier	10.5 (7.8)	3.5 (2.6)	0.54 (0.40)
	2009 +[3]	4.0 (3.0)		0.20 (0.15)
450≤KW≤560 (600≤HP≤750)	2008 and earlier	10.5 (7.8)	3.5 (2.6)	0.54 (0.40)
	2009 +	4.0 (3.0)		0.20 (0.15)
KW>560 (HP>750)	2007 and earlier	10.5 (7.8)	3.5 (2.6)	0.54 (0.40)
	2008 +	6.4 (4.8)		0.20 (0.15)

[1] For model years 2011–2013, manufacturers, owners and operators of fire pump stationary CI ICE in this engine power category with a rated speed of greater than 2,650 revolutions per minute (rpm) may comply with the emission limitations for 2010 model year engines.

[2] For model years 2010–2012, manufacturers, owners and operators of fire pump stationary CI ICE in this engine power category with a rated speed of greater than 2,650 rpm may comply with the emission limitations for 2009 model year engines.

[3] In model years 2009–2011, manufacturers of fire pump stationary CI ICE in this engine power category with a rated speed of greater than 2,650 rpm may comply with the emission limitations for 2008 model year engines.

Table 5 to Subpart IIII of Part 60—Labeling and Recordkeeping Requirements for New Stationary Emergency Engines

[You must comply with the labeling requirements in § 60.4210(f) and the recordkeeping requirements in § 60.4214(b) for new emergency stationary CI ICE beginning in the following model years:]

Engine power	Starting model year
19≤KW<56 (25≤HP<75)	2013
56≤KW<130 (75≤HP<175)	2012
KW≥130 (HP≥175)	2011

Table 6 to Subpart IIII of Part 60—Optional 3-Mode Test Cycle for Stationary Fire Pump Engines

[As stated in § 60.4210(g), manufacturers of fire pump engines may use the following test cycle for testing fire pump engines:]

Mode No.	Engine speed[1]	Torque (percent)[2]	Weighting factors
1	Rated	100	0.30
2	Rated	75	0.50
3	Rated	50	0.20

[1] Engine speed: ±2 percent of point.

[2] Torque: NFPA certified nameplate HP for 100 percent point. All points should be ±2 percent of engine percent load value.

Table 7 to Subpart IIII of Part 60—Requirements for Performance Tests for Stationary CI ICE With a Displacement of ≥30 Liters per Cylinder

As stated in § 60.4213, you must comply with the following requirements for performance tests for stationary CI ICE with a displacement of ≥30 liters per cylinder:

Each	Complying with the requirement to	You must	Using	According to the following requirements
1. Stationary CI internal combustion engine with a displacement of ≥ 30 liters per cylinder	a. Reduce NO_X emissions by 90 percent or more;	i. Select the sampling port location and number/ location of traverse points at the inlet and outlet of the control device;		(a) For NO_X, O_2, and moisture measurement, ducts ≤6 inches in diameter may be sampled at a single point located at the duct centroid and ducts >6 and ≤12 inches in diameter may be sampled at 3 traverse points located at 16.7, 50.0, and 83.3% of the measurement line ('3-point long line'). If the duct is >12 inches in diameter *and* the sampling port location meets the two and half-diameter criterion of Section 11.1.1 of Method 1 of 40 CFR part 60, appendix A–1, the duct may be sampled at '3-point long line'; otherwise, conduct the stratification testing and select sampling points according to Section 8.1.2 of Method 7E of 40 CFR part 60, appendix A–4.
		ii. Measure O_2 at the inlet and outlet of the control device;	(1) Method 3, 3A, or 3B of 40 CFR part 60, appendix A–2	(b) Measurements to determine O_2 concentration must be made at the same time as the measurements for NO_X concentration.

Each	Complying with the requirement to	You must	Using	According to the following requirements
		iii. If necessary, measure moisture content at the inlet and outlet of the control device; and	(2) Method 4 of 40 CFR part 60, appendix A–3, Method 320 of 40 CFR part 63, appendix A, or ASTM D 6348–03 (incorporated by reference, see § 60.17)	(c) Measurements to determine moisture content must be made at the same time as the measurements for NO_X concentration.
		iv. Measure NO_X at the inlet and outlet of the control device.	(3) Method 7E of 40 CFR part 60, appendix A–4, Method 320 of 40 CFR part 63, appendix A, or ASTM D 6348–03 (incorporated by reference, see § 60.17)	(d) NO_X concentration must be at 15 percent O_2, dry basis. Results of this test consist of the average of the three 1-hour or longer runs.
	b. Limit the concentration of NO_X in the stationary CI internal combustion engine exhaust.	i. Select the sampling port location and number/ location of traverse points at the exhaust of the stationary internal combustion engine;		(a) For NO_X, O_2, and moisture measurement, ducts ≤6 inches in diameter may be sampled at a single point located at the duct centroid and ducts >6 and ≤12 inches in diameter may be sampled at 3 traverse points located at 16.7, 50.0, and 83.3% of the measurement line ('3-point long line'). If the duct is >12 inches in diameter *and* the sampling port location meets the two and half-diameter criterion of Section 11.1.1 of Method 1 of 40 CFR part 60, appendix A–1, the duct may be sampled at '3-point long line'; otherwise, conduct the stratification testing and select sampling points according to Section 8.1.2 of Method 7E of 40 CFR part 60, appendix A–4.
		ii. Determine the O_2	(1) Method 3, 3A, or 3B of	(b) Measurements to determine O_2 concentration must be made at the same

Each	Complying with the requirement to	You must	Using	According to the following requirements
		concentration of the stationary internal combustion engine exhaust at the sampling port location;	40 CFR part 60, appendix A–2	time as the measurement for NO_X concentration.
		iii. If necessary, measure moisture content of the stationary internal combustion engine exhaust at the sampling port location; and	(2) Method 4 of 40 CFR part 60, appendix A–3, Method 320 of 40 CFR part 63, appendix A, or ASTM D 6348–03 (incorporated by reference, see § 60.17)	(c) Measurements to determine moisture content must be made at the same time as the measurement for NO_X concentration.
		iv. Measure NO_X at the exhaust of the stationary internal combustion engine; if using a control device, the sampling site must be located at the outlet of the control device.	(3) Method 7E of 40 CFR part 60, appendix A–4, Method 320 of 40 CFR part 63, appendix A, or ASTM D 6348–03 (incorporated by reference, see § 60.17)	(d) NO_X concentration must be at 15 percent O_2, dry basis. Results of this test consist of the average of the three 1-hour or longer runs.
	c. Reduce PM emissions by 60 percent or more	i. Select the sampling port location and the number of traverse	(1) Method 1 or 1A of 40 CFR part 60, appendix A–1	(a) Sampling sites must be located at the inlet and outlet of the control device.

Each	Complying with the requirement to	You must	Using	According to the following requirements
		points;		
		ii. Measure O_2 at the inlet and outlet of the control device;	(2) Method 3, 3A, or 3B of 40 CFR part 60, appendix A–2	(b) Measurements to determine O_2 concentration must be made at the same time as the measurements for PM concentration.
		iii. If necessary, measure moisture content at the inlet and outlet of the control device; and	(3) Method 4 of 40 CFR part 60, appendix A–3	(c) Measurements to determine and moisture content must be made at the same time as the measurements for PM concentration.
		iv. Measure PM at the inlet and outlet of the control device.	(4) Method 5 of 40 CFR part 60, appendix A–3	(d) PM concentration must be at 15 percent O_2, dry basis. Results of this test consist of the average of the three 1-hour or longer runs.
	d. Limit the concentration of PM in the stationary CI internal combustion engine exhaust	i. Select the sampling port location and the number of traverse points;	(1) Method 1 or 1A of 40 CFR part 60, appendix A–1	(a) If using a control device, the sampling site must be located at the outlet of the control device.
		ii. Determine the O_2 concentration of the stationary internal combustion engine exhaust at the sampling port location;	(2) Method 3, 3A, or 3B of 40 CFR part 60, appendix A–2	(b) Measurements to determine O_2 concentration must be made at the same time as the measurements for PM concentration.
		iii. If necessary, measure moisture	(3) Method 4 of 40 CFR part 60, appendix	(c) Measurements to determine moisture content must be made at the same time as the measurements for PM concentration.

Each	Complying with the requirement to	You must	Using	According to the following requirements
		content of the stationary internal combustion engine exhaust at the sampling port location; and	A–3	
		iv. Measure PM at the exhaust of the stationary internal combustion engine.	(4) Method 5 of 40 CFR part 60, appendix A–3	(d) PM concentration must be at 15 percent O_2, dry basis. Results of this test consist of the average of the three 1-hour or longer runs.

[79 FR 11251, Feb. 27, 2014]

Table 8 to Subpart IIII of Part 60—Applicability of General Provisions to Subpart IIII

[As stated in § 60.4218, you must comply with the following applicable General Provisions:]

General Provisions citation	Subject of citation	Applies to subpart	Explanation
§ 60.1	General applicability of the General Provisions	Yes	
§ 60.2	Definitions	Yes	Additional terms defined in § 60.4219.
§ 60.3	Units and abbreviations	Yes	
§ 60.4	Address	Yes	
§ 60.5	Determination of construction or modification	Yes	
§ 60.6	Review of plans	Yes	
§ 60.7	Notification and Recordkeeping	Yes	Except that § 60.7 only applies as specified in § 60.4214(a).
§ 60.8	Performance tests	Yes	Except that § 60.8 only applies to stationary CI ICE with a displacement of (≥30 liters per cylinder and engines that are not certified.
§ 60.9	Availability of information	Yes	

General Provisions citation	Subject of citation	Applies to subpart	Explanation
§ 60.10	State Authority	Yes	
§ 60.11	Compliance with standards and maintenance requirements	No	Requirements are specified in subpart IIII.
§ 60.12	Circumvention	Yes	
§ 60.13	Monitoring requirements	Yes	Except that § 60.13 only applies to stationary CI ICE with a displacement of (≥30 liters per cylinder.
§ 60.14	Modification	Yes	
§ 60.15	Reconstruction	Yes	
§ 60.16	Priority list	Yes	
§ 60.17	Incorporations by reference	Yes	
§ 60.18	General control device requirements	No	
§ 60.19	General notification and reporting requirements	Yes	

Appendix D

MANUFACTURER SPECIFICATIONS AND VENDOR STATEMENT

Submittal

Microsoft
MKE04
C3000 - COLO

26.32.13 Engine Generators
26.05.01 Electrical OFCI General Requirements
26.08.00 Electrical Testing and Commissioning
26.08.13 Electrical System Pre-Functional Checklist and Startup
26.08.16 Electrical Systems Functional Performance Testing
26.09.13 Electrical Power Monitoring System Point List (Excel)

The Power of One™

Cummins, Inc.

Powerful Solutions. Dependable Support. Every Time.

Generator set data sheet

Model:	**C3000 D6e**
Frequency:	**60 Hz**
Fuel type:	**Diesel**
kW rating:	**3000 Standby** **2750 Prime** **2500 Continuous**
Emissions level:	**EPA NSPS Stationary emergency Tier 2**

Fuel consumption

	Standby				Prime				Continuous			
	kW (kVA)				kW (kVA)				kW (kVA)			
Ratings	3000 (3750)				2750 (3438)				2500 (3125)			
Ratings without fan[1]	~~3075 (3844)~~				2826 (3532)				2576 (3220)			
Load	**1/4**	**1/2**	**3/4**	**Full**	**1/4**	**1/2**	**3/4**	**Full**	**1/4**	**1/2**	**3/4**	**Full**
US gph	67	113	158	202	63	104	145	187	59	97	134	172
L/hr	254	428	598	769	238	394	549	708	223	367	507	651

[1]Ratings for reference with the optional remote radiator cooling configuration. See note 1 under “Alternator data” section.

Engine

	Standby rating	Prime rating	Continuous rating
Engine model	QSK95-G9		
Configuration	Cast iron, Vee, 16 cylinder		
Aspiration	Turbocharged and after-cooled		
Gross engine power output, kWm (bhp)	3213 (4307)	2923 (3918)	2665 (3572)
BMEP at set rated load, kPa (psi)	2248 (326)	2041 (296)	1862 (270)
Bore, mm (in.)	190.0 (7.48)		
Stroke, mm (in.)	210.1 (8.27)		
Rated speed, rpm	1800		
Piston speed, m/s (ft/min)	12.6 (2480)		
Compression ratio	15.1:1		
Lube oil capacity, L (qt)	647 (684)		
Overspeed limit, rpm	2070		
Regenerative power, kW	321		

Fuel flow

Maximum fuel flow, L/hr (US gph)	1601.1 (423)
Maximum fuel inlet restriction with clean filter, kPa (in Hg)	13.5 (4)
Maximum fuel return line restriction, kPa (in Hg)	34 (10)
Maximum fuel inlet temperature, °C (°F)	71.1 (160)
Maximum fuel outlet temperature, °C (°F)	92.2 (198)

Air	Standby rating	Prime rating	Continuous rating
Combustion air, m^3/min (scfm)	270 (9550)	265 (9350)	260 (9170)
Maximum air cleaner restriction with clean filter, mm H_2O (in H_2O)	457 (18)		
Alternator cooling air, m^3/min (scfm)	255 (9005)		

Exhaust			
Exhaust flow at set rated load, m^3/min (scfm)	641 (22630)	605 (21370)	573 (20250)
Exhaust temperature at set rated load, °C (°F)	441 (825)	414 (778)	392 (737)
Maximum back pressure, kPa (in H_2O)	7 (28)		

Standard set-mounted radiator cooling	
Ambient design, °C (°F)	48 118
Fan load, kWm (HP)	78 (105)
Coolant capacity (with radiator), L (US gal)	1120 (296)
Cooling system air flow, m^3/min (scfm)	3135 (110700)
Maximum cooling air flow static restriction, kPa (in H_2O)	0.12 (0.5)

Optional set-mounted radiator cooling	
Ambient design, °C (°F)	50 (122)
Fan load, kWm (HP)	78 (105)
Coolant capacity (with radiator), L (US gal)	1120 (296)
Cooling system air flow, m^3/min (scfm)	3135 (110700)
Maximum cooling air flow static restriction, kPa (in H_2O)	0.12 (0.5)

Optional remote radiator cooling			
Engine coolant capacity, L (US gal)	379 (100)		
Max flow rate at max friction head, jacket water circuit, L/min (US gal/min)	3081 (814)		
Max flow rate at max friction head, after-cooler circuit, L/min (US gal/min)	651 (172)		
Heat rejected, jacket water circuit, MJ/min (Btu/min)	90 (85280)	81.60 (77310)	74.10 (70230)
Heat rejected, after-cooler circuit, MJ/min (Btu/min)	21.30 (20190)	20.20 (19110)	19.10 (18150)
Heat rejected, fuel circuit, MJ/min (Btu/min)	0.26 (248)	0.23 (222)	0.21 (199)
Total heat radiated to room, MJ/min (Btu/min)	24.70 (23380)	22.60 (21390)	20.60 (19570)
Maximum friction head, jacket water circuit, kPa (psi)	83 (12)		
Maximum friction head, after-cooler circuit, kPa (psi)	83 (12)		
Maximum static head above engine crank centerline, jacket water circuit, m (ft)	18 (60)		
Maximum static head above engine crank centerline, after-cooler circuit, m (ft)	18 (60)		
Maximum jacket water outlet temp, °C (°F)	140.4 (220)	100 (212)	100 (212)
Maximum after-cooler inlet temp, °C (°F)	71.1 (160)	68 (155)	68 (155)
Maximum after-cooler inlet temp at 25 °C (77 °F) ambient, °C (°F)	46.1 (115)		

Note: For non-standard remote installations contact your local Cummins representative.

Confirm generator rated for ASHRAE n=50 temperature +105.9degF as per 263213 1.6.B.

Weights

Unit dry weight kg (lb)	29500 (65092)
Unit wet weight kg (lb)	31200 (68771)

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

Derating factors

Standby	Full genset power available up to 1312 m (4304 ft) at ambient temperatures up to 40 °C (104 °F) and 962 m (3156 ft) at ambient temperatures up to 50 °C (122 °F). Above these conditions, derate at 6.3% per 305 m (1000 ft) and 8% per 10 °C (18 °F).
Prime	Full genset power available up to 1641 m (5384 ft) at ambient temperatures up to 40 °C (104 °F) and 1205 m (3953 ft) at ambient temperatures up to 50 °C (122 °F). Above these conditions, derate at 5.1% per 305 m (1000 ft) and 10% per 10 °C (18 °F).
Continuous	Full genset power available up to 1350 m (4429 ft) at ambient temperatures up to 40 °C (104 °F) and 961 m (3153 ft) at ambient temperatures up to 50 °C (122 °F). Above these conditions, derate at 5.9 % per 305 m (1000 ft) and 10% per 10 °C (18 °F).

Ratings definitions

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

Alternator data[1]

Voltage	Connection	Temp rise degrees C	Duty[2]	Max surge kVA[3]	Winding number	Alternator data sheet	Feature code
380	Wye, 3-phase	125	S	N/A	13	ADS-531	BB05-2
380	Wye, 3-phase	150	S	N/A	13	ADS-531	B814-2
380	Wye, 3-phase	105	P	N/A	13	ADS-531	B840-2
380	Wye, 3-phase	125	P	N/A	13	ADS-531	B815-2
380	Wye, 3-phase	105	C	N/A	13	ADS-531	B597-2
416	Wye, 3-phase	125	S	15093	12	ADS-532	BB76-2
416	Wye, 3-phase	150	S	13283	12	ADS-531	BA53-2
416	Wye, 3-phase	105	P	15093	12	ADS-532	BB75-2
416	Wye, 3-phase	125	P	13283	12	ADS-531	B982-2
416	Wye, 3-phase	80	C	15093	12	ADS-532	BB06-2
416	Wye, 3-phase	105	C	13283	12	ADS-531	BA54-2

Notes:

[1]Alternator data is configured for a set with ratings including engine cooling fan losses and standard features at 40 °C ambient temperature. For non-standard configurations, including remote radiator applications, check appropriate alternator data sheets or contact your local Cummins representative.

[2]Standby (S), Prime (P) and Continuous ratings (C).

[3]Maximum rated starting kVA that results in a minimum of 90% of rated sustained voltage during starting.

Alternator data[1] (Continued)

Voltage	Connection	Temp rise degrees C	Duty[2]	Max surge kVA[3]	Winding number	Alternator data sheet	Feature code
440	Wye, 3-phase	105	S	14781	12	ADS-532	B665-2
440	Wye, 3-phase	125	S	13024	12	ADS-531	B535-2
440	Wye, 3-phase	150/125/105	S/P/C	13024	12	ADS-531	B813-2
440	Wye, 3-phase	105	P	13024	12	ADS-531	B981-2
440	Wye, 3-phase	80	C	14781	12	ADS-532	BA55-2
480	Wye, 3-phase	105	S	13024	12	ADS-531	B280-2
480	Wye, 3-phase	125/105/80	S/P/C	13024	12	ADS-531	B801-2
480	Wye, 3-phase	80	P	14781	12	ADS-532	B694-2
600	Wye, 3-phase	105	S	12426	7	ADS-531	BB07-2
600	Wye, 3-phase	125/105/80	S/P/C	12426	7	ADS-531	B465-2
600	Wye, 3-phase	150/125/105	S/P/C	12426	7	ADS-531	B451-2
600	Wye, 3-phase	80	S	N/A	7	ADS-532	B695-2
4160	Wye, 3-phase	80	S	15662	51	ADS-587	B935-2
4160	Wye, 3-phase	105/80	S/P	9481	51	ADS-545	B937-2
4160	Wye, 3-phase	125/105/80	S/P/C	8752	51	ADS-520	B467-2
4160	Wye, 3-phase	150/125/105	S/P/C	7295	51	ADS-519	B938-2
12.47k	Wye, 3-phase	80	S	N/A	8030	ADS-590	B607-2
12.47k	Wye, 3-phase	105	S	13438	91	ADS-534	B568-2
12.47k	Wye, 3-phase	125/105/80	S/P/C	13438	91	ADS-534	B609-2
12.47k	Wye, 3-phase	80	P	15883	8029	ADS-589	B812-2
12.47k	Wye, 3-phase	105	C	11213	91	ADS-533	B569-2
13.2k	Wye, 3-phase	80	S	N/A	8030	ADS-590	B807-2
13.2k	Wye, 3-phase	105	S	13438	91	ADS-534	B501-2
13.2-13.8k	Wye, 3-phase	125/105	S/P	11213	91	ADS-533	B803-2
13.2k	Wye, 3-phase	80	P	13438	91	ADS-534	B566-2
13.2-13.8k	Wye, 3-phase	105	C	13438	91	ADS-534	B657-2
13.2k	Wye, 3-phase	80	C	13438	91	ADS-534	B808-2
13.8k	Wye, 3-phase	80	S	16688	8029	ADS-589	B610-2
13.8k	Wye, 3-phase	105	S	13438	91	ADS-534	B895-2
13.8k	Wye, 3-phase	80	P	13438	91	ADS-534	B809-2
13.8k	Wye, 3-phase	80	C	11213	91	ADS-533	B565-2

Notes:

[1]Alternator data is configured for a set with ratings including engine cooling fan losses and standard features at 40 °C ambient temperature. For non-standard configurations, including remote radiator applications, check appropriate alternator data sheets or contact your local Cummins representative.

[2]Standby (S), Prime (P) and Continuous ratings (C).

[3]Maximum rated starting kVA that results in a minimum of 90% of rated sustained voltage during starting.

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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NAD-5942-EN (05/18)

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.

ISO8528-5 G3 Capable - refer to factory for site and configuration specific transient performance classification

	Standby Rating	Prime Rating	Continuous Rating	Emissions Compliance	Data Sheets
Model	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.

Generator Set Specifications

Governor regulation	ISO 8528 Part 1
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 ºC Standby/105 ºC 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
- 240/416
- 255/440
- 7200/12470
- 277/480
- 347/600
- 2400/4160
- 7620/13200
- 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

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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

•L028 Genset Warranty - 2 Years Base

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

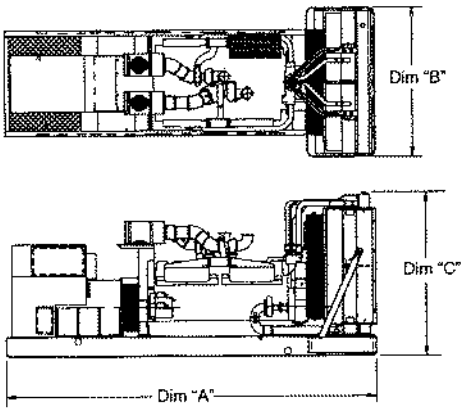
Ratings Definitions

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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NAS-5849-EN PDA056G726 (11/20)

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		

Performance Data	1/4 Standby	1/2 Standby	3/4 Standby	Full Standby	Full Prime	Full Continuous
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)
Exhaust Emission Data						
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_2O/lb) of dry air
Intake Restriction:	Set to 20 in of H_2O as measured from compressor inlet
Exhaust Back Pressure:	Set to 1.5 in Hg
Note:	mg/m³ values are measured dry, corrected to 5% O_2 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 results in elevated emission levels.

2021 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:	MCEXL95.0AAA-034
Effective Date:	07/09/2020
Date Issued:	07/09/2020
EPA Engine Family (Cummins Emissions Family):	MCEXL95.0AAA

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		
	NO_X + NMHC	CO	PM	NO_X + NMHC	CO	PM
Test Results	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 emissions recorded per 40 CFR Part 60, 89, 1039, 1065 and weighted at load points prescribed in the regulations for constant speed engines.

Diesel fuel specifications: Cetane number: 40-50. Reference: ASTM D975 No. 2-D, 7-15 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 NOx correction, Restrictions: Intake restriction set to a maximum allowable limit for clean filter; Exhaust back pressure set to a maximum allowable limit.

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

Cooling system data
C3000 D6e

High ambient air temperature radiator cooling system

	Duty	Rating (kW)	Max cooling @ air flow static restriction, unhoused (inches water/mm water)				
			0.0/0.0	0.25/6.4	0.5/12.7	0.75/19.1	1.0/25.4
			Maximum allowable ambient temperature, degree C				
60 Hz	Standby	3000	51	50	48	46	44
	Data Center Continuous	2750	52	52	51	49	47
	Prime	2750	50	48	47	45	43
	Continuous	2500	50	50	49	47	45

Enhanced high ambient air temperature radiator cooling system

	Duty	Rating (kW)	Max cooling @ air flow static restriction, unhoused (inches water/mm water)				
			0.0/0.0	0.25/6.4	0.5/12.7	0.75/19.1	1.0/25.4
			Maximum allowable ambient temperature, degree C				
60 Hz	Standby	3000	53	52	50	48	46
	Data Center Continuous	2750	54	54	53	51	49
	Prime	2750	52	50	49	47	45
	Continuous	2500	52	52	51	49	47

Notes:

1. Data shown are anticipated cooling performance for typical generator set.
2. Cooling data is based on 1000 ft (305 m) site test location.
3. Generator set power output may need to be reduced at high ambient conditions. Consult generator set data sheet for derate schedules.
4. Cooling performance may be reduced due to several factors including but not limited to: Incorrect installation, improper operation, fouling of the cooling system, and other site installation variables.

Sound data
C3000 D6e 60 Hz

Sound pressure level @ 7 meters, dB(A)

See notes 1-6 listed below

Configuration	Exhaust	Measurement location number (note 1)								8 Position average
		1	2	3	4	5	6	7	8	
Unhoused - remote cooled	Infinite	93.5	98.9	97.1	97.7	95.0	99.5	99.4	98.1	97.8
Unhoused - high ambient cooling system	Infinite	94.3	99.9	99.6	99.2	96.4	100.0	99.2	101.3	99.2
Unhoused - enhanced high ambient cooling system	Infinite	94.3	99.9	99.6	99.2	96.4	100.0	99.2	101.3	99.2

Sound power level, dB(A)

See notes 2-4, 7 and 8 listed below

Configuration	Exhaust	Octave band center frequency (Hz)										Overall sound power level
		31.5	63	125	250	500	1000	2000	4000	8000	16000	
Unhoused - remote cooled	Infinite	68.0	87.2	106.0	110.7	117.7	119.6	120.4	117.6	121.8	99.7	126.9
Unhoused - high ambient cooling system	Infinite	72.7	90.3	113.4	118.3	121.1	121.9	121.6	117.2	120.0	97.3	128.3
Unhoused - enhanced high ambient cooling system	Infinite	72.7	90.3	113.4	118.3	121.1	121.9	121.6	117.2	120.0	97.3	128.3

Exhaust sound power level, dB(A)

See note 2 and 9 listed below

Open exhaust (no muffler) @ rated load	Octave band center frequency (Hz)										Overall sound power level
	31.5	63	125	250	500	1000	2000	4000	8000	16000	
	68.7	99.3	108.4	123.1	122.8	121.8	122.1	121.9	119.0	101.1	129.8

Note:

1. Position 1 faces the generator front per ISO 8528-10. The positions proceed around the generator set in a counter-clockwise direction in 45° increments. All positions are at 7 m (23 ft) from the surface of the generator set and 1.2 m (48 in) from floor level.
2. Sound levels are subject to instrumentation, measurement, installation and manufacturing variability.
3. Data based on full rated load. Sound data with remote-cooled generator sets are based on rated loads without cooling fan noise.
4. Sound data for generator set with infinite exhaust do not include exhaust noise.
5. Sound pressure levels are measured per ANSI S1.13 and ANSI S12.18, as applicable.
6. Reference sound pressure is 20 µPa.
7. Sound power levels per ISO 3744 and ISO 8528-10, as applicable.
8. Reference power = 1 pw (10^{-12} W).
9. Exhaust sound power levels are per ISO 6798, as applicable.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2022 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: **Cummins Inc.**
(U.S. Manufacturer or Importer)

Certificate Number: NCEXL95.0AAA-044

Effective Date: 08/19/2021

Expiration Date: 12/31/2022

Byron J. Bunker, Division Director
Compliance Division

Issue Date: 08/19/2021

Revision Date: N/A

Model Year: 2022
Manufacturer Type: Original Engine Manufacturer
Engine Family: NCEXL95.0AAA

Mobile/Stationary Indicator: Stationary
Emissions Power Category: kW>560
Fuel Type: Diesel
After Treatment Devices: No After Treatment Devices Installed
Non-after Treatment Devices: No Non-After Treatment Devices Installed

Pursuant to Section 111 and Section 213 of the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Part 60, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60.

This certificate does not cover engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

PROJECT:

PREPARED FOR: CUMMINS SALES & SERVICE
PROJECT MNGR:

PROJECT SHIPPING ADDRESS:
MKE03/04
MOUNT PLEASANT, WI

SPECIFICATION NOTES:

REVIEWED SPEC:
26_05_01_Electrical OFCI General Requirements_M11.docx
26_08_00_Electrical System Testing and Commissioning_M2.docx
26_08_13_Electrical System Pre-Functional Checklist and Start-ups_M6.docx
26_08_16_Electrical Systems Functional Performance Testing_M0.docx
26_32_13_Engine_Generators_M9.docx

TANK NOTES:

1. 9,160 USABLE GALLON UL142 SUB BASE TANK.
2. PRIME & PAINT BLACK.
3. CUSTOMER TO VERIFY STUB UP, MOUNTING HOLES & FITTING LOCATIONS.
4. (2X) FLAMMABLE LIQUID DECALS (INSTALLED)
5. ANTI-SLIP COATING ON ALL ACCESSIBLE FLOOR AREAS.

UL FILE:	46187
CLASS:	EVFT
TOTAL TANK CAPACITY:	9,980 gallons
USABLE CAPACITY:	9,160 gallons
SECONDARY CONTAINMENT:	1,888 gallons
RUN TIME @ FULL LOAD:	45.39 hours
RUN TIME @75% LOAD:	48 hours
GALLONS PER IN. OF DEPTH:	327.04 gallons
TANK WEIGHT (DRY):	TBD lbs.
TANK WEIGHT (WET):	TBD lbs.
CONDUIT STUB UP AREA:	TBD

SKID NOTES:

1. PRIME & PAINT BLACK.
2. CUSTOMER TO VERIFY STUB UP, MOUNTING HOLES & FITTING LOCATIONS.
3. ANTI-SLIP COATING ON ALL ACCESSIBLE FLOOR AREAS.
4. REMOVABLE STUB UP COVERS.

ENCLOSURE NOTES:

1. 4" 12 GA GALVANNEAL WALL PANELS.
2. UL2200, IBC, & SEISMIC CERTIFICATION.
3. ENCLOSURE DOORS W/ PUSH BAR RELEASE.
4. ENCLOSURE EXTERIOR POWDER PAINT COLOR:
   ANSI 61 LIGHT GRAY (#42082)
5. 75DBA @ 50' FREE FIELD.
6. DISHARGE PLENUM EXTENSION BOX. (INTEGRAL WITH EXHAUST)
7. 120 MPH WIND LOAD.
8. SHIPPING COVERS FOR FIXED INTAKE LOUVERS.
9. ROOF MOUNTED EQUIPMENT TO SHIP LOOSE.
10. INTAKE SOUND PACKS W/ STAY DRY RAIN SHIELDS.
11. DRIP CHANNEL WILL EXTEND TO COVER E-STOP.

EXHAUST NOTES:

1. EK TO SKID MOUNT CUMMINS SUPPLIED SCR REACTOR.
2. SKID PACKAGE TO SHIP LOOSE.
3. TAILPIPE STACK TO 33' ABOVE GRADE. (MATCH DISCHARGE PLENUM)
4. SEPARATE SKID TO HOUSE MIRATECH EQUIPMENT & TANK. EK TO PROVIDE CIRCUIT & J-BOX FOR ELECTRICAL CONNECTION & STANDOFF SUPPORTS FOR PLUMBING & CONTROL WIRING.

ELECTRICAL NOTES:

1. EK TO INSTALL, WIRE, & TERMINATE CUMMINS SUPPLIED 4000A FREE STANDING BREAKER BOX INCLUDING INTEGRAL HRG.
2. EK TO INSTALL, WIRE, & TERMINATE CUMMINS SUPPLIED EPMS CONTROL PANEL. (STAND INTEGRAL WITH STUB UP)
3. 45KVA TRANSFORMER (CEILING MOUNTED). DISCONNECT AT 480V PANEL.
4. 480V 3ϕ 100A PANEL BOARD (BOLT-IN BREAKERS).
5. 120/208V 3ϕ 150A PANEL BOARD (BOLT-IN BREAKERS).
6. (4X) 4' LED LIGHT (VAPOR TIGHT) ON (2X) 3-WAY SWITCHES W/ (2X) GFCI RECEPTACLES.
7. (2X) EMERGENCY LIGHTING W/ BATTERY BACKUP.
8. EK TO INSTALL, WIRE,& TERMINATE CUMMINS SUPPLIED BATTERY CHARGERS.
9. (2X) ENCLOSURE SPACE HEATERS.
10. 120V INTAKE DAMPERS.
11. 120V 14" ROOF MOUNTED EXHAUST FAN.
12. (4X) EXTERNAL LED LIGHTS W/ PHOTOCELL.
13. (1X) EXTERNAL E-STOP STATION, & (1X) INTERNAL E-STOP STATION.
14. 24VDC HIGH ALARM PANEL (95, 90, 50, & LEAK).
15. AMBER, GREEN, & RED STACK LIGHT ALARMED BEACON (24VDC) PROVISIONS FOR INSTALL ON EITHER SIDE OF ENCLOSURE.
16. EK TO INSTALL, WIRE, & TERMINATE CUMMINS SUPPLIED 10KW IN-LINE FUEL HEATER.

GENSET NOTES:

GENSET: C3000 D6e QSK95-G9 3000KW

COMBUSTION AIR:	9,550 cfm
RADIATOR COOLING AIR:	110,700 cfm
RADIATOR OA WIDTH:	119.14 in
RADIATOR OA HEIGHT:	111.37 in
RADIATOR CORE WIDTH:	113.89 in
RADIATOR CORE HEIGHT:	108.79 in
EXHAUST TEMP:	825 °F
EXHAUST FLOW:	22,630 cfm

GENSET DRAWING:
NOT PROVIDED AT THIS TIME

ISOLATOR DRAWING:
NOT PROVIDED AT THIS TIME

GENSET DRAWING CONSTRUCTED FROM MULTIPLE CUSTOMER SUPPLIED DRAWINGS.

1. EK TO INSTALL CUMMINS SUPPLIED SHIP LOOSE RADIATOR.
2. EK TO PROVIDE & FILL RADIATOR WITH 50/50 PRE-MIX COOLANT.
3. EK TO INSTALL, WIRE, & TERMINATE CUMMINS SUPPLIED LOOSE EPMS GENSET CONTROL PANEL.

SHEET INDEX:

JOB NAME: MICROSOFT (CUMMINS)
PART NUMBER: SAE-G2-ULSB-9160 (WALK-IN)
APPROVAL SIGNATURE:
DATE:

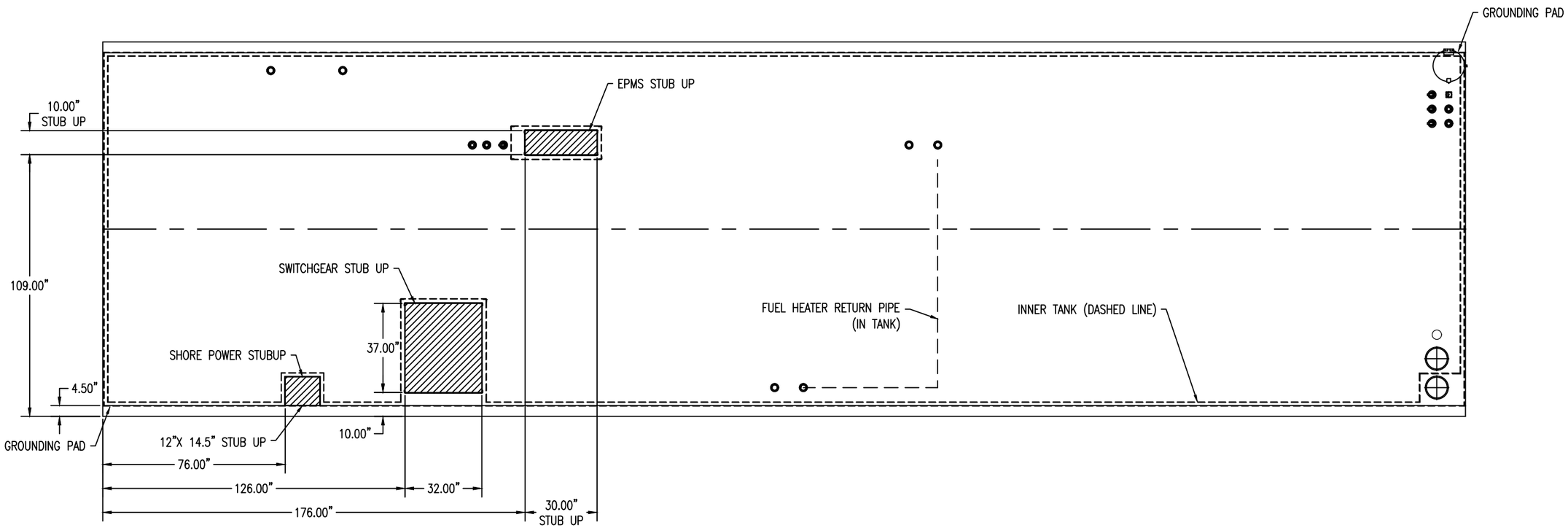
GENERATOR: C3000 D6e QSK95-G9 3000KW

DRAWN BY: SLL	SCALE: NTS

QUOTE: 15918-REV 1
REV DATE: 11-14-2023

JOB NUMBER: 28164	REV: J

SHEET: 1 OF 20



TANK TOP VIEW

MICROSOFT (CUMMINS)

SAE-G2-ULSB-9160 (WALK-IN)

JOB NAME:

PART NUMBER:

APPROVAL SIGNATURE:

DATE:

GENERATOR: C3000 D6e QSK95-G9 3000KW

DRAWN BY: SLL

SCALE: NTS

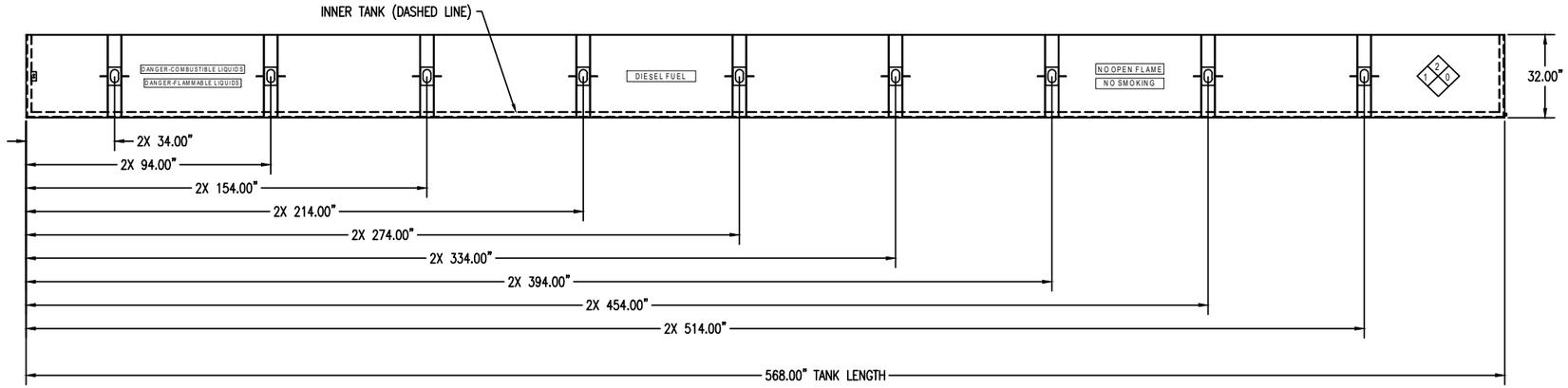
QUOTE: 15918-REV I

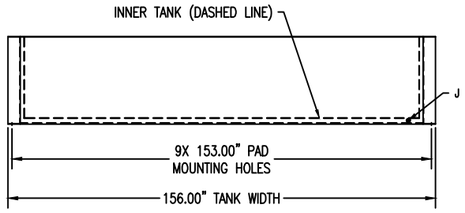
REV DATE: 11-14-2023

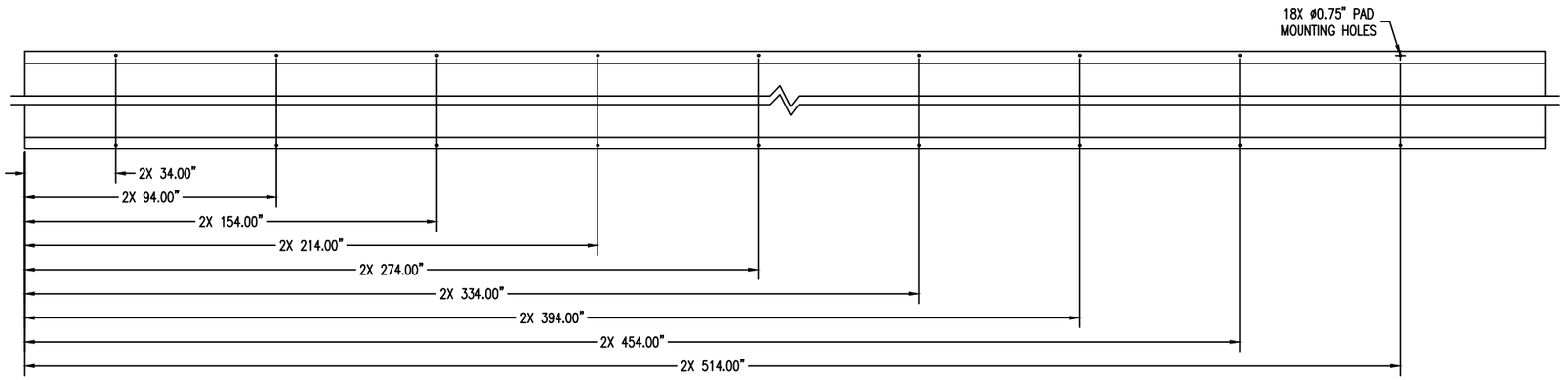
JOB NUMBER: 28164

REV: J

SHEET: 2 OF 20







TANK FRONT VIEW

EK

JOB NAME: MICROSOFT (CUMMINS)

PART NUMBER: SAE-G2-ULSB-9160 (WALK-IN)

DATE:

APPROVAL SIGNATURE:

GENERATOR: C3000 D6e QSK95-G9 3000KW

DRAWN BY: SLL

SCALE: NTS

QUOTE: 15918-REV I

REV DATE: 11-14-2023

JOB NUMBER: 28164

REV: J

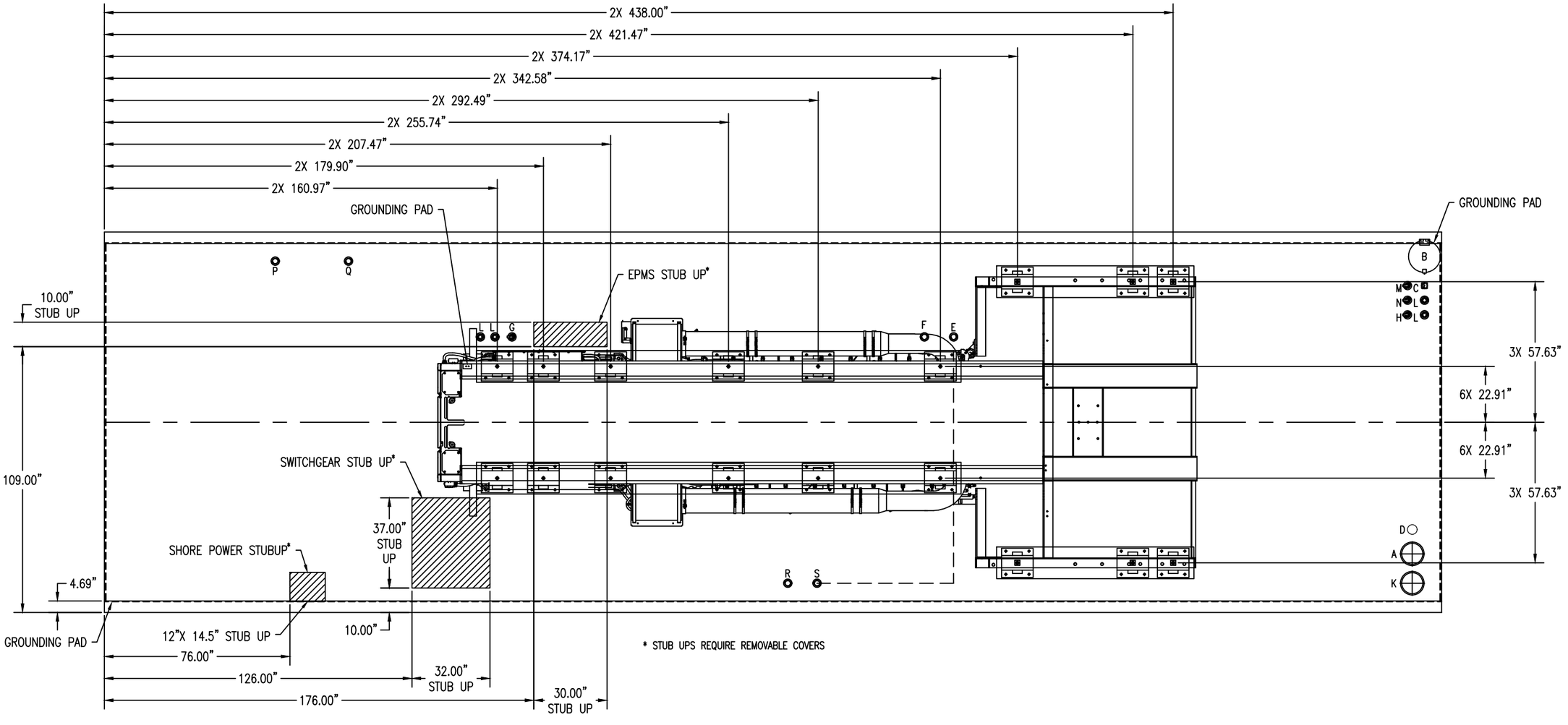
SHEET: 3 OF 20

FUEL TANK FITTINGS

ITEM #	PART #	QTY	LABEL'S	DESCRIPTION
Ⓐ	8" NPT	1	EMERGENCY VENT	8" NPT PRIMARY EMERGENCY VENT
Ⓑ	4" NPT	1	FILL PORT	2" NIPPLE W/ 5 GALLON SPILL BOX, 95% OVERFILL PREVENTION VALVE & 2" QUICK CONNECT
Ⓒ	2" NPT	1	FUEL LEVEL	2" NPT MECHANICAL FUEL LEVEL GAUGE
Ⓓ	2" NPT	1	VENT	2" NPT MUSHROOM VENT
Ⓔ	2" NPT	1	ENGINE FUEL RETURN	3/4" PIPE W/ DOUBLE TAP
Ⓕ	2" NPT	1	ENGINE FUEL SUPPLY	3/4" PIPE W/ DOUBLE TAP & CHECK VALVE
Ⓖ	2" NPT	1	GEN CONTINUOUS LVL SENSOR	2" NPT FUEL CONTINUOUS LEVEL SENSOR
Ⓗ	2" NPT	1	RUPTURE BASIN ALARM	2" NPT BASIN ALARM LEAK DETECTION

FUEL TANK FITTINGS

ITEM #	PART #	QTY	LABEL'S	DESCRIPTION
Ⓙ	1/2" NPT	1	BASIN DRAIN	1/2" BASIN DRAIN W/ PLUG (SHEET 3 OF 20)
Ⓚ	8" NPT	1	EMERGENCY VENT	8" NPT SECONDARY EMERGENCY VENT
Ⓛ	2" NPT	4	EXTRA FITTING	2" NPT EXTRA FITTINGS
Ⓜ	2" NPT	1	HIGH ALARM FLOAT CLUSTER	2" NPT FUEL ALARM CLUSTER (95% & 50%)
Ⓝ	2" NPT	1	HIGH ALARM FLOAT CLUSTER	2" NPT FUEL ALARM CLUSTER (90%)
Ⓟ	2" NPT	1	FUEL POLISHER SUPPLY	1" PIPE W/ DOUBLE TAP, BALL VALVE, & FOOT VALVE
Ⓠ	2" NPT	1	FUEL POLISHER RETURN	1" PIPE W/ DOUBLE TAP, BALL VALVE & 1" PIPE RETURN
Ⓡ	2" NPT	1	IN-LINE FUEL HEATER SUPPLY	2" NPT DOUBLE TAP
Ⓢ	2" NPT	1	IN-LINE FUEL HEATER RETURN	2" NPT DOUBLE TAP



* STUB UPS REQUIRE REMOVABLE COVERS

SKID TOP VIEW

EK

JOB NAME: MICROSOFT (CUMMINS)

PART NUMBER: SAE-G2-ULSB-9160 (WALK-IN)

APPROVAL SIGNATURE:

DATE:

GENERATOR: C3000 D6e QSK95-G9 3000KW

DRAWN BY: SLL

SCALE: NTS

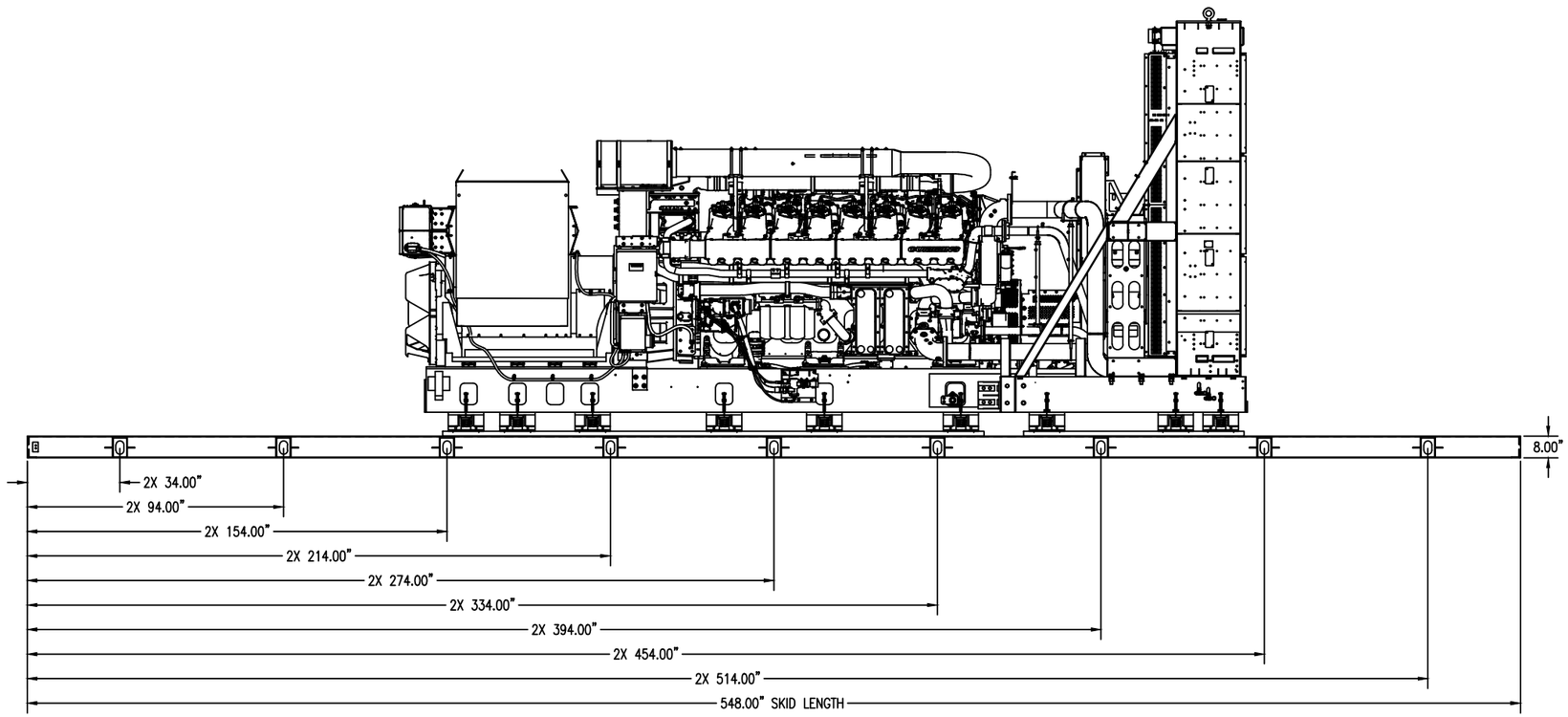
QUOTE: 15918-REV I

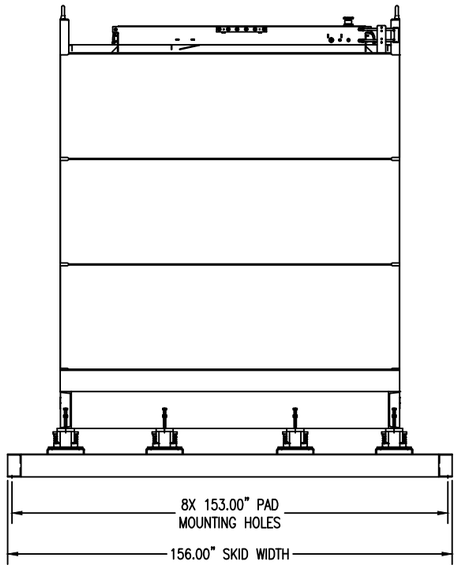
REV DATE: 11-14-2023

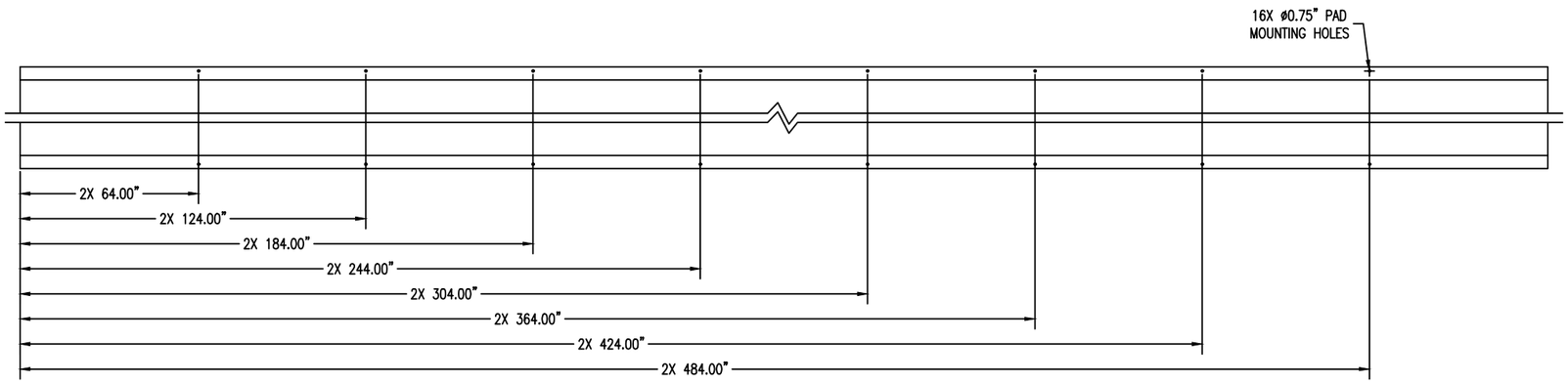
JOB NUMBER: 28164

REV: J

SHEET: 4 OF 20







SKID FRONT VIEW

EK

JOB NAME: MICROSOFT (CUMMINS)

PART NUMBER: SAE-G2-ULSB-9160 (WALK-IN)

APPROVAL SIGNATURE:

DATE:

GENERATOR: C3000 D6e QSK95-G9 3000KW

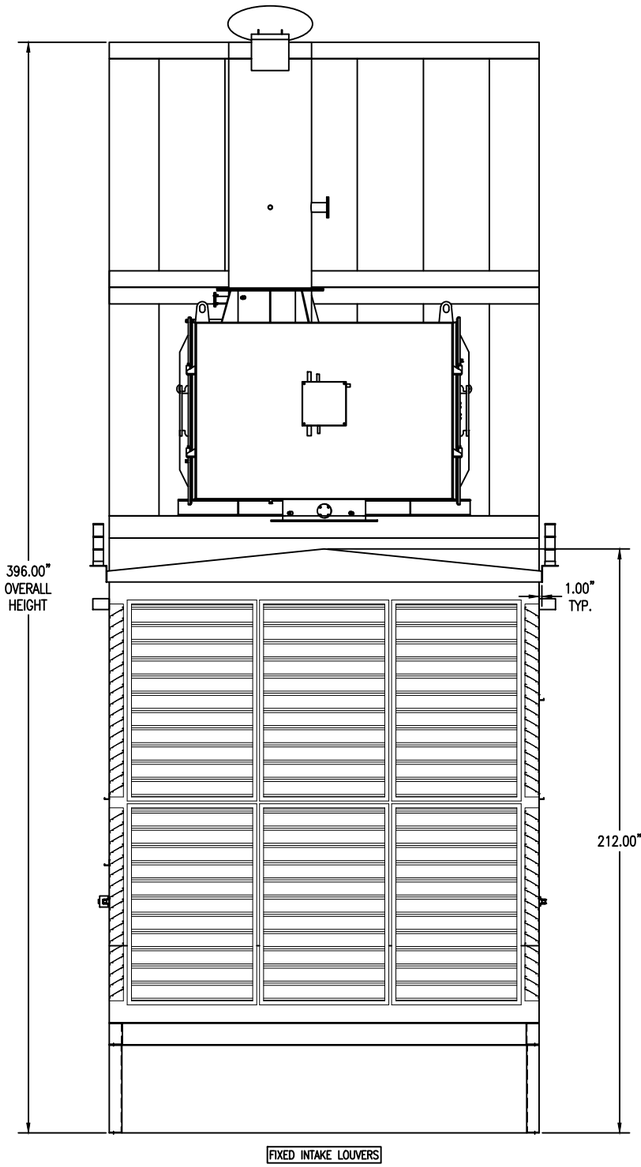
DRAWN BY:	SCALE:
SLL	NTS

QUOTE: 15918-REV I

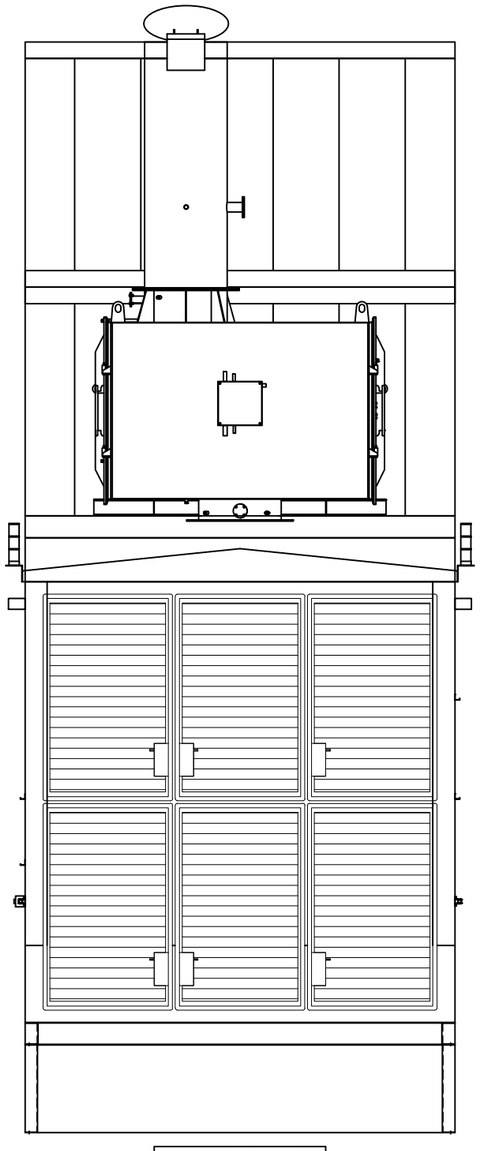
REV DATE: 11-14-2023

JOB NUMBER:	REV:
28164	J

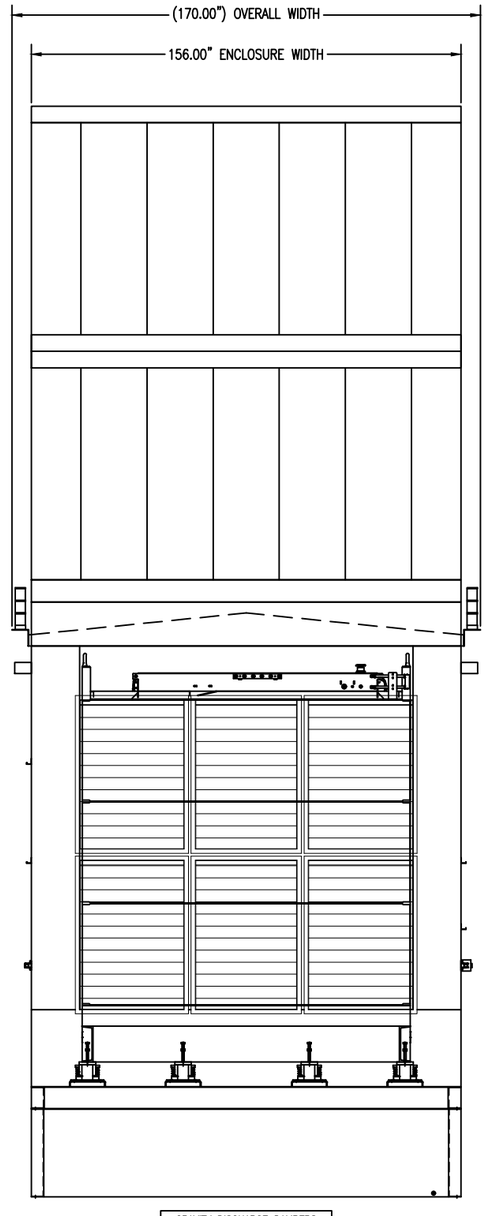
SHEET: 5 OF 20



FIXED INTAKE LOUVERS



120V MOTORIZED INTAKE DAMPERS
SPRING OPEN/ MOTOR CLOSE
(PLENUM REMOVED FOR CLARITY)



GRAVITY DISCHARGE DAMPERS
(PLENUM REMOVED FOR CLARITY)

ENCLOSURE END VIEWS

EK

JOB NAME: MICROSOFT (CUMMINS)

PART NUMBER: SAE-G2-ULSB-9160 (WALK-IN)

DATE:

APPROVAL SIGNATURE:

GENERATOR: C3000 D6e QSK95-G9 3000KW

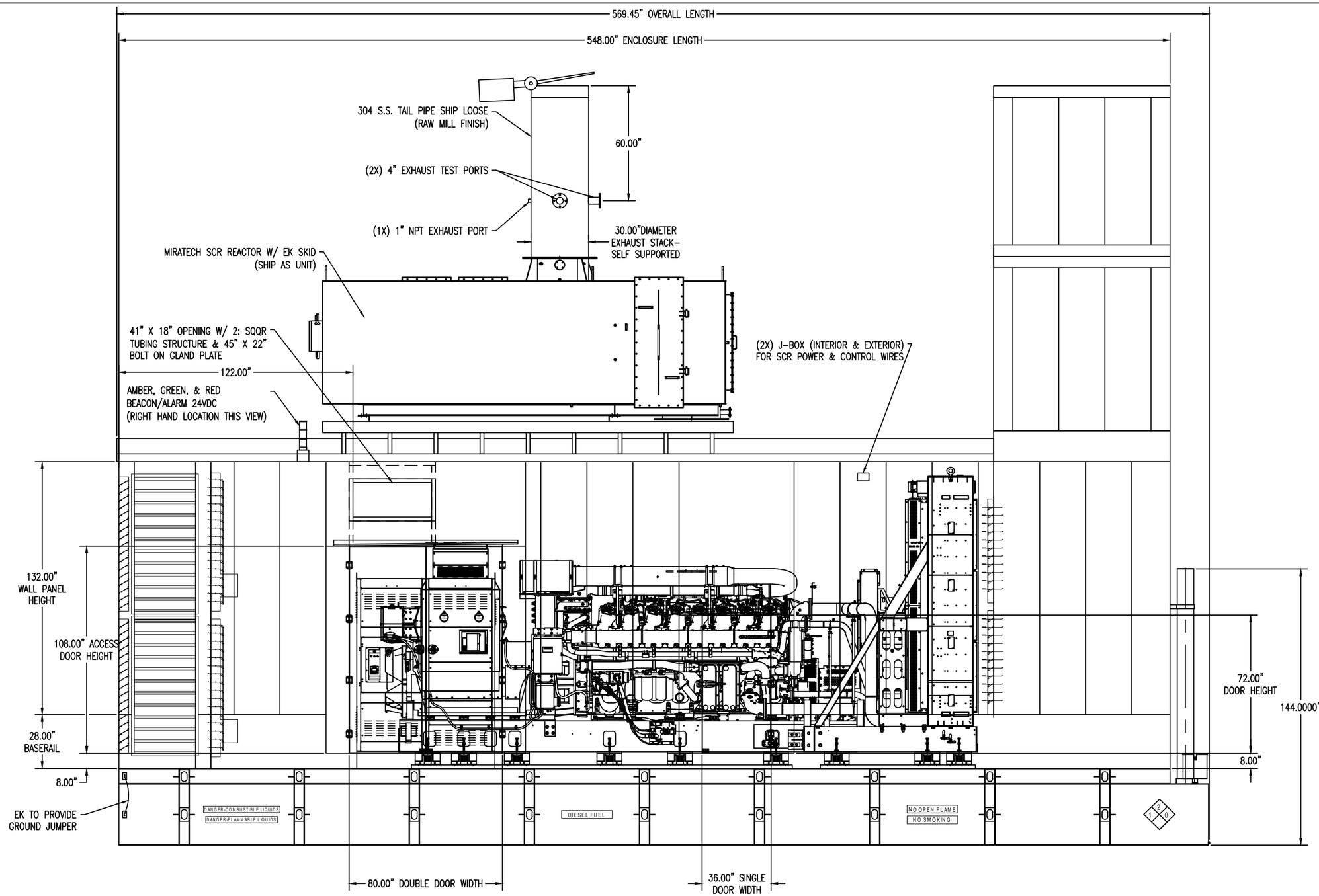
DRAWN BY:	SCALE:
SLL	NTS

QUOTE: 15918-REV I

REV DATE: 11-14-2023

JOB NUMBER:	REV:
28164	J

SHEET: 6 OF 20



RIGHT SIDE ELEVATION

EK

JOB NAME: MICROSOFT (CUMMINS)

PART NUMBER: SAE-G2-ULSB-9160 (WALK-IN)

APPROVAL SIGNATURE:

DATE:

GENERATOR: C3000 D6e QSK95-G9 3000KW

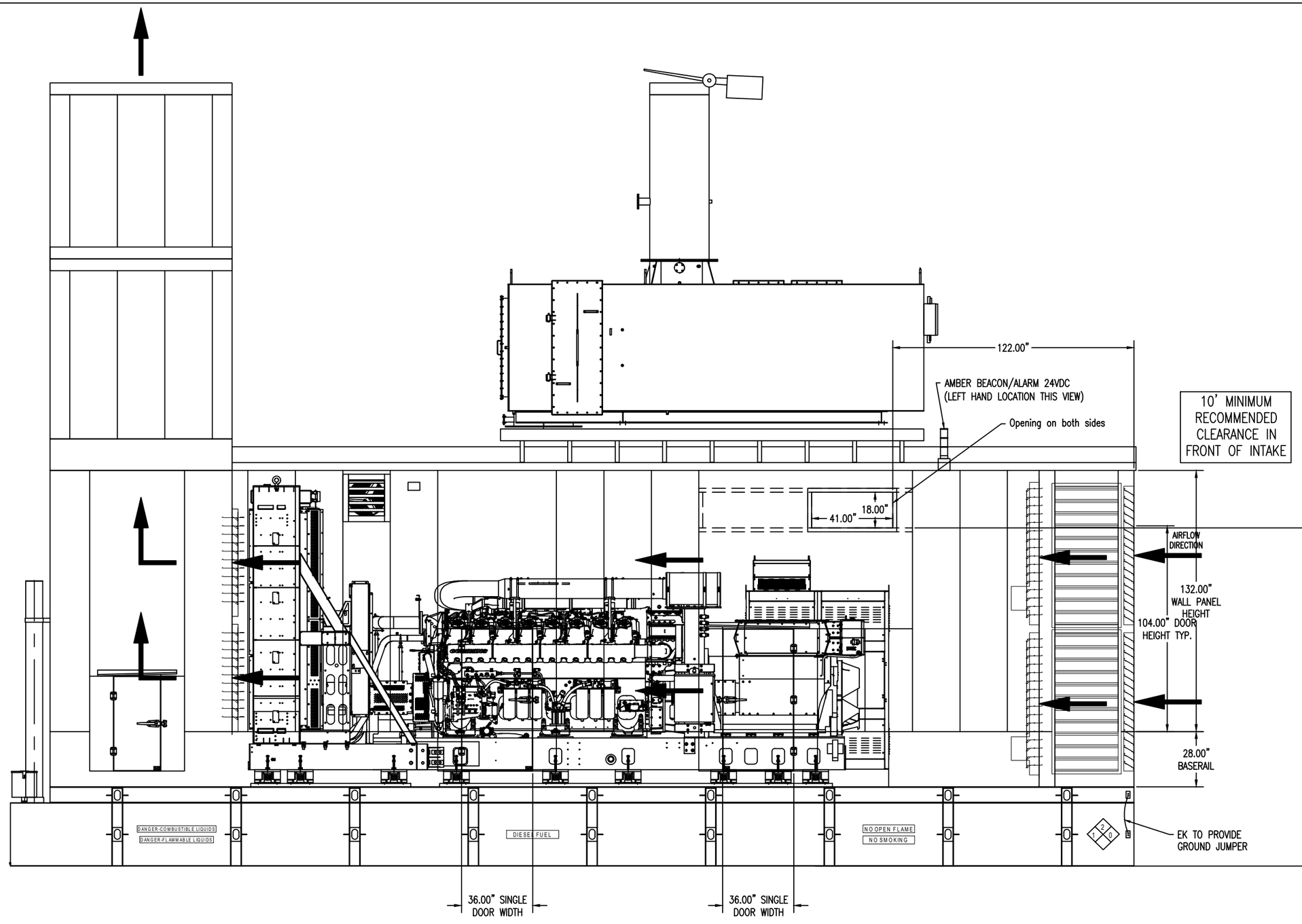
DRAWN BY:	SCALE:
SLL	NTS

QUOTE: 15918-REV I

REV DATE: 11-14-2023

JOB NUMBER:	REV:
28164	J

SHEET: 7 OF 20



LEFT SIDE ELEVATION

JOB NAME: MICROSOFT (CUMMINS)

PART NUMBER: SAE-G2-ULSB-9160 (WALK-IN)

APPROVAL SIGNATURE:

DATE:

171.0 GLAND

GENERATOR: C3000 D6e QSK95-G9 3000KW

DRAWN BY: SLL

SCALE: NTS

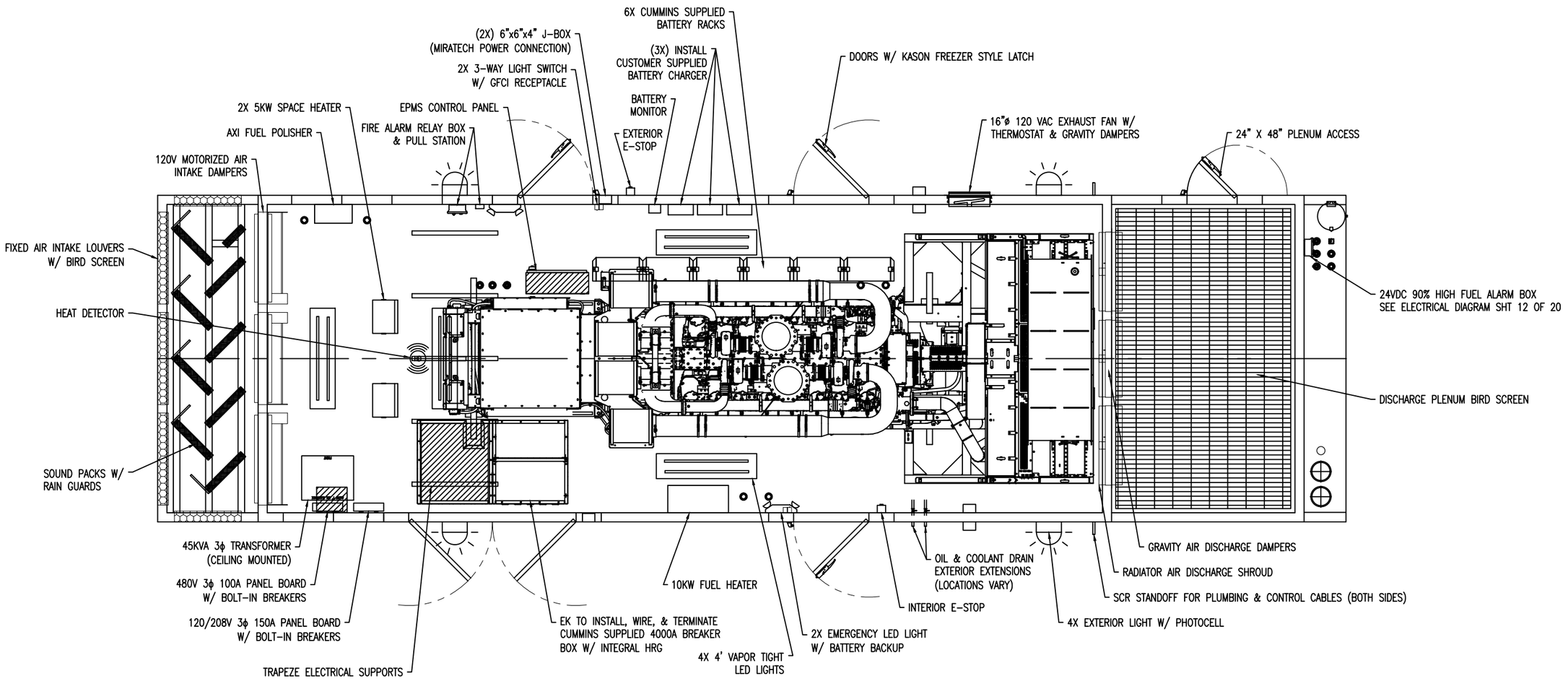
QUOTE: 15918-REV I

REV DATE: 11-14-2023

JOB NUMBER: 28164

REV: J

SHEET: 8 OF 20



ENCLOSURE TOP VIEW

JOB NAME: MICROSOFT (CUMMINS)

PART NUMBER: SAE-G2-ULSB-9160 (WALK-IN)

APPROVAL SIGNATURE:

DATE:

GENERATOR: C3000 D6e QSK95-G9 3000KW

DRAWN BY:	SCALE:
SLL	NTS

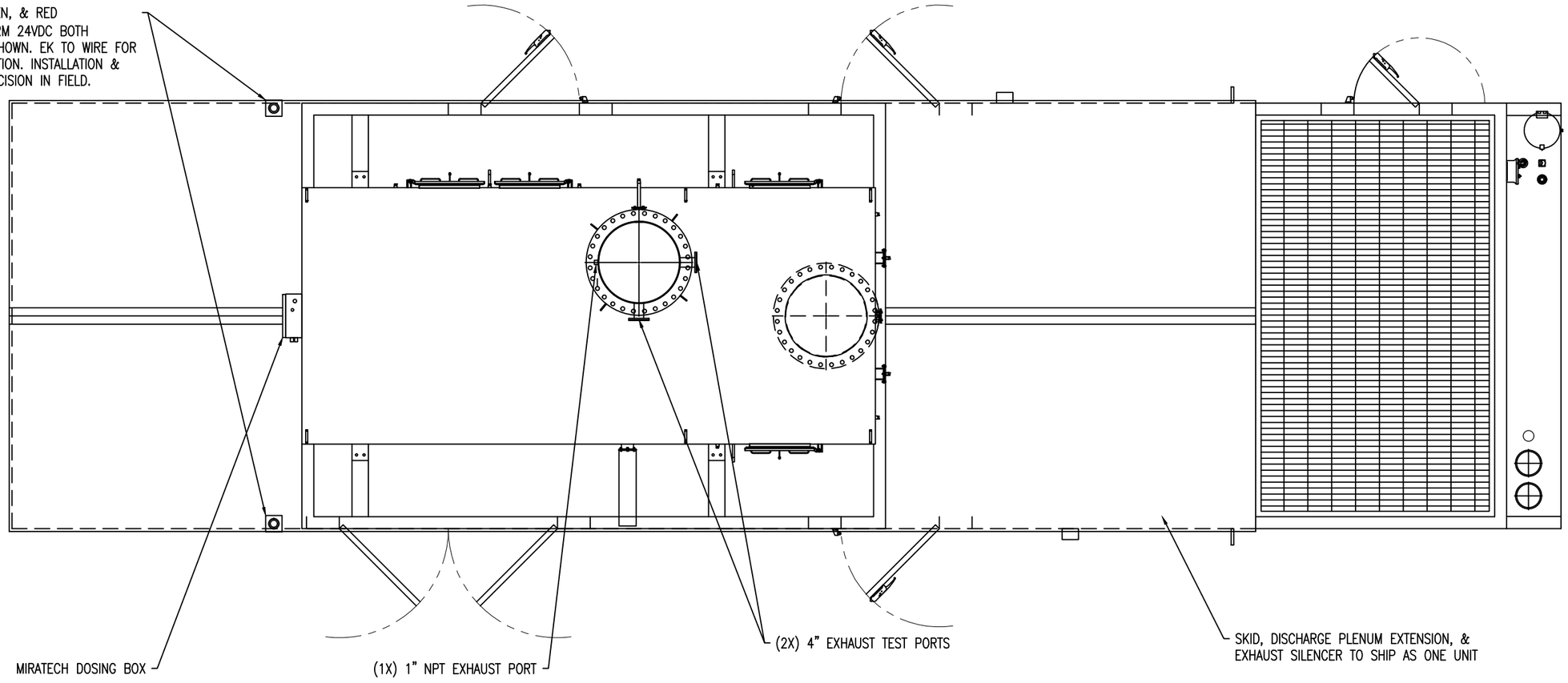
QUOTE: 15918-REV I

REV DATE: 11-14-2023

JOB NUMBER:	REV:
28164	J

SHEET: 9 OF 20

AMBER, GREEN, & RED BEACON/ALARM 24VDC BOTH LOCATIONS SHOWN. EK TO WIRE FOR EITHER LOCATION. INSTALLATION & LOCATION DECISION IN FIELD.



ENCLOSURE TOP VIEW

MICROSOFT (CUMMINS)

SAE-G2-ULSB-9160 (WALK-IN)

JOB NAME:

PART NUMBER:

APPROVAL SIGNATURE:

DATE:

GENERATOR: C3000 D6e QSK95-G9 3000KW

DRAWN BY: SLL

SCALE: NTS

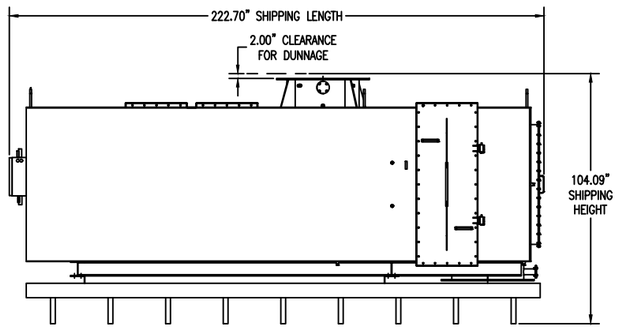
QUOTE: 15918-REV I

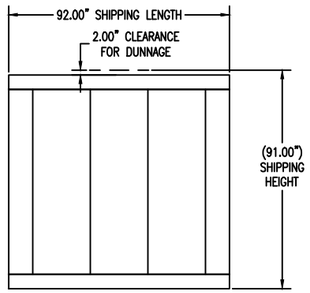
REV DATE: 11-14-2023

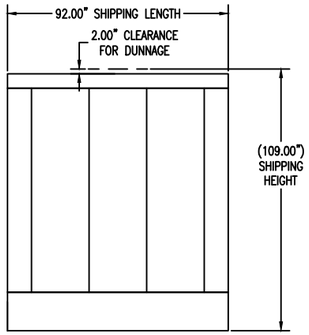
JOB NUMBER: 28164

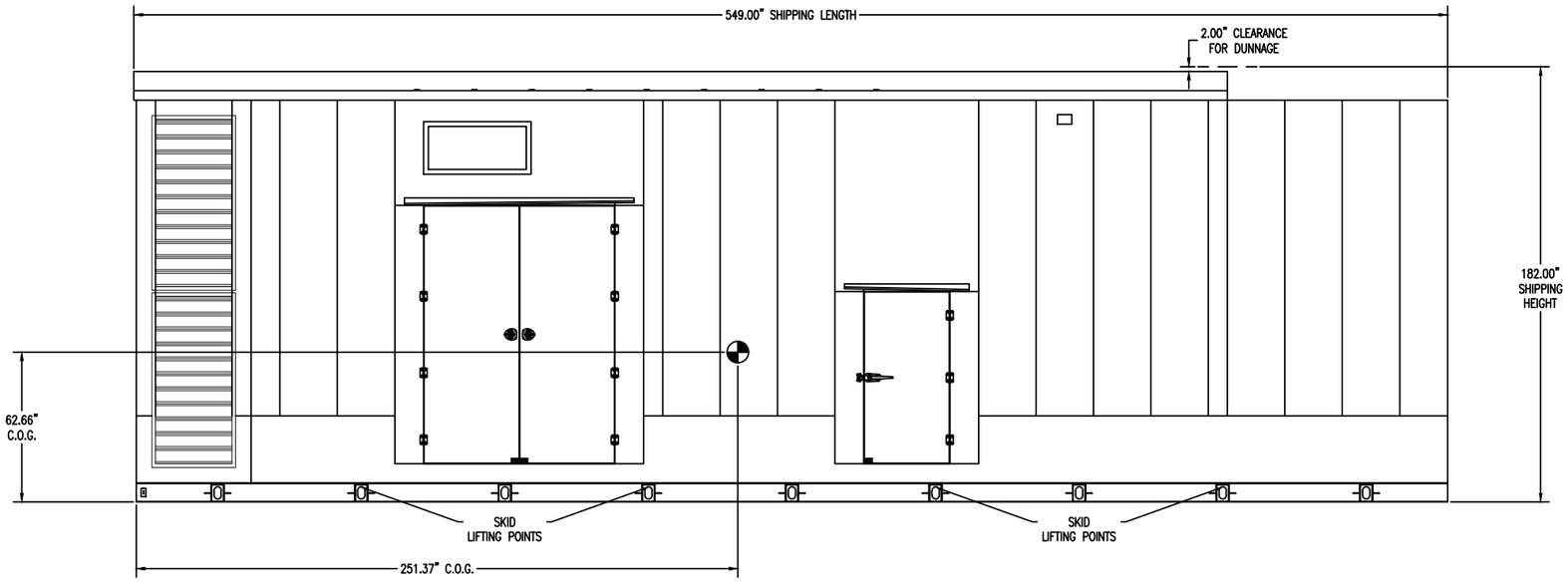
REV: J

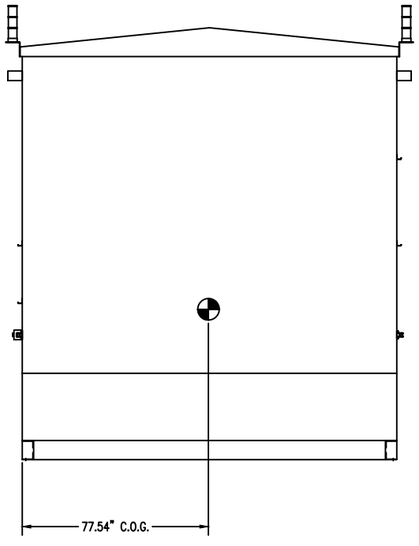
SHEET: 10 OF 20

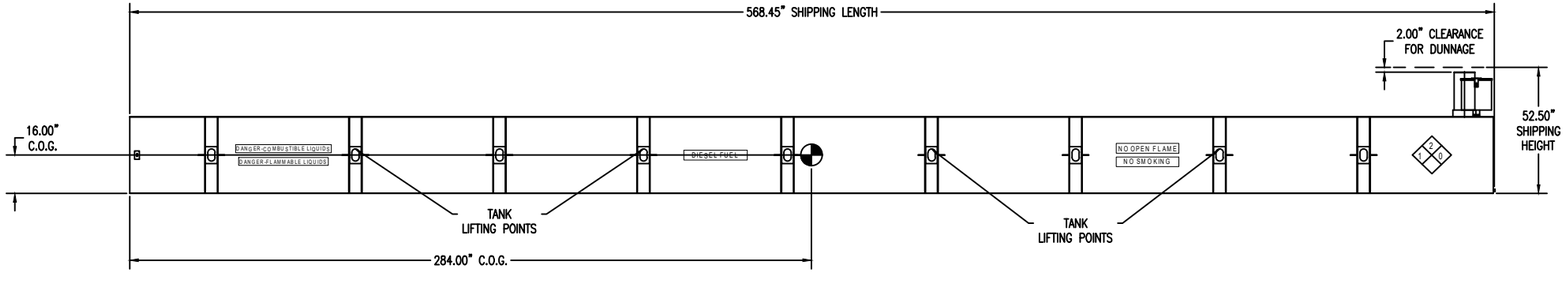












PLANNED SHIPPING CONFIGURATION

ESTIMATED WEIGHTS:

PLENUM EXT 1:	3,185 lbs
PLENUM EXT 2:	3,800 lbs
SKID:	7,600 lbs.
ENCLOSURE:	27,600 lbs.
GENSET:	65,092 lbs.
BREAKER BOX:	3,000 lbs.
TRANSFORMER:	800 lbs.
TANK (DRY):	24,700 lbs.

JOB NAME: MICROSOFT (CUMMINS)

PART NUMBER: SAE-G2-ULSB-9160 (WALK-IN)

DATE:

APPROVAL SIGNATURE:

GENERATOR: C3000 D6e QSK95-G9 3000KW

DRAWN BY: SLL

SCALE: NTS

QUOTE: 15918-REV 1

REV DATE: 11-14-2023

JOB NUMBER: 28164

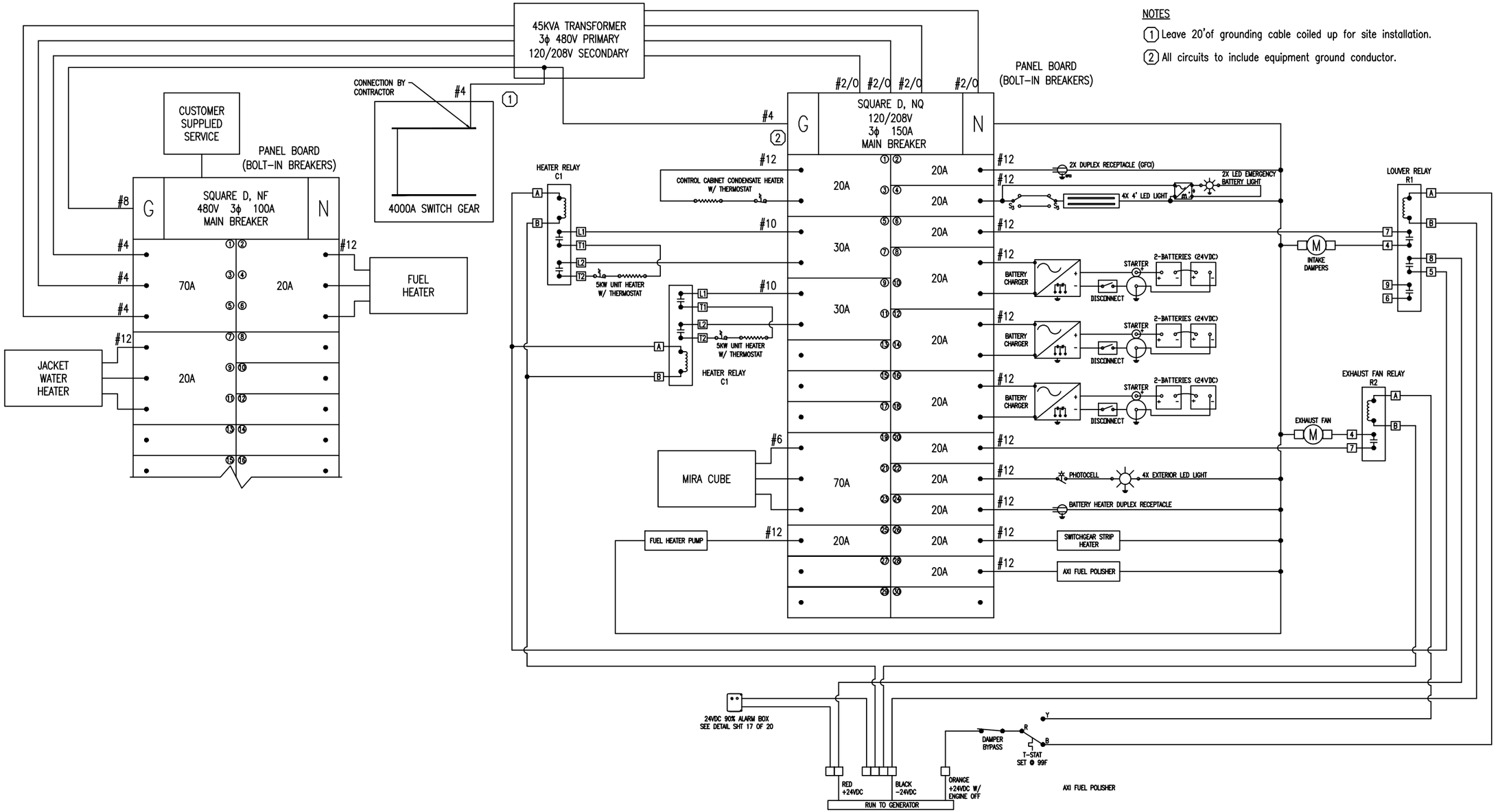
REV: J

SHEET: 11 OF 20

NOTES

(1) Leave 20'of grounding cable coiled up for site installation.

(2) All circuits to include equipment ground conductor.



ELECTRICAL DIAGRAM

EK

MICROSOFT (CUMMINS)

SAE-G2-ULSB-9160 (WALK-IN)

JOB NAME:

PART NUMBER:

DATE:

APPROVAL SIGNATURE:

GENERATOR: C3000 D6e QSK95-G9 3000KW

DRAWN BY: SLL

SCALE: NTS

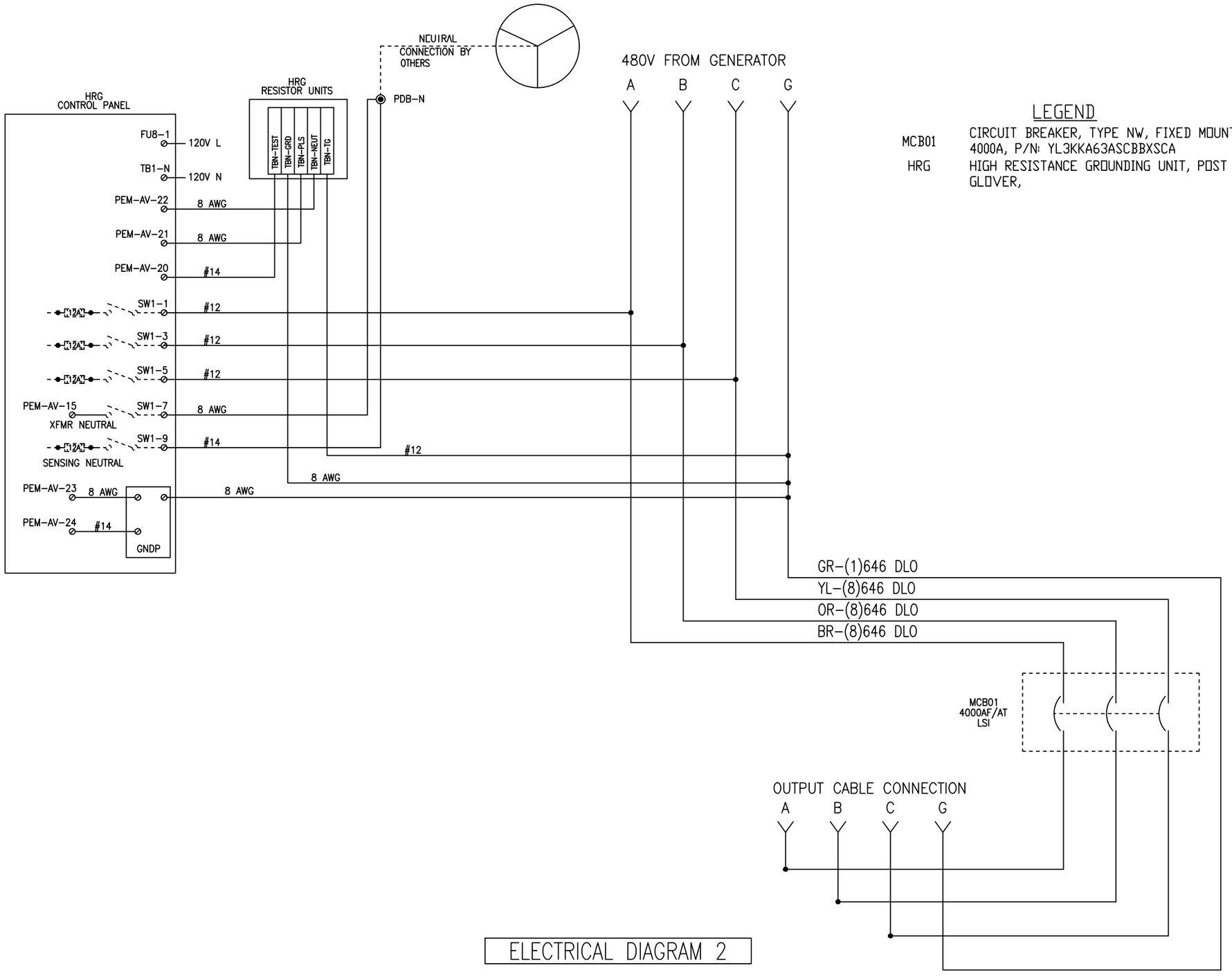
QUOTE: 15918-REV I

REV DATE: 11-14-2023

JOB NUMBER: 28164

REV: J

SHEET: 12 OF 20



LEGEND

MCB01	CIRCUIT BREAKER, TYPE NW, FIXED MOUNT, 4000A, P/N: YL3KKA63ASCBBXSCA
HRG	HIGH RESISTANCE GROUNDING UNIT, POST GLOVER,

ELECTRICAL DIAGRAM 2

MICROSOFT (CUMMINS)

SAE-G2-ULSB-9160 (WALK-IN)

JOB NAME:

PART NUMBER:

APPROVAL SIGNATURE:

DATE:

GENERATOR: C3000 D6e QSK95-G9 3000KW

DRAWN BY: SLL

SCALE: NTS

QUOTE: 15918-REV I

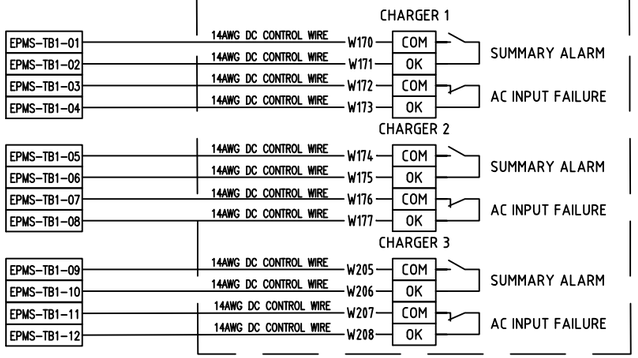
REV DATE: 11-14-2023

JOB NUMBER: 28164

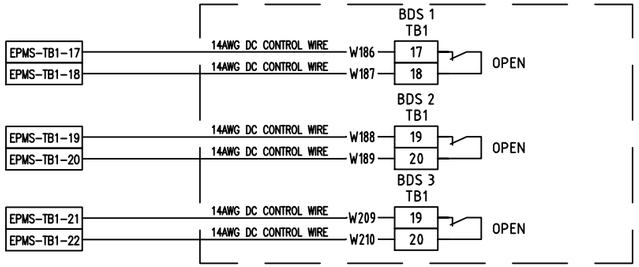
REV: J

SHEET: 13 OF 20

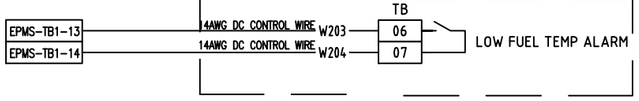
BATTERY CHARGERS



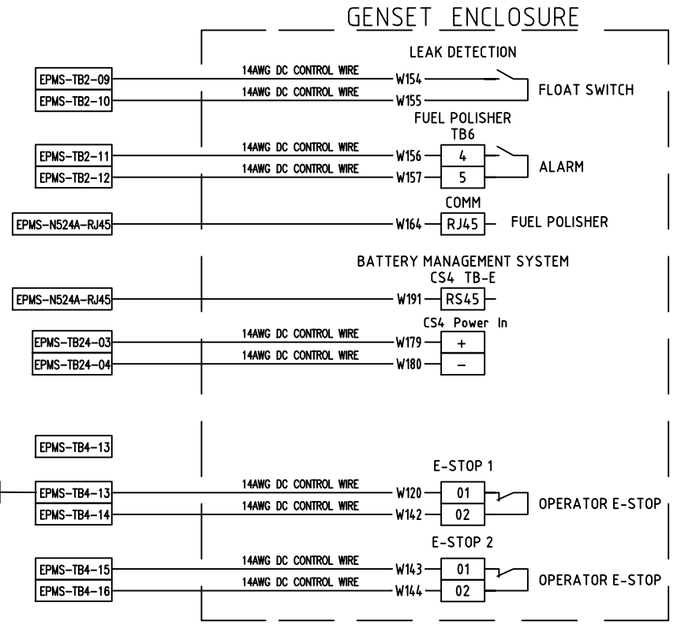
BATTERY DISCONNECT SWITCH



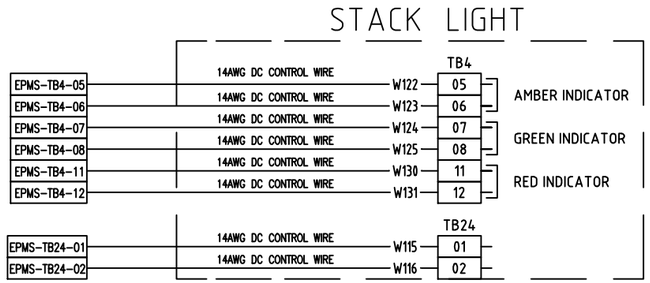
LOW FUEL TEMP ALARM



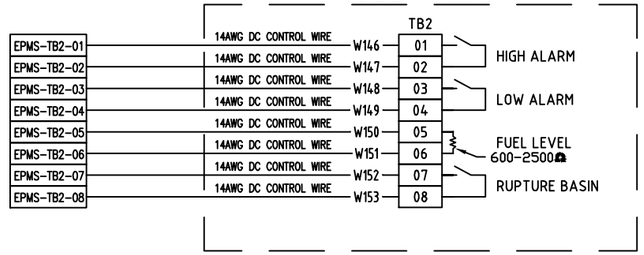
GENSET ENCLOSURE



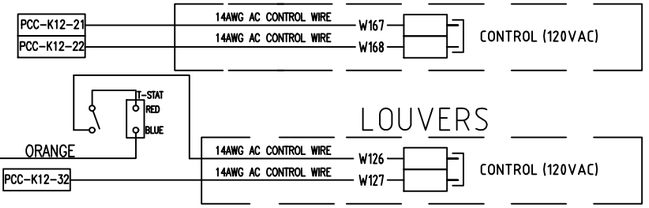
STACK LIGHT



FUEL TANK

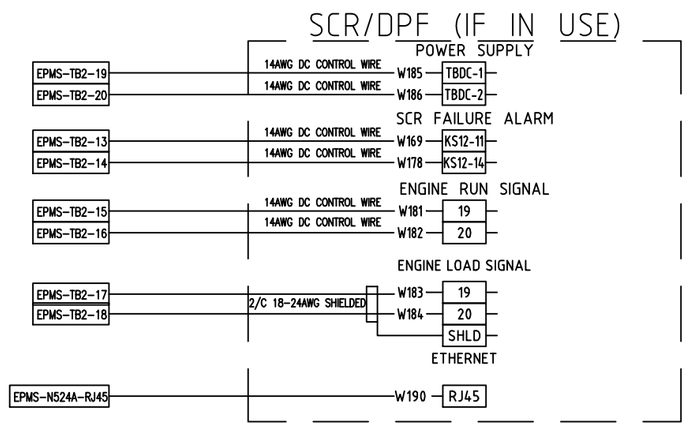


UNIT HEATERS INTERLOCK



LOUVERS

SCR/DPF (IF IN USE)



ELECTRICAL DIAGRAM 3

MICROSOFT (CUMMINS)

SAE-G2-ULSB-9160 (WALK-IN)

JOB NAME:

PART NUMBER:

APPROVAL SIGNATURE:

DATE:

GENERATOR: C3000 D6e QSK95-G9 3000KW

DRAWN BY:	SCALE:
SLL	NTS

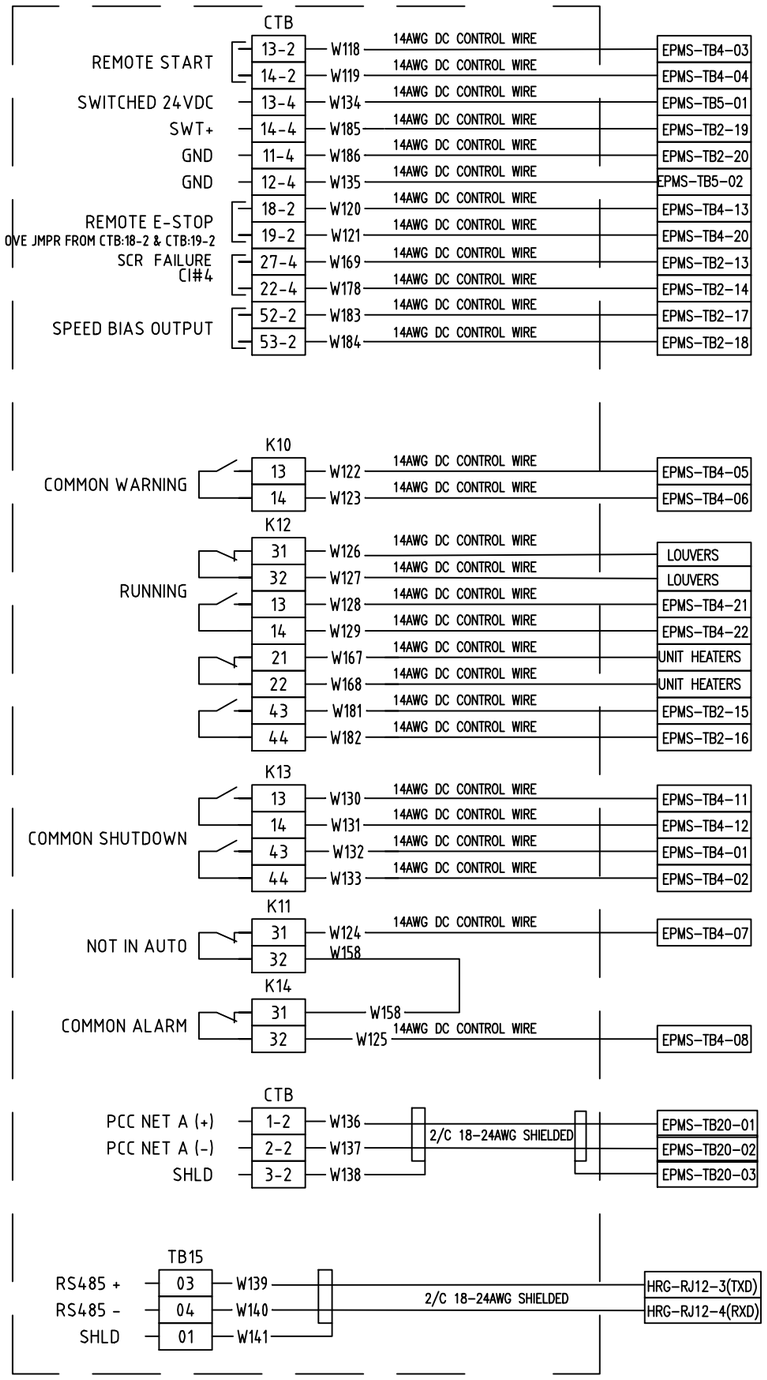
QUOTE: 15918-REV I

REV DATE: 11-14-2023

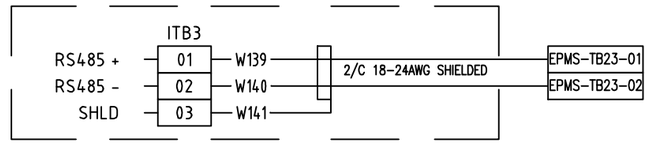
JOB NUMBER:	REV:
28164	J

SHEET: 14 OF 20

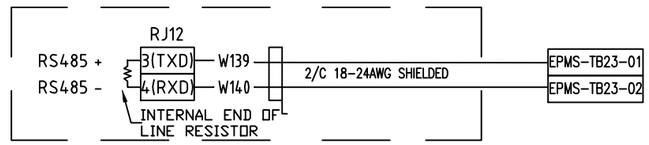
GENSET CONTROL



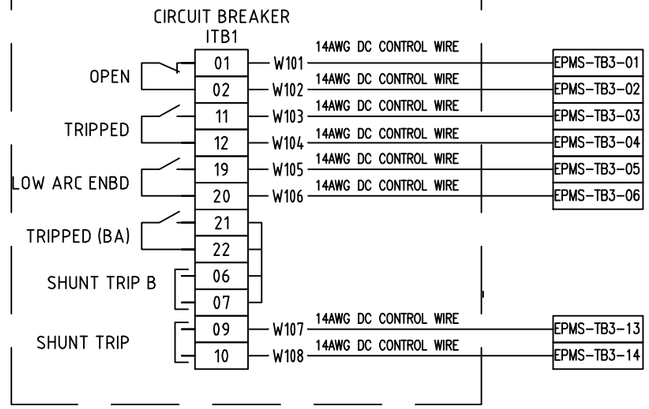
TMS



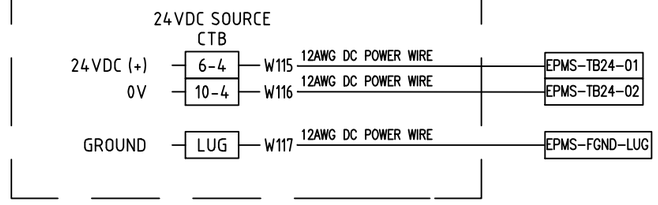
HRG



SWTICHGEAR EQUIPMENT



BATTERY SOURCE



ELECTRICAL DIAGRAM 4

MICROSOFT (CUMMINS)

SAE-G2-ULSB-9160 (WALK-IN)

JOB NAME:

PART NUMBER:

APPROVAL SIGNATURE:

DATE:

GENERATOR: C3000 D6e QSK95-G9 3000KW

DRAWN BY: SLL

SCALE: NTS

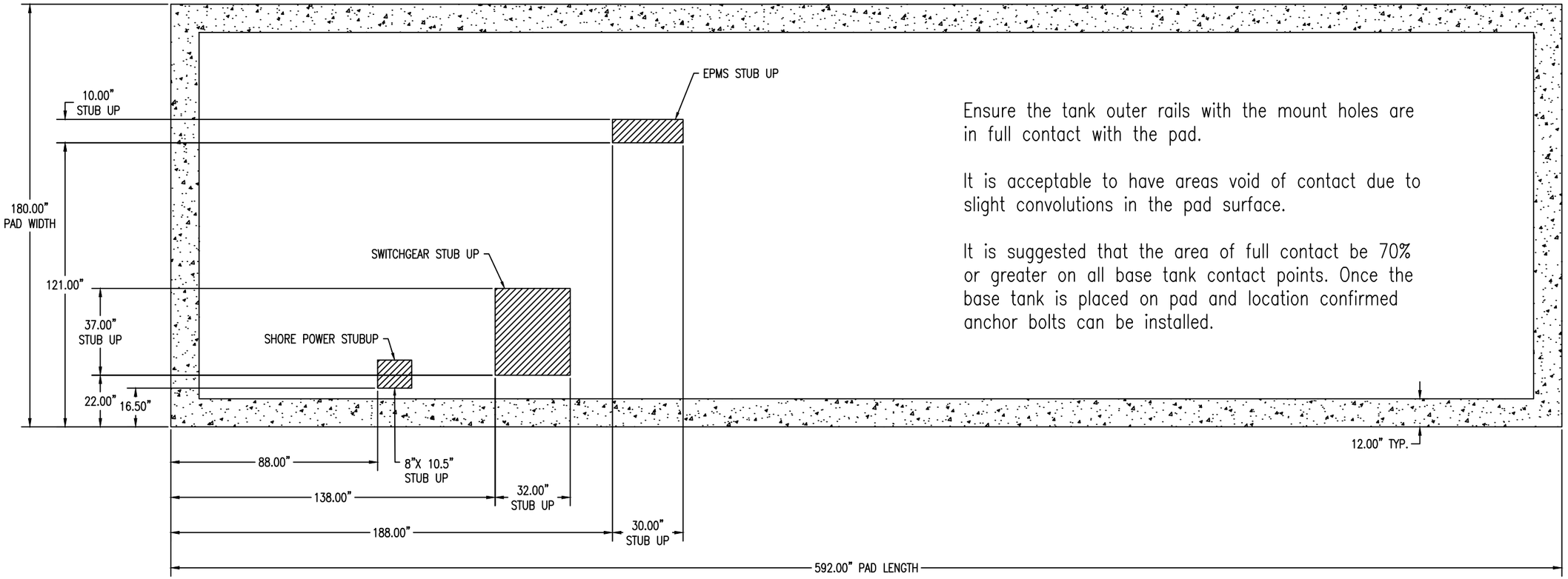
QUOTE: 15918-REV I

REV DATE: 11-14-2023

JOB NUMBER: 28164

REV: J

SHEET: 15 OF 20



Ensure the tank outer rails with the mount holes are in full contact with the pad.

It is acceptable to have areas void of contact due to slight convolutions in the pad surface.

It is suggested that the area of full contact be 70% or greater on all base tank contact points. Once the base tank is placed on pad and location confirmed anchor bolts can be installed.

SUGGESTED PAD LAYOUT

JOB NAME: MICROSOFT (CUMMINS)

PART NUMBER: SAE-G2-ULSB-9160 (WALK-IN)

APPROVAL SIGNATURE:

DATE:

GENERATOR: C3000 D6e QSK95-G9 3000KW

DRAWN BY: SLL

SCALE: NTS

QUOTE: 15918-REV I

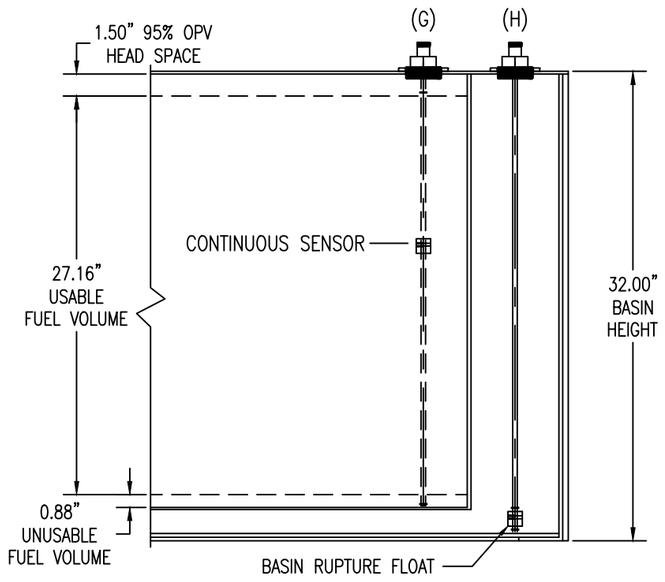
REV DATE: 11-14-2023

JOB NUMBER: 28164

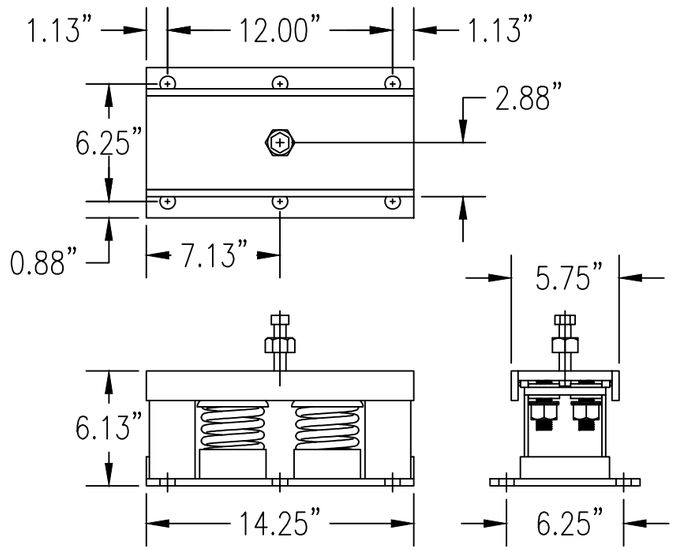
REV: J

SHEET: 16 OF 20

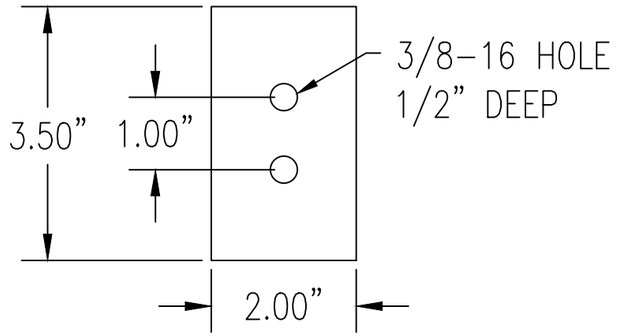
GENSET ALARM FLOAT DETAILS
(NTS)



ISOLATOR DETAIL
(NTS)

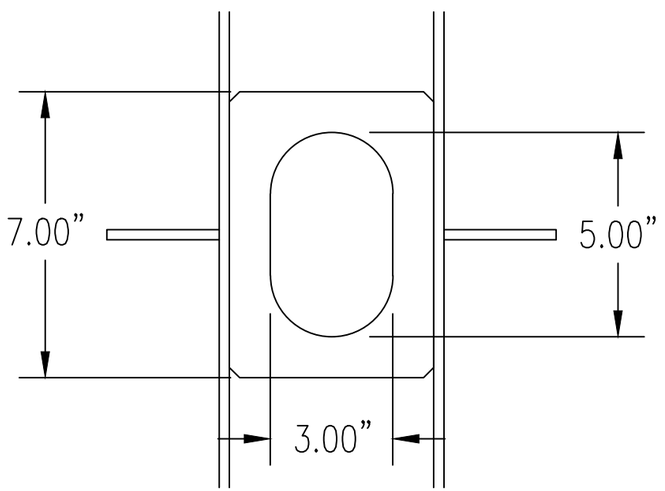


GROUNDING PAD DETAILS
(NTS)



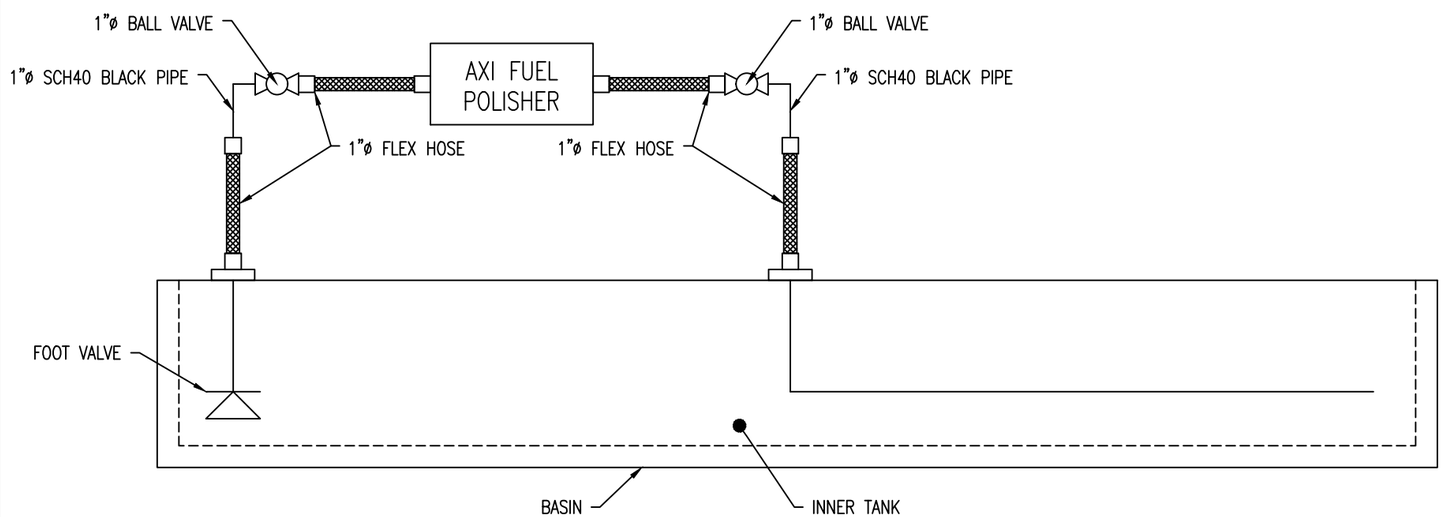
(2X) OPPOSIDE CORNERS TANK
(2X) OPPOSITE CORNERS SKID
(1X) BEHIND LEFT GENSET MOUNTING CHANNEL

BASIN LIFTING LUG DETAILS
(NTS)



LIFTING LUG CAPACITY: 16,200 LBS
TOUCH UP PAINT PROVIDED IN SHIP LOOSE BOX

FUEL POLISHER LINE DIAGRAM
TYPICAL INSTALLATION
(NTS)



JOB NAME: MICROSOFT (CUMMINS)
PART NUMBER: SAE-G2-ULSB-9160 (WALK-IN)
DATE:
APPROVAL SIGNATURE:

GENERATOR: C3000 D6e QSK95-G9 3000KW

DRAWN BY:	SCALE:
SLL	NTS

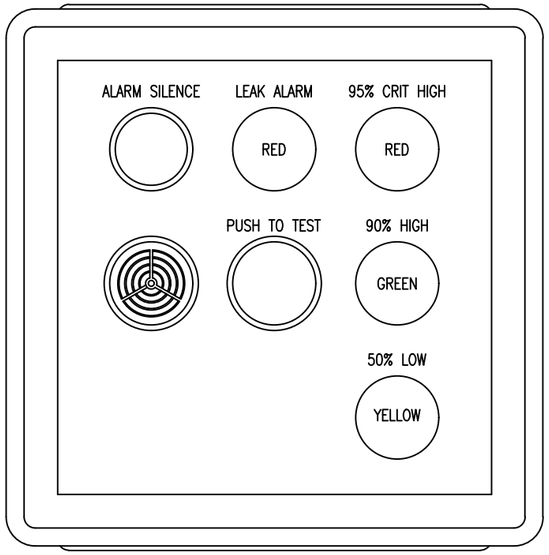
QUOTE: 15918-REV I

REV DATE: 11-14-2023

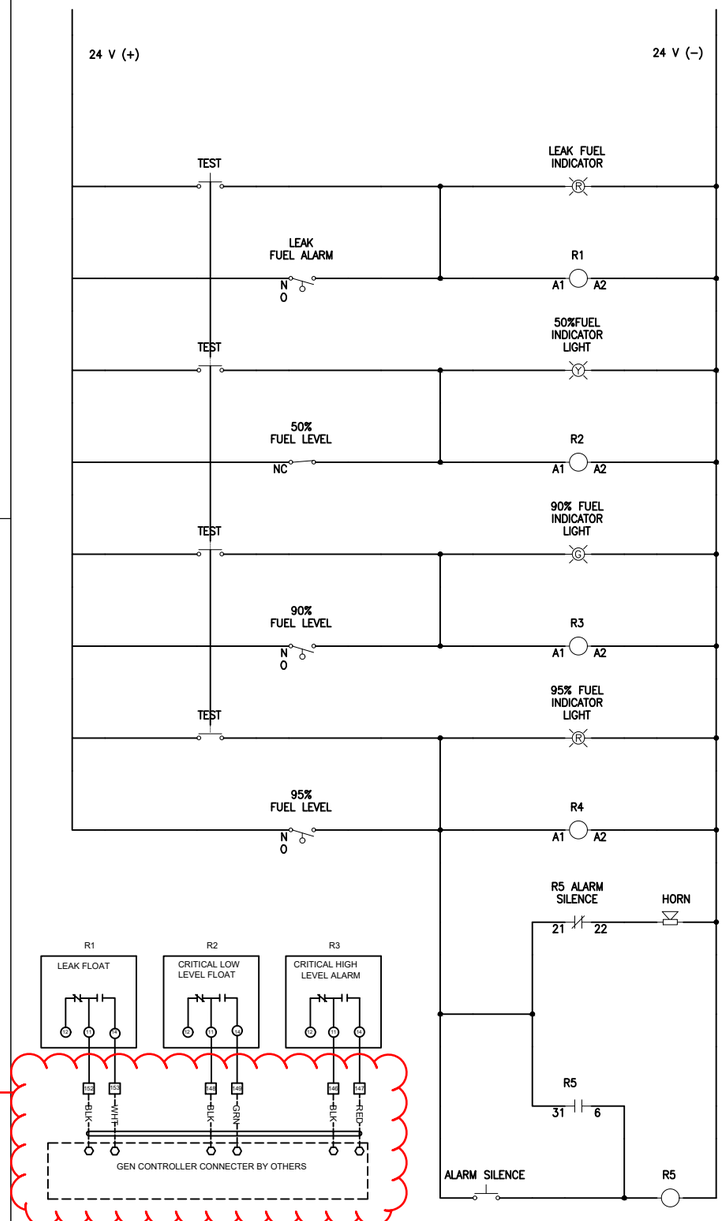
JOB NUMBER:	REV:
28164	J

SHEET: 17 OF 20

HIGH FUEL ALARM BOX DETAILS
24 VDC / 90%CH, 90%H, 50%L & LEAK (NTS)

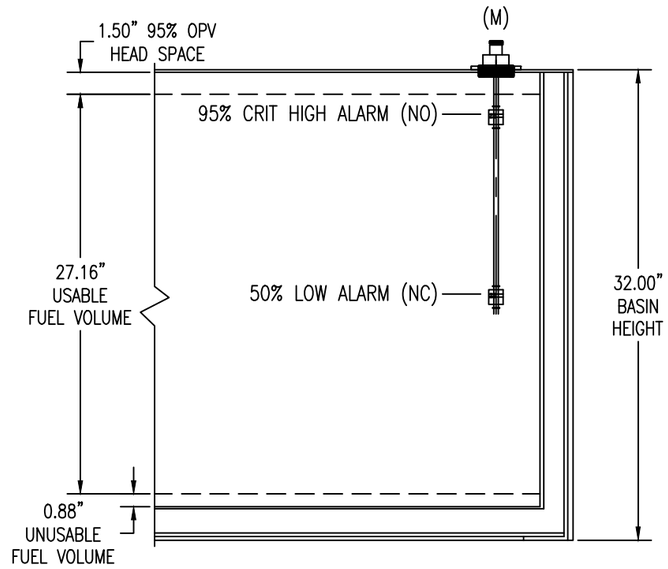


HIGH FUEL ALARM BOX SCHEMATIC
24VDC/95% C.HIGH, 90% HIGH, 50% C.LOW, & LEAK ALARM
(NTS)

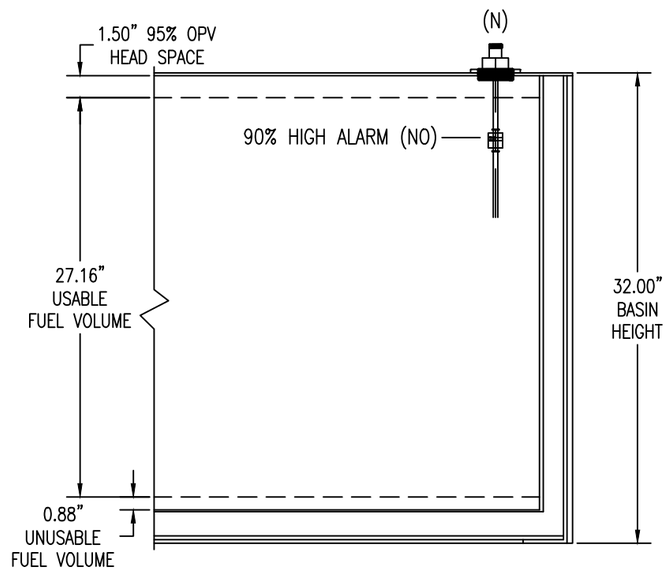


Connected by Cummins

HIGH ALARM BOX FLOAT DETAILS
(NTS)



HIGH ALARM BOX FLOAT DETAILS
(NTS)



EK

JOB NAME: MICROSOFT (CUMMINS)

PART NUMBER: SAE-G2-ULSB-9160 (WALK-IN)

DATE:

APPROVAL SIGNATURE:

GENERATOR: C3000 D6e QSK95-G9 3000KW

DRAWN BY:	SCALE:
SLL	NTS

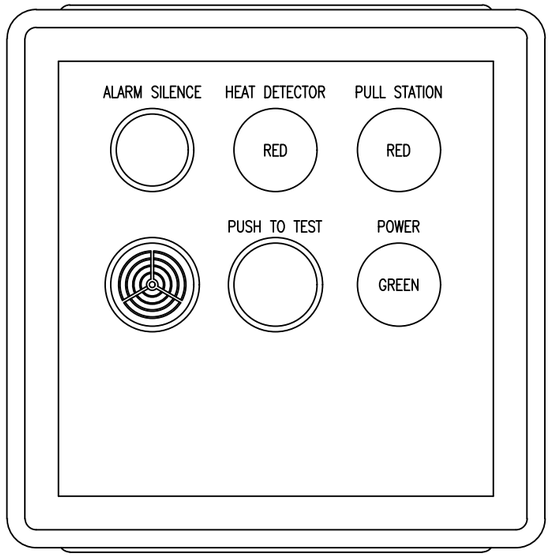
QUOTE: 15918-REV I

REV DATE: 11-14-2023

JOB NUMBER:	REV:
28164	J

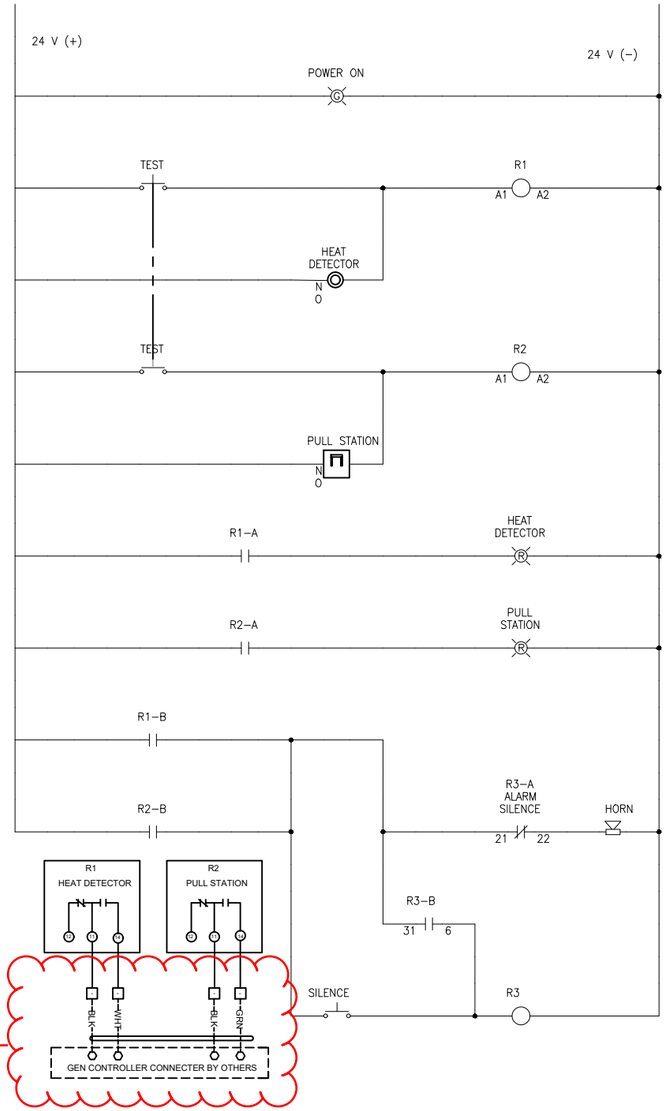
SHEET: 18 OF 20

FIRE ALARM BOX DETAILS
24 VDC / HEAT DETECTOR & PULL STATION (NTS)



Site to connect directly to heat detector and pull station contacts. Wiring and conduit from building to fire alarm panel to be installed by others at site.

FIRE ALARM BOX SCHEMATIC
24VDC HEAT DETECTOR & PULL STATION
(NTS)



MICROSOFT (CUMMINS)

SAE-G2-ULSB-9160 (WALK-IN)

JOB NAME:

PART NUMBER:

APPROVAL SIGNATURE:

DATE:

GENERATOR: C3000 D6e QSK95-G9 3000KW

DRAWN BY: SLL

SCALE: NTS

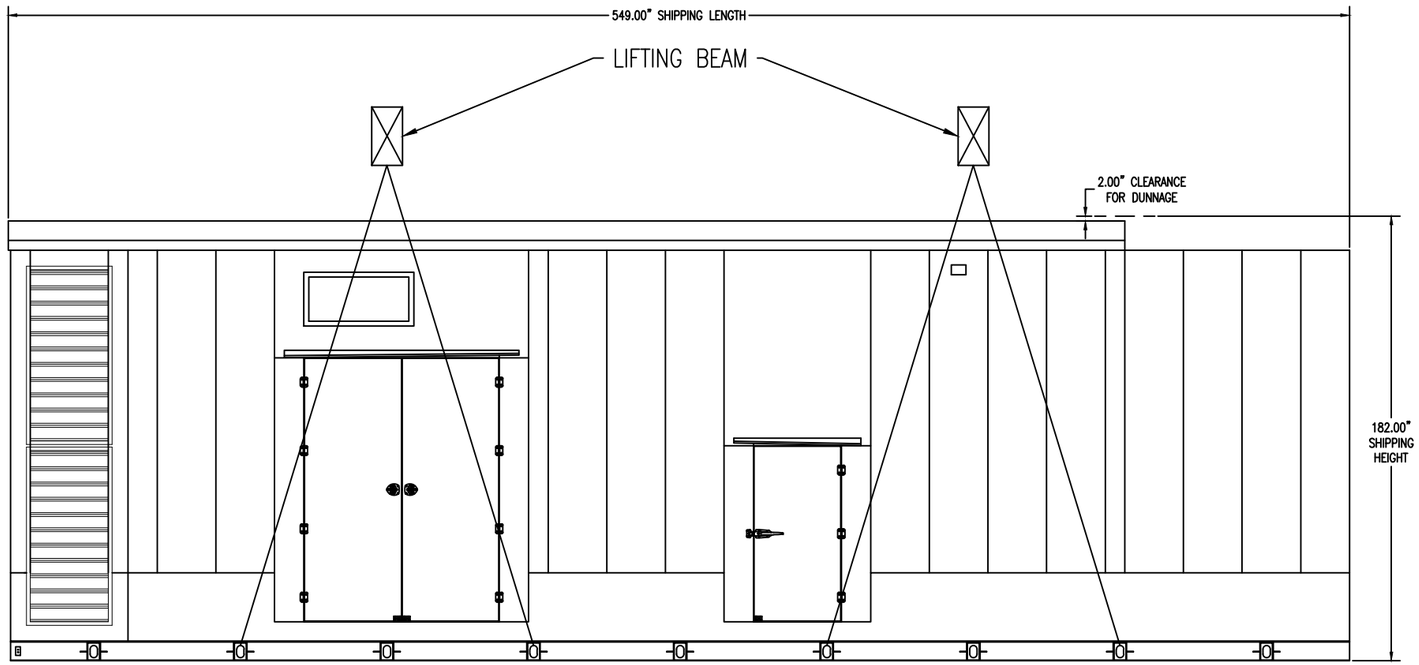
QUOTE: 15918-REV 1

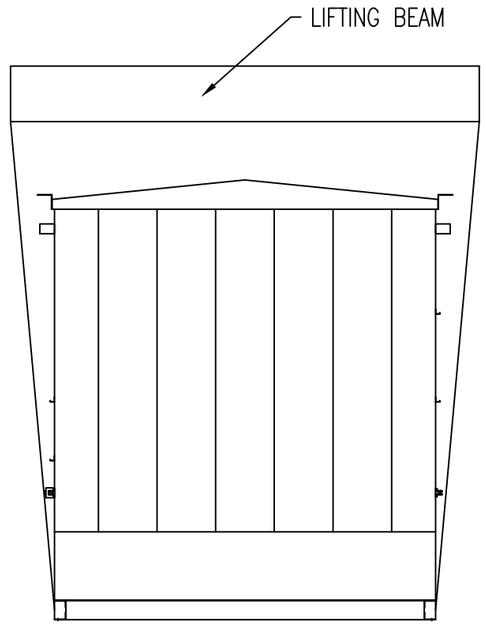
REV DATE: 11-14-2023

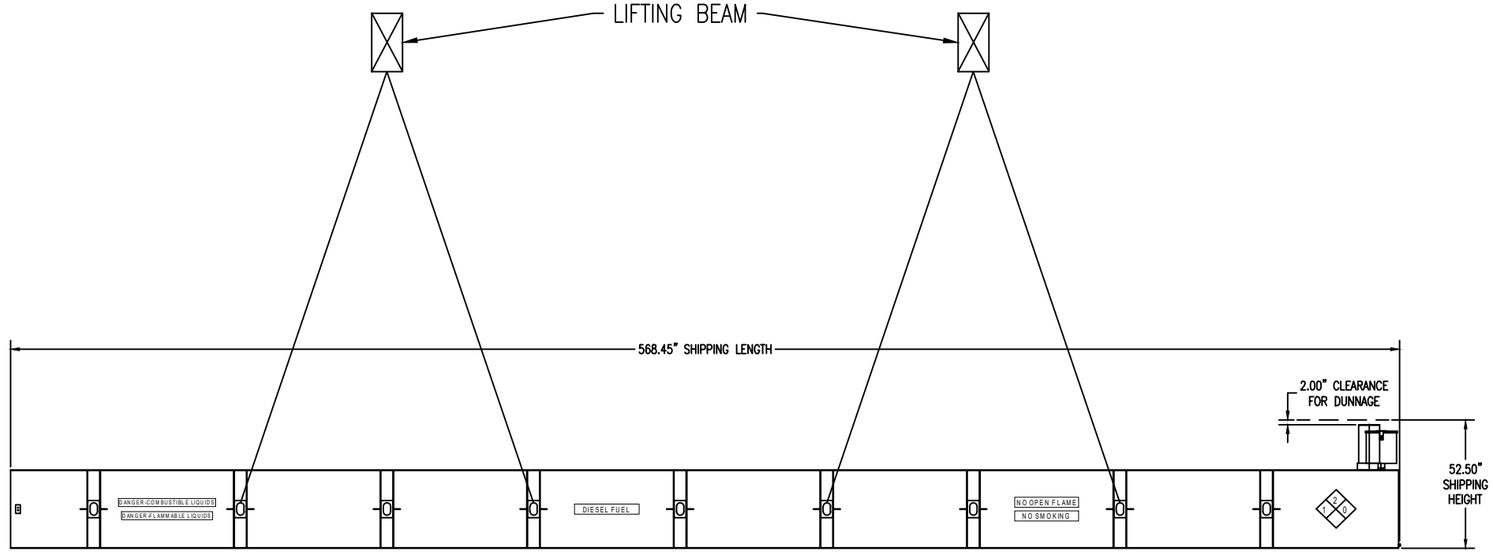
JOB NUMBER: 28164

REV: J

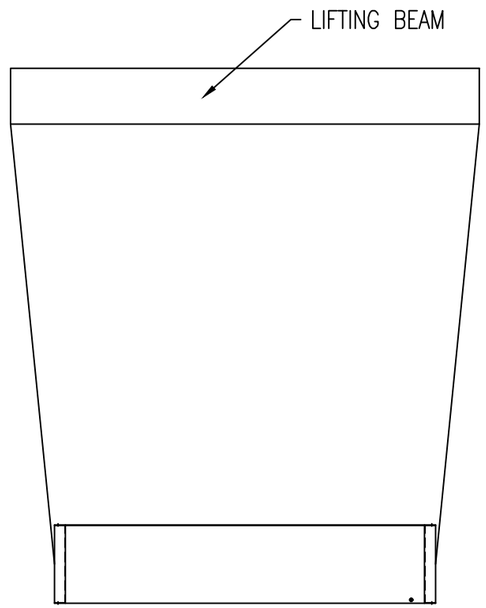
SHEET: 19 OF 20







SUGGESTED PAD LAYOUT



RIGGING DIAGRAM IS FOR REFERENCE ONLY.

JOB NAME: MICROSOFT (CUMMINS)

PART NUMBER: SAE-G2-ULSB-9160 (WALK-IN)

APPROVAL SIGNATURE:

DATE:

GENERATOR: C3000 D6e QSK95-G9 3000KW

DRAWN BY: SLL

SCALE: NTS

QUOTE: 15918-REV I

REV DATE: 11-14-2023

JOB NUMBER: 28164

REV: J

SHEET: 20 OF 20

Aftertreatment Submittal

6.32.13 Engine Generators
26.05.01 Electrical OFCI General Requirements
26.08.00 Electrical Testing and Commissioning
26.08.13 Electrical System Pre-Functional Checklist and Startup
26.08.16 Electrical Systems Functional Performance Testing
26.09.13 Electrical Power Monitoring System Point List (Excel)

The Power of One™

Cummins, Inc.

Powerful Solutions. Dependable Support. Every Time.

Application & Performance Warranty Data

Project Information

Site Location:	WI
Project Name:	CPG Data Centers MKE
Application:	Standby Power
Number Of Engines:	39
Operating Hours per Year:	200

Engine Specifications

Engine Manufacturer:	Cummins
Model Number:	QSK95 G9
Rated Speed:	1800 RPM
Type of Fuel:	Ultra-Low Sulfur Diesel (ULSD)
Type of Lube Oil:	1 wt% sulfated ash or less
Lube Oil Consumption:	0.1 % Fuel Consumption
Number of Exhaust Manifolds:	1

Engine Cycle Data

Load	Speed	Power	Exhaust Flow	Exhaust Temp.	Fuel Cons.	NO_x	CO	NMHC	NMNEHC	PM_{10}	O_2	H_2O
%		*bhp*	*acfm (cfm)*	*° F*	*gal/hr*	*g/bhp-hr*	*g/bhp-hr*	*g/bhp-hr*	*g/bhp-hr*	*g/bhp-hr*	*%*	*%*
100	Rated	4,265	23,220	825	38.3	7.62	0.4	0.12	0.12	0.1	10	12.5

Emission Data (100% Load)

Emission	Raw Engine Emissions						Target Outlet Emissions						Calculated Reduction
	g/bhp-hr	*tons/yr*	*ppmvd @ 15% O_2*	*ppmvd*	*g/kW-hr*	*lb/MW-hr*	*g/bhp-hr*	*tons/yr*	*ppmvd @ 15% O_2*	*ppmvd*	*g/kW-hr*	*lb/MW-hr*	
NO_x*	7.62	7.16	648	1,198	10.219	22.53	0.5	0.47	43	79	0.671	1.48	93.4%
CO	0.4	0.38	56	103	0.536	1.18							
NMHC**	0.12	0.11	29	54	0.161	0.35							
PM_{10}	0.1	0.09	33	60	0.134	0.3							

* MW referenced as NO_2

** MW referenced as CH_4. Propane in the exhaust shall not exceed 15% by volume of the NMHC compounds in the exhaust, excluding aldehydes. The 15% (vol.) shall be established on a wet basis, reported on a methane molecular weight basis. The measurement of exhaust NMHC composition shall be based upon EPA method 320 (FTIR), and shall exclude formaldehyde.

System Specifications

DOC/SCR/DPF-Ready System Specifications (M3BZ-80-70-J-22120031-R4, ACIS-3, Commissioning & Startup, FACINS-M3BZ-80-70-22120031)

SCR Catalyst Space Velocity:	11,243 1/hr
Sound Target:	62 dBA @ 50 ft
Reactant:	Urea
Percent Concentration:	32.5%
Design Exhaust Flow Rate:	23,220 acfm (cfm)
Design Exhaust Temperature[1]:	825° F
Exhaust Temperature Limits:	572° F – 977° F
Minimum Regeneration Temperature[2]:	500° F
SCR Catalyst Volume:	50 ft³
System Dosing Capacity:	115 L/hr
System Pressure Loss:	7.0 inH_2O (Clean)
Estimated Reactant Consumption:	18.5 gal/hr (70 L/hr) / Per Engine

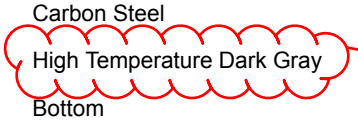
Sound Data

	Octave Band Center Frequency (OBCF)											Receiver	
	Hz	*31.5*	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*	*dBA*	*Angle*	*Distance*
Raw Engine Exhaust Sound Levels													
Sound Power A-Weighted	dBA	68.7	99.3	108.4	123.1	122.8	121.8	122.1	121.9	119.0	129.8		
Calculated Sound Power	dB	108.2	125.5	124.6	131.8	126.0	121.8	120.9	120.9	120.1	129.8		
Calculated Sound Pressure	dB	100.2	117.5	116.5	123.7	118.0	113.7	112.8	112.9	112.1	121.7	90°	3.3 ft
Requested Sound Target													
Overall Sound Pressure											62.0	90°	50 ft
Calculated Target Overall Sound Pressure											85.6	90°	3.3 ft
Sound Performance Estimations (M3BZ-80-70-J-22120031-R4)													
Estimated Sound Attenuation	dB	14.9	20.9	27.9	34.3	33.0	37.4	43.1	45.2	46.6	36.1		
Estimated Sound Power	dB	93.3	104.6	96.7	97.5	93.0	84.4	77.8	75.7	73.5	93.6		
Estimated Sound Pressure	dB	61.6	72.9	65.0	65.8	61.4	52.7	46.1	44.1	41.9	62.0	90°	50 ft
Estimated Sound Pressure	dB	85.3	96.6	88.6	89.4	85.0	76.3	69.7	67.7	65.5	85.6	90°	3.3 ft

- The stated values are based on the data given by the engine manufacturer (as referenced in table above) according to the unsilenced exhaust noise, exhaust gas flow, and temperature.
- The length of the exhaust piping before and after the silencer must be free of resonance in terms of the ignition frequency of the combustion engine.
- If the engine manufacturer sound data is missing any octave bands, it will affect the estimation calculation in the table above.
- Computed noise levels at each distance and frequency are based on a free field condition; site conditions have not been considered in acoustic predictions.
- For all distance noise propagation, free field dispersion rule of 6 dB is used every time distance is doubled.
- Product shall be installed in accordance with standard industry practices, local codes/standards, and manufacturer requirements.
- The acoustic performance shown is an estimate only; the performance is not guaranteed.

MIRATECH Scope of Supply & Equipment Details

	Model Number	Quantity
DOC/SCR/DPF-Ready Housing	**M3BZ-80-70-J-22120031-R4**	**1 / engine**
SCR/DPF-Ready Housing	M3BZ-80-70-J-22120031-HSG	1 / engine
• Number of Catalyst Layers	1 OXI / 1 DPF / 2 SCR	
• Number of Catalyst Blocks per Layer	80 DPF / 70 SCR	
• Material	Carbon Steel	
• Paint	High Temperature Dark Gray	
• Inlet Location	Bottom	
• Outlet Location	Top	
• Door Location	Sides	
• Insulation	None	
• Dimensions	H 65 in x W 94 in x L 246.25 in	
• Inlet Pipe Size & Connection	30 in FF Flange, 150# ANSI standard bolt pattern	
• Outlet Pipe Size & Connection	30 in FF Flange, 150# ANSI standard bolt pattern	
• Weight Fully Loaded With Catalyst	14,419 lbs	
• Weight Without Catalyst	10,410 lbs	
Tray Set	STS-M3Z-70-22120031	2 / engine
SCR Catalyst	SCRC-044-150-450	140 / engine
Oxidation Catalyst	MECR-OX-SB2269-2400-1650-291	4 / engine
SCR Control System	**ACIS-3**	**1 / engine**
SCR Controller	SP-A3C-60-22070041	1 / engine
• Overall Dimensions	W 24.110 in x H 31.535 in x D 12.442 in	
• Weight	76 lbs	
Dosing Box	SEN115-U	1 / engine
• Overall Dimensions	W 15.75 in x H 15.75 in x D 6.562 in	
• Weight	31 lbs	
Reactant Pump	VPN115.lab	1 / engine
• Overall Dimensions	W 19.685 in x H 15.906 in x D 23.031 in	
• Weight	101 lbs	
Reactant Filter	FILTER115	1 / engine
Injector	DEN115-700-U	1 / engine
• Weight	14 lbs	
Differential Pressure Sensor	PT.040	1 / engine
Bypass Probe	NP-18	2 / engine
Temperature Sensor	TT-14-FLEX60-32-1112	2 / engine
Air Compressor	CA115.lab	1 / engine
• Overall Dimensions	W 24.606 in x H 26.772 in x D 15.748 in	
• Weight	82 lbs	



NOTES:

EXHAUST INLET — CUSTOMER SUPPLIED EXHAUST PIPE INLET AND EXPANSION JOINTS

EXHAUST OUTLET — CUSTOMER SUPPLIED EXHAUST PIPE OUTLET AND EXPANSION JOINTS

REACTANT INJECTOR
(DEN)
OPPOSITE SIDE
OF HOUSING

EXHAUST OUTLET

OUTLET NOX
PROBE/SENSOR
(NP-XX/NOX-24V)

COMMISSIONING CHECK
SAMPLE PORT

SCR TEMPERATURE
SENSOR
(TT)

DIFFERENTIAL PRESSURE
TRANSDUCER
(PT)
(Optional)

UPSTREAM
TEMPERATURE SENSOR
(TT)

CUSTOMER ENGINE

INLET NOX PROBE/SENSOR
(NP-XX/NOX-24V)

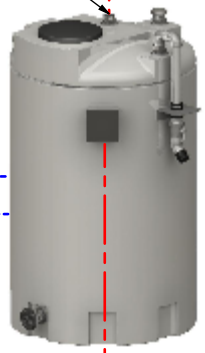
EXHAUST INLET

DOC/DPF/SCR
COMBINATION HOUSING
(M3)

DOSING
BOX
(SEN)

REACTANT
FILTER

REACTANT LEVEL TRANSMITTER
(Optional)

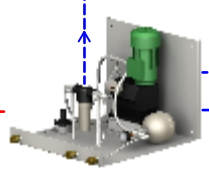


REACTANT
LEVEL
INDICATION
(Optional)

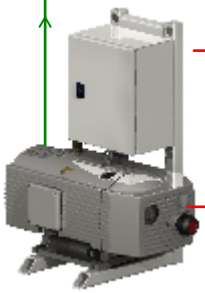
SCR
CONTROLLER
(A3C)

COMMUNICATIONS
(Optional)

REACTANT
BOOSTER PUMP
(VPN)



REACTANT TANK
(Customer or MIRATECH Supplied)



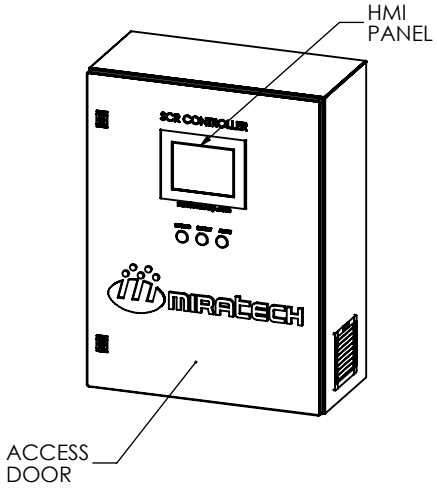
AIR COMPRESSOR
(CA)

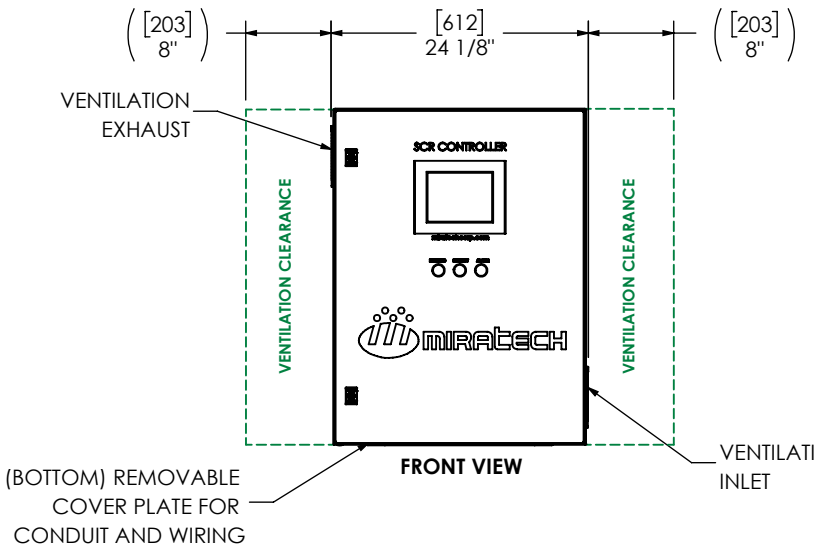
POWER SOURCE
(Customer Supplied)

Wire Harness
Air
Wire
Exhaust Sample Tubing
Reactant

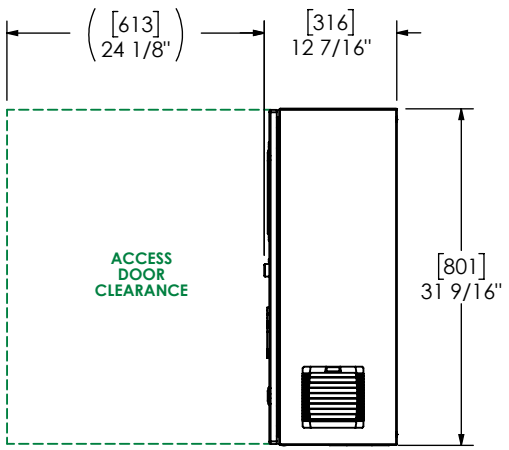
NOT FOR CONSTRUCTION

PROJECT NAME	PROPRIETARY AND CONFIDENTIAL	DIMENSIONS ARE APPROXIMATE IN INCHES UNLESS OTHERWISE SPECIFIED	MIRATECH
PROPOSAL NUMBER	THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF MIRATECH GROUP, LLC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF MIRATECH GROUP, LLC IS PROHIBITED.	DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED ANGLES MACH: ±2° BEND: ±3° / INCHES: ±1/8 MILLIMETERS: ±3	M3-ACIS-3 System Overview
SALES ORDER NO.		DO NOT SCALE DRAWING	
CUSTOMER P.O.		DRAWN: TES — DATE: 05/19/2022	DRAWING: M3-ACIS-3 SOD — REV: 1
		REVIEWED BY: GFS — DATE: 05/20/2022	SIZE: A — SCALE: NTS — SHEET 1 OF 1

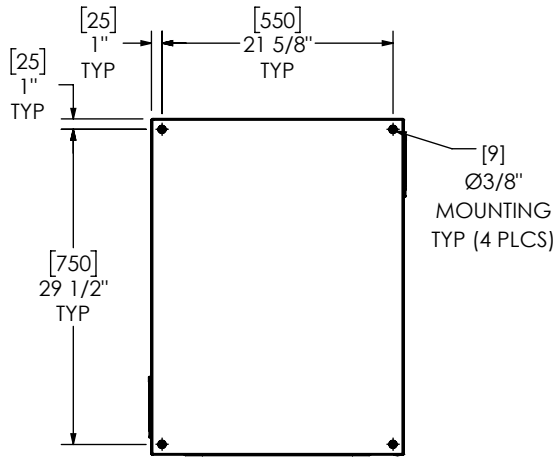




FRONT VIEW



RIGHT VIEW



BACK VIEW

NOTES:

- POWER CONSUMPTION: 300 W MAX
- VOLTAGE: 230 VAC +/- 10%, SINGLE Φ, 50 - 60 HZ
- CURRENT DRAW: 1.5 A
- POWER CONSUMPTION OF THE REACTANT BOOSTER PUMP AND DOSING PANEL ARE SUPPLIED USING THE SAME CIRCUIT AS THE OLC; REFERENCE THESE DRAWINGS FOR THEIR ADDED POWER CONSUMPTION
- OPERATING TEMPERATURE: 32°F - 122°F (0°C - 50°C) (NON-CONDENSING)
- UL COMPLIANT

INSTALLATION INSTRUCTIONS:

- ENCLOSURE RATED IP55 (NEMA 12 EQUIVALENT)
- INSTALLATION LOCATION MUST BE VENTILATED AND TEMPERATURE CONTROLLED TO MAINTAIN PROPER OPERATING TEMPERATURE.
- UNIT MAY BE WALL MOUNTED OR INSTALLED ON A BASE
- POWDER COATED GRAY

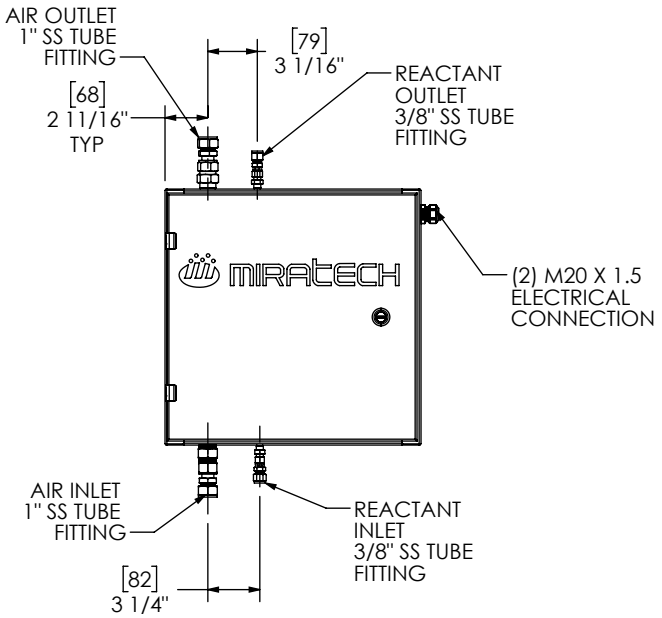
PROJECT NAME	**PROPRIETARY AND CONFIDENTIAL**	DIMENSIONS ARE APPROXIMATE IN INCHES UNLESS OTHERWISE SPECIFIED
PROPOSAL NUMBER	THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF MIRATECH GROUP, LLC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF MIRATECH GROUP, LLC IS PROHIBITED.	DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED ANGLES MACH: ±2° BEND: ±3° | INCHES: ±0.125 MILLIMETERS: ±3
SALES ORDER NO.		DO NOT SCALE DRAWING
CUSTOMER P.O.		DRAWN TES 05/18/2022
		REVIEWED BY GFS 05/18/2022

MIRATECH

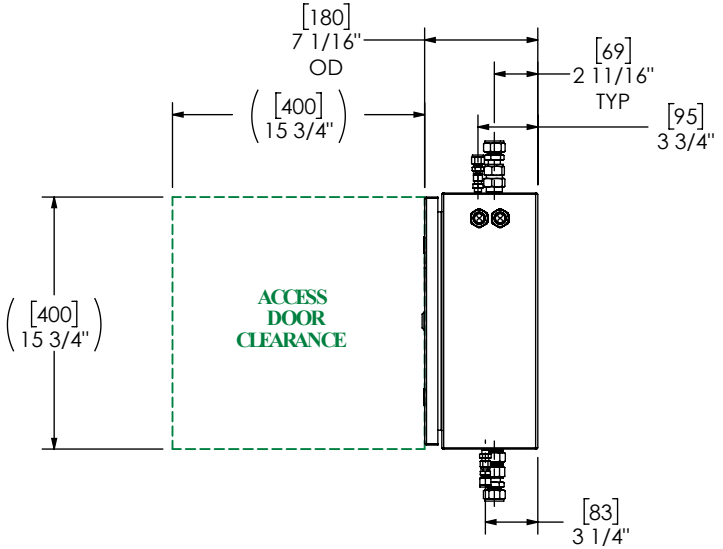
A3C-60-HMI Controller
Sales Drawing

DRAWING	REV
A3C-60-HMI SD	0

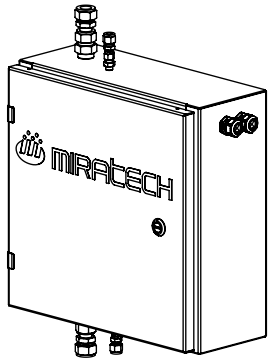
SIZE	SCALE	WEIGHT	SHEET
A	SCALE 1:18	WEIGHT: 76lb	SHEET 1 OF 1

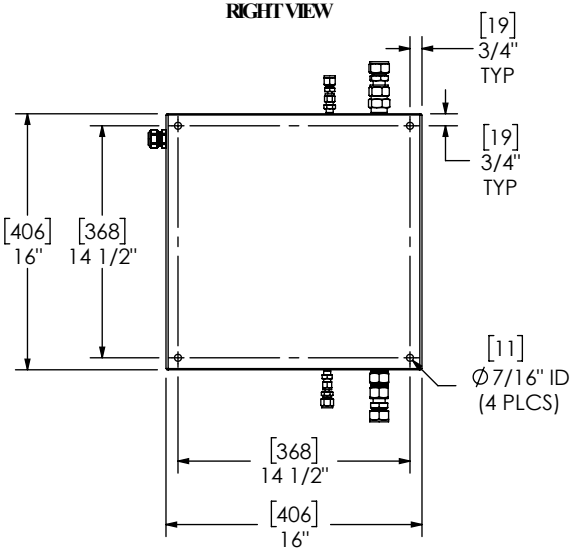


FRONT VIEW



RIGHT VIEW





REAR VIEW

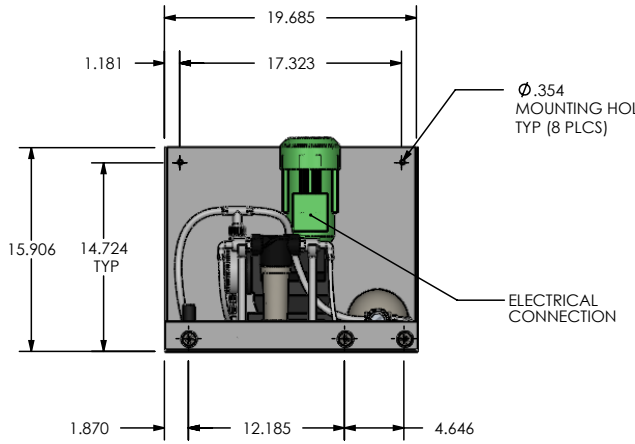
NOTES:

- POWER CONSUMPTION: 5.75 W MAX
- POWER: SUPPLIED FROM SCR CONTROLLER
- OPERATION TEMPERATURE: 40-122°F (5-50°C)
- OPERATING PRESSURE:
  - REACTANT: 3 BAR (43.5 PSI)
  - AIR: 1 BAR (14.5 PSI)
- SUITABLE FOR INDOOR/OUTDOOR USE PER IP55 RATING
- OPERATING FLOW RATE:
  - REACTANT: 115 L/HR MAX (30.4 GAL/HR)
  - AIR: 800 L/MIN (28.2 CFM)

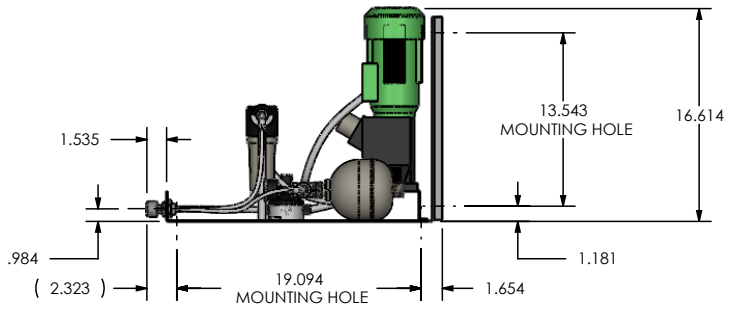
INSTALLATION INSTRUCTIONS:

- IF UNIT IS INSTALLED IN AN ENCLOSURE, THE ENCLOSURE MUST BE VENTILATED AND TEMPERATURE CONTROLLED TO MAINTAIN PROPER OPERATION TEMPERATURE.
- UNIT TO BE MOUNTED SO THAT IT IS ACCESSIBLE WHILE ENGINE IS IN OPERATION AND TUBING IS NO MORE THAN 6.5 FEET (2 M) TO DOSING INJECTOR.
- UREA LINES SHOULD BE HEAT TRACED IF AMBIENT CONDITIONS FALL BELOW 32°F (0°C)

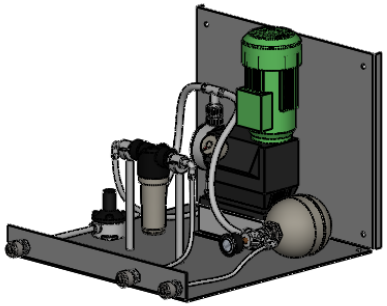
PROJECT NAME	**PROPRIETARY AND CONFIDENTIAL**	DIMENSIONS ARE APPROXIMATE IN INCHES UNLESS OTHERWISE SPECIFIED	MIRATECH			
PROPOSAL NUMBER	THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF MIRATECH GROUP, LLC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF MIRATECH GROUP, LLC IS PROHIBITED.	DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED ANGLES MACH: ±2° BEND: ±3° / INCHES: ±1/8 MILLIMETERS: ±3	**SEN115-U Dosing Box Sales Drawing**			
SALES ORDER NO.		DO NOT SCALE DRAWING	DRAWING: SEN115-U SD	REV: 0		
CUSTOMER P.O.		DRAWN: MLC / DATE: 05/17/2022				
		REVIEWED BY: GEP / DATE: 05/17/2022	SIZE: A	SCALE 1:12	WEIGHT: 53 lb	SHEET 1 OF 1

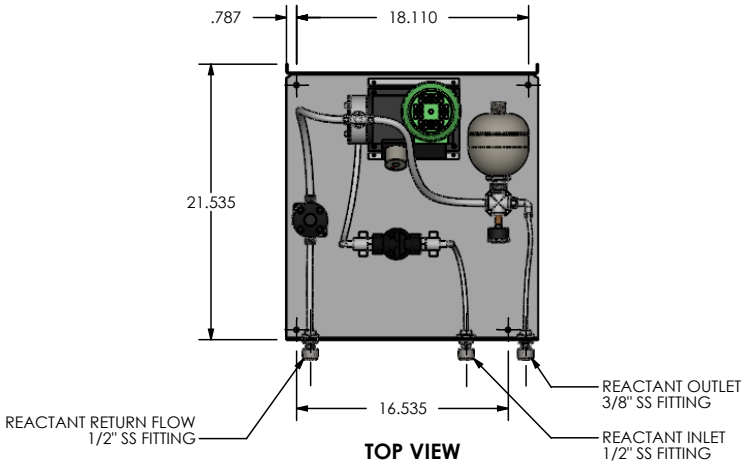


FRONT VIEW



RIGHT VIEW





TOP VIEW

NOTES:

- *POWER CONSUMPTION:* 250 W MAX SUPPLIED BY SNQ CONTROLLER
- *OPERATION TEMPERATURE:* 40°F - 104°F

INSTALLATION INSTRUCTIONS:

- UNIT TO BE MOUNTED SO THAT THE MAXIMUM SUCTION HEIGHT IS LESS THAN 5 FEET
- UREA LINES SHOULD BE HEAT TRACED IF AMBIENT CONDITIONS FALL BELOW 40° F

PROJECT NAME	
PROPOSAL NUMBER	
SALES ORDER NO.	
CUSTOMER P.O.	

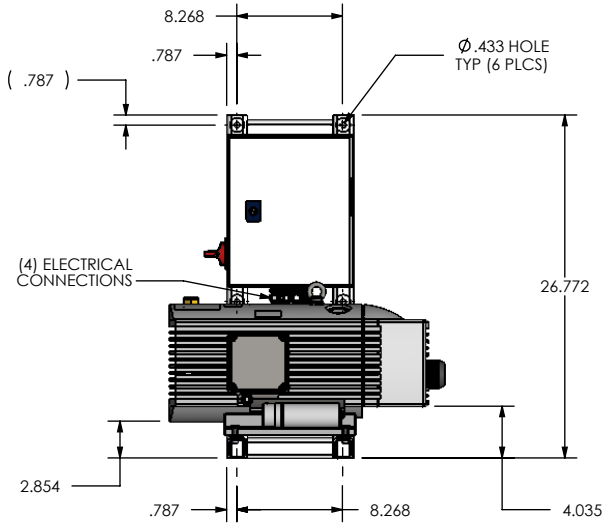
DIMENSIONS ARE APPROXIMATE IN INCHES UNLESS OTHERWISE SPECIFIED

DO NOT SCALE DRAWING

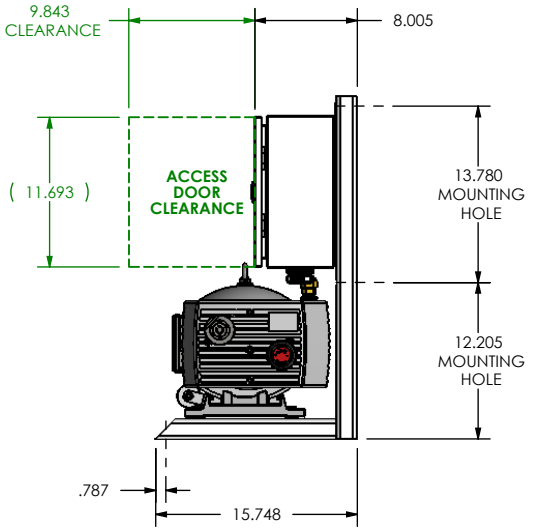
DRAWN	JFS	DATE	08/22/2011	DRAWING	VPN115 SD	REV 6
REVIEWED BY	AJM	DATE	08/22/2011	SIZE A	SCALE 1:15	WEIGHT: 101 lb	SHEET 1 OF 1

MIRATECH

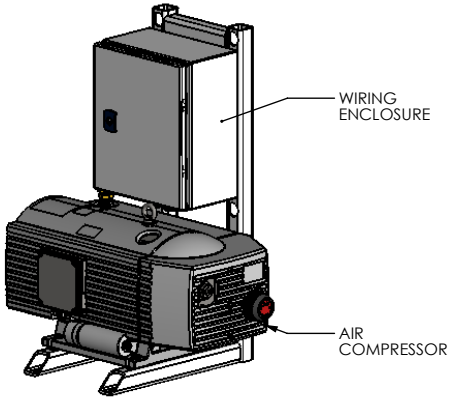
VPN115 Booster Pump
Sales Drawing

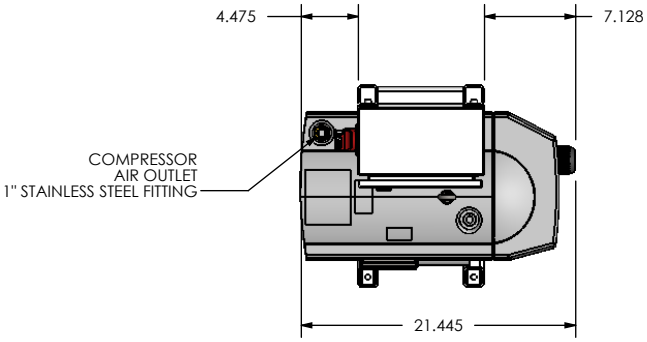


FRONT VIEW



RIGHT VIEW





TOP VIEW

NOTES:

- *POWER CONSUMPTION:* 2200 W MAX
- *VOLTAGE:* 230 VAC +/- 10%, SINGLE Φ, 60 Hz
- *CURRENT DRAW:* 11.0 A
- OPERATION TEMPERATURE: 32°F - 104°F

INSTALLATION INSTRUCTIONS:

- IF UNIT IS INSTALLED IN AN ENCLOSURE, THE ENCLOSURE MUST BE VENTILATED AND TEMPERATURE CONTROLLED TO MAINTAIN PROPER OPERATION TEMPERATURE

PROJECT NAME	
PROPOSAL NUMBER	
SALES ORDER NO.	
CUSTOMER P.O.	

DIMENSIONS ARE APPROXIMATE IN INCHES UNLESS OTHERWISE SPECIFIED

DO NOT SCALE DRAWING

DRAWN	JFS	DATE	08/22/2011	DRAWING	CA115 SD	REV 7
REVIEWED BY	AJM	DATE	08/22/2011	SIZE A	SCALE 1:15	WEIGHT: 131 lb	SHEET 1 OF 1

MIRATECH

CA115 Air Compressor Sales Drawing

Submittal

Microsoft
Master Specification
DFEK - ADMIN

26.32.13 Engine Generators
26.05.01 Electrical OFCI General Requirements
26.08.00 Electrical Testing and Commissioning
26.08.13 Electrical System Pre-Functional Checklist and Startup
26.08.16 Electrical Systems Functional Performance Testing
26.09.13 Electrical Power Monitoring System Point List (Excel)

The Power of One™

Cummins, Inc.

Powerful Solutions. Dependable Support. Every Time.

Generator set data sheet

Model:	**DFEK**
Frequency:	**60 Hz**
Fuel type:	**Diesel**
kW rating:	**500 Standby**
	455 Prime
Emissions level:	**EPA NSPS Stationary Emergency Tier 2**

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

Fuel consumption

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

Engine

	Standby rating	**Prime rating**	**Continuous rating**
Engine manufacturer	Cummins Inc.		
Engine model	QSX15-G9		
Configuration	Cast iron with replaceable wet cylinder liners, in-line 6 cylinder		
Aspiration	Turbocharged with air-to-air charge air-cooling		
Gross engine power output, kWm (bhp)	563.0 (755.0)	507.3 (680.0)	
BMEP at set rated load, kPa (psi)	2433.9 (353.0)	2213.2 (321.0)	
Bore, mm (in.)	136.9 (5.39)		
Stroke, mm (in.)	168.9 (6.65)		
Rated speed, rpm	1800		
Piston speed, m/s (ft/min)	10.1 (1995.0)		
Compression ratio	17.0:1		
Lube oil capacity, L (qt)	83.3 (88.0)		
Overspeed limit, rpm	2150 ± 50		
Regenerative power, kW	52.00		

Fuel flow	Standby rating	Prime rating	Continuous rating
Maximum fuel flow, L/hr (US gph)	423.9 (112.0)		
Maximum inlet restriction, mm Hg (in Hg)	127.0 (5.0)		
Maximum return restriction, mm Hg (in Hg)	165.1 (6.5)		

Air

Combustion air, m^3/min (scfm)	41.6 (1470.0)	38.8 (1370.0)	
Maximum air cleaner restriction, kPa (in H_2O)	6.2 (25.0)		
Alternator cooling air, m^3/min (scfm)	62.0 (1290.0)		

Exhaust

Exhaust flow at set rated load, m^3/min (cfm)	102.6 (3625.0)	88.7 (3135.0)	
Exhaust temperature, °C (°F)	482.8 (901.0)	466.7 (872.0)	
Maximum back pressure, kPa (in H_2O)	10.2 (41.0)		

Standard set-mounted radiator cooling

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

Optional set-mounted radiator cooling

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

Optional heat exchanger cooling

Set coolant capacity, L (US Gal.)			
Heat rejected, jacket water circuit, MJ/min (Btu/min)			
Heat rejected, after-cooler circuit, MJ/min (Btu/min)			
Heat rejected, fuel circuit, MJ/min (Btu/min)			
Total heat radiated room, MJ/min (Btu/min)			
Maximum raw water pressure, jacket water circuit, kPa (psi)			
Maximum raw water pressure, after-cooler circuit, kPa (psi)			
Maximum raw water pressure, fuel circuit, kPa (psi)			
Maximum raw water flow, jacket water circuit, L/min (US gal/min)			
Maximum raw water flow, after-cooler circuit, L/min (US gal/min)			
Maximum raw water flow, fuel circuit, L/min (US gal/min)			
Minimum raw water flow at 27 °C (80 °F) inlet temp, jacket water circuit, L/min (US gal/min)			
Minimum raw water flow at 27 °C (80 °F) inlet temp, after-cooler circuit, L/min (US gal/min)			
Minimum raw water flow at 27 °C (80 °F) inlet temp, fuel circuit, L/min (US gal/min)			

Optional heat exchanger cooling (continued)

Raw water delta P at min flow, jacket water circuit, kPa (psi)			
Raw water delta P at min flow, after-cooler circuit, kPa (psi)			
Raw water delta P at min flow, fuel circuit, kPa (psi)			
Maximum jacket water outlet temp, °C (°F)			
Maximum after-cooler inlet temp, °C (°F)			
Maximum after-cooler inlet temp at 25 °C (77 °F) ambient, °C (°F)			

Optional remote radiator cooling[1]

Set coolant capacity, L (US gal)	
Max flow rate at max friction head, jacket water circuit, L/min (US gal/min)	
Max flow rate at max friction head, after-cooler circuit, L/min (US gal/min)	
Heat rejected, jacket water circuit, MJ/min (Btu/min)	
Heat rejected, after-cooler circuit, MJ/min (Btu/min)	
Heat rejected, fuel circuit, MJ/min	
Total heat radiated to room, MJ/min (Btu/min)	
Maximum friction head, jacket water circuit, kPa (psi)	
Maximum friction head, after-cooler circuit, kPa (psi)	
Maximum static head, jacket water circuit, m (ft)	
Maximum static head, after-cooler circuit, m (ft)	
Maximum jacket water outlet temp, °C (°F)	
Maximum after-cooler inlet temp at 25 °C (77 °F) ambient, °C (°F)	
Maximum after-cooler inlet temp, °C (°F)	
Maximum fuel flow, L/hr (US gph)	
Maximum fuel return line restriction, kPa (in Hg)	

Weights[2]

Unit dry weight kgs (lbs)	4325 (9535)
Unit wet weight kgs (lbs)	4461 (9835)

Notes:

[1] For non-standard remote installations contact your local Cummins representative.

[2] Weights represent a set with standard features. See outline drawing for weights of other configurations.

Derating factors

Standby	Genset may be operated at up to 1400 m (4593 ft) and 40°C (104°F) without power deration. For sustained operation above these conditions, derate by 3.1% per 305 m (1000 ft), and 9% per 10°C (9% per 18°F). Genset may be operated at up to 500 m (1640 ft) and 50°C (122°F) without power deration. For sustained operation above these conditions, derate by 3% per 305 m (1000 ft), and 9.5% per 10°C (9% per 18°F).
Prime	Genset may be operated at up to 2250 m (7382 ft) and 40°C (104°F) without power deration. For sustained operation above these conditions, derate by 3.2% per 305 m (1000 ft), and 16.6% per 10°C (16.6% per 18°F). Genset may be operated at up to 1600 m (5249 ft) and 50°C (122°F) without power deration. For sustained operation above these conditions, derate by 3.2% per 305 m (1000 ft), and 16.6% per 10°C (16.6% per 18°F).
Continuous	

Ratings definitions

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

Alternator data

Three phase table[1]		105 °C	105 °C	105 °C	125 °C	125 °C	125 °C	125 °C	125 °C	150 °C	150 °C	150 °C	150 °C
Feature code		B262	B301	B252	B258	B252	B414	B246	B300	B426	B413	B424	B419
Alternator data sheet number		308	307	307	308	307	308	306	306	307	307	305	306
Voltage ranges		110/190 thru 139/240 220/380 thru 277/480	347/600	120/208 thru 139/240 240/416 thru 277/480	110/190 thru 139/240 220/380 thru 277/480	120/208 thru 139/240 240/416 thru 277/480	120/208 thru 139/240 240/416 thru 277/480	277/480	347/600	110/190 thru 139/240 220/380 thru 277/480	120/208 thru 139/240 240/416 thru 277/480	277/480	347/600
Surge kW		514	517	514	514	514	516	515	515	512	514	512	515
Motor starting kVA (at 90% sustained voltage)	Shunt												
	PMG	2429	2208	2208	2429	2208	2429	1896	1896	2208	2208	1749	1896

Full load current - amps at Standby rating	110/190	120/208	110/220	115/230	139/240	220/380	230/400	240/416	255/440	277/480	347/600	
	1901	1737	1642	1571	1505	951	903	868	821	753	602	

Note:

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

Formulas for calculating full load currents:

Three phase output

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

Single phase output

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

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

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

Our energy working for you.™

D-3401 (04/20)

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 ℃ (32 ℉)
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 ºC (104 ºF) 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 ℃ standby at 40 ℃ 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 ℃ (40℉)
- 208/240/480 V thermostatically controlled coolant heater for ambient below 4.5 ℃ (40℉)
- 120 V 300 W lube oil heater
- Heavy duty air cleaner with safety element

Alternator

- 80 ℃ rise
- 105 ℃ rise
- 150 ℃ 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 ℃ 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 ℃ to +70 ℃ 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 ºC to +70 ºC

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 meter
- PowerCommand 2.3 and 3.3 control with AmpSentry protection

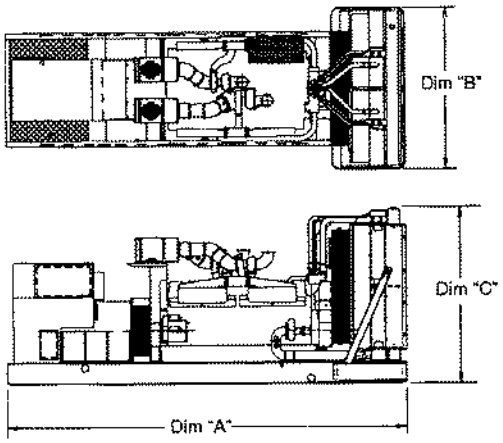
For further detail on PC 2.3 see document S-1569.
For further detail on PC 3.3 see document S-1570.

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 if 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.™

S-1582 (08/17)

Reference Enclosure drawing for Actual Sound

Sound data
500DFE□
60H□ Diesel

Sound pressure level □ 7 meters, dB(A)

See notes 1-8 listed below

Configuration		Measurement location number								Average
		1	2	3	4	5	6	7	8	
Standard – unhoused	Infinite exhaust	89	92	92	91	88	91	91	93	91
F183 – residential muffler	Mounted muffler	88	90	90	89	88	88	88	90	89
F200 – weather	Mounted muffler	91	90	85	88	89	88	85	91	89
F201 – quiet site II first stage	Mounted muffler	90	89	84	83	79	81	83	90	87
F202 – quiet site II second stage	Mounted muffler	71	73	71	72	73	74	74	73	73

Sound power level, dB(A)

See notes 2-6, 9, 10 listed below

Configuration		Octave band center frequency (H□)								Overall sound power level
		63	125	250	500	1000	2000	4000	8000	
Standard – unhoused (note 3)	Infinite exhaust	82	98	104	109	112	113	111	113	119
F183 – residential muffler	Mounted muffler	105	114	115	111	108	108	102	101	119
F200 – weather	Mounted muffler	101	108	106	110	112	111	107	102	118
F201 – quiet site II first stage	Mounted muffler	101	108	105	108	111	109	106	99	116
F202 – quiet site II second stage	Mounted muffler	84	93	93	96	98	99	96	89	104

Exhaust sound power level, dB(A)

Open exhaust (no muffler) □ rated load	Octave band center frequency (H□)								Overall sound power level
	63	125	250	500	1000	2000	4000	8000	
	103	119	125	123	125	126	127	121	133

Note:

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

Exhaust Emission Data Sheet
500DFE□
60 H□ 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		

Performance Data	1/4 Standby	1/2 Standby	3/4 Standby	Full Standby	Full Prime
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
Exhaust Emission Data					
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_2O/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.

2022 EPA Tier 2 Exhaust Emission Compliance Statement 500DFE□ Stationary Emergency

60 H□ 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.

Engine Manufacturer:	Cummins Inc.
EPA Certificate Number:	NCEXL015.AAJ-051
Effective Date:	09/03/2021
Date Issued:	09/03/2021
EPA Engine Family (Cummins Emissions Family):	NCEXL015.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. (203 mm)

Diesel Fuel Emission Limits

D2 Cycle Exhaust Emissions

	Grams per BHP-hr			Grams per kWm-hr		
	NO□ □ NMHC	CO	PM	NO□ □ NMHC	CO	PM
Test Results	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 methods: EPA emissions recorded per 40 CFR Part 60, 89, 1039, 1065 and weighted at load points prescribed in the regulations for constant speed engines.

Diesel fuel specifications: Cetane number: 40-50, Reference: ASTM D975 No. 2-D, 300-500 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 NOx correction, Restrictions: Intake Restriction set to a maximum allowable limit for clean filter; Exhaust Back Pressure set to a maximum allowable limit..

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

Prototype Test Support (PTS)
60 Hz test summary

Generator set models	Representative prototype	
450DFEJ 500DFEK	Model:	500DFEK
	Alternator:	HC5F
	Engine:	QSX15-G9

The following summarizes prototype testing conducted on the designated representative prototype of the specified models. This testing is conducted to verify the complete generator set electrical and mechanical design integrity. Prototype testing is conducted only on generator sets not sold as new equipment.

Maximum surge power: 516 kW

The generator set was evaluated to determine the stated maximum surge power.

Maximum motor starting: 2429 kVA

The generator set was tested to simulate motor starting by applying the specified kVA load at low lagging power factor (0.4 or lower). With this load applied, the generator set recovered to a minimum of 90% rated voltage.

Torsional analysis and testing:

The generator set was tested to verify that the design is not subjected to harmful torsional stresses in excess of 5000 psi. A spectrum analysis of the transducer output was conducted over the speed range of 1200 to 2000 RPM.

Cooling system: 50 °C ambient
0.50 in. H_2O restriction

The cooling system was tested to determine ambient temperature and static restriction capabilities. The test was performed at full rated load in elevated ambient temperature under static restriction conditions.

Durability:

The generator set was subjected to a minimum 500 hour endurance test operating at variable load up to the Standby rating based upon MIL-STD-705 to verify structural soundness and durability of the design.

Electrical and mechanical strength:

The generator set was tested to several single phase and three phase faults to verify that the generator can safely withstand the forces associated with short circuit conditions. The generator set was capable of producing full rated output at the conclusion of the testing.

Steady state performance:

The generator set was tested to verify steady state operating performance was within the specified maximum limits.

Voltage regulation:	± 0.5%
Random voltage variation:	± 0.3%
Frequency regulation:	Isochronous
Random frequency variation:	± 0.25%

Transient performance:

The generator set was tested with the standard alternator to verify single step loading capability as required by NFPA 110. Verify acceptable Voltage and frequency response on load addition or rejection were evaluated. The following results were recorded:

Full load acceptance:

Voltage dip:	30.1%
Recovery time:	3.6 seconds
Frequency dip:	9.9%
Recovery time:	3.8 seconds

Full load rejection:

Voltage rise:	12.8%
Recovery time:	3.8 seconds
Frequency rise:	3.2%
Recovery time:	1.5 seconds

Harmonic analysis:

(per MIL-STD-705B, method 601.4)

	Line to Line		Line to Neutral	
Harmonic	No load	Full load	No load	Full load
3	0.1	0.1	0.1	0.1
5	0.3	1.2	0.3	1.1
7	0.4	1.1	0.4	1.0
9	0.0	0.0	0.0	0.0
11	0.7	0.9	0.6	0.8
13	0.2	0.3	0.1	0.2
15	0.0	0.0	0.0	0.0

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2022 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: **Cummins Inc.**
(U.S. Manufacturer or Importer)

Certificate Number: NCEXL015.AAJ-051

Effective Date: 09/03/2021

Expiration Date: 12/31/2022

Byron J. Bunker, Division Director
Compliance Division

Issue Date: 09/03/2021

Revision Date: N/A

Model Year: 2022
Manufacturer Type: Original Engine Manufacturer
Engine Family: NCEXL015.AAJ

Mobile/Stationary Indicator: Stationary
Emissions Power Category: 560<kW<=2237
Fuel Type: Diesel
After Treatment Devices: No After Treatment Devices Installed
Non-after Treatment Devices: Electronic Control

Pursuant to Section 111 and Section 213 of the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Part 60, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60.

This certificate does not cover engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

Exhaust emission data sheet 1000DQFAD

60 Hz Diesel generator set

Engine information:			
Model:	Cummins Inc. QST30-G5 NR2	Bore:	5.51 in. (139 mm)
Type:	4 Cycle, 50° V, 12 cylinder diesel	Stroke:	6.5 in. (165 mm)
Aspiration:	Turbocharged and low temperature after-cooled	Displacement:	1860 cu. in. (30.4 liters)
Compression ratio:	14.7:1		
Emission control device:	After-cooled (air-to-air)		

Performance data	1/4 Standby	1/2 Standby	3/4 Standby	Full Standby	Full Prime
BHP @ 1800 RPM (60 Hz)	371	741	1112	1482	1322
Fuel consumption (gal/Hr)	19.1	35.8	54.1	72.2	63.9
Exhaust gas flow (CFM)	2780	4500	6370	7540	6950
Exhaust gas temperature (°F)	620	760	814	890	873
Exhaust emission data					
HC (Total unburned hydrocarbons)	0.12	0.10	0.08	0.07	0.08
NOx (Oxides of nitrogen as NO2)	4.17	5.20	3.87	3.95	4.00
CO (Carbon monoxide)	0.66	0.36	0.48	0.66	0.58
PM (Particular matter)	0.19	0.15	0.12	0.11	0.11
SO2 (Sulfur dioxide)	0.11	0.10	0.10	0.11	0.10
Smoke (Bosch)	0.88	0.80	0.79	0.73	0.75

All values are Grams/HP-Hour, Smoke is Bosch #

Test conditions

Data was recorded during steady-state rated engine speed (± 25 RPM) with full load (± 2%). Pressures, temperatures, and emission rates were stabilized.

Fuel specification:	46.5 Cetane Number, 0.035 Wt.% Sulfur; Reference ISO8178-5, 40CFR86. 1313-98 Type 2-D and ASTM D975 No. 2-D.
Fuel temperature:	99 ± 9 °F (at fuel pump inlet)
Intake air temperature:	77 ± 9 °F
Barometric pressure:	29.6 ± 1 in. Hg
Humidity:	NOx measurement corrected to 75 grains H2O/lb dry air
Reference standard:	ISO 8178

The NOx, HC, CO and PM emission data tabulated here were 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 results in elevated emission levels.

Application & Performance Warranty Data

Project Information

Site Location:	WI
Project Name:	Cummins Data Centers of North America MKE 17 House 1000DQFAD
Application:	Standby Power
Number Of Engines:	1
Operating Hours per Year:	200

Engine Specifications

Engine Manufacturer:	Cummins
Model Number:	QST30-G5
Rated Speed:	1800 RPM
Type of Fuel:	Ultra-Low Sulfur Diesel (ULSD)
Type of Lube Oil:	1 wt% sulfated ash or less
Lube Oil Consumption:	0.1 % Fuel Consumption
Number of Exhaust Manifolds:	1

Engine Cycle Data

Load	Speed	Power	Exhaust Flow	Exhaust Temp.	Fuel Cons.	NO_x	CO	NMHC	NMNEHC	PM_{10}	O_2	H_2O
%		*bhp*	*acfm (cfm)*	*° F*	*gal/hr*	*g/bhp-hr*	*g/bhp-hr*	*g/bhp-hr*	*g/bhp-hr*	*g/bhp-hr*	*%*	*%*
100	Rated	1,422	7,337	883	140	6.14	1.2	0.153	0.12	0.23	10	12.5

Emission Data (100% Load)

Emission	Raw Engine Emissions						Target Outlet Emissions						Calculated Reduction
	g/bhp-hr	*tons/yr*	*ppmvd @ 15% O_2*	*ppmvd*	*g/kW-hr*	*lb/MW-hr*	*g/bhp-hr*	*tons/yr*	*ppmvd @ 15% O_2*	*ppmvd*	*g/kW-hr*	*lb/MW-hr*	
NO_x*	6.14	1.92	576	1,064	8.234	18.15	0.5	0.16	47	87	0.671	1.48	91.9%
CO	1.2	0.38	185	342	1.609	3.55	2.6	0.82	401	740	3.487	7.69	
NMNEHC**	0.12	0.04	32	60	0.161	0.35	0.14	0.04	38	70	0.188	0.41	
PM_{10}	0.23	0.07	83	153	0.308	0.68	0.02	0	5	10	0.02	0.04	93.5%

* MW referenced as NO_2

** MW referenced as CH_4. Propane in the exhaust shall not exceed 15% by volume of the NMHC compounds in the exhaust, excluding aldehydes. The 15% (vol.) shall be established on a wet basis, reported on a methane molecular weight basis. The measurement of exhaust NMHC composition shall be based upon EPA method 320 (FTIR), and shall exclude formaldehyde.

System Specifications

DOC/SCR/DPF System Specifications (M3BZ-24-24-J-TBD, ACIS-3, Commissioning & Startup, FACINS-M3BZ-24-24-TBD)

SCR Catalyst Space Velocity:	9,914 1/hr
Sound Attenuation:	25-30 dBA insertion loss
Reactant:	Urea
Percent Concentration:	32.5%
Design Exhaust Flow Rate:	7,337 acfm (cfm)
Design Exhaust Temperature[1]:	883° F
Exhaust Temperature Limits:	572° F – 977° F
Minimum Regeneration Temperature[2]:	500° F
SCR Catalyst Volume:	17 ft³
System Dosing Capacity:	60 L/hr
System Pressure Loss:	16.0 inH_2O (Clean)
Total Catalyst Volume:	17 ft³
Estimated Reactant Consumption:	5.4 gal/hr (21 L/hr) / Per Engine

MIRATECH Scope of Supply & Equipment Details

	Model Number	Quantity
DOC/SCR/DPF Housing	**M3BZ-24-24-J-TBD**	**1 / engine**
SCR/DPF Housing	M3BZ-24-24-J-TBD-HSG	1 / engine
• Number of Catalyst Layers	1 OXI / 1 DPF / 2 SCR	
• Number of Catalyst Blocks per Layer	24 DPF / 24 SCR	
• Material	Carbon Steel	
• Paint	High Temperature Dark Gray	
• Inlet Location	Bottom	
• Outlet Location	Top	
• Door Location	Sides	
• Insulation	None	
• Dimensions	H 40 in x W 60 in x L 227 in	
• Inlet Pipe Size & Connection	20 in FF Flange, 150# ANSI standard bolt pattern	
• Outlet Pipe Size & Connection	20 in FF Flange, 150# ANSI standard bolt pattern	
• Weight Fully Loaded With Catalyst	6,603 lbs	
• Weight Without Catalyst	4,954 lbs	
Tray Set	STS-M3-24	2 / engine
Tray Set	DTS-M3-24	1 / engine
DPF Block	LTR-DPF-Filter-Block	24 / engine
SCR Catalyst	SCRC-044-150-450	48 / engine
Oxidation Catalyst	APXR-OX-SB1619-2400-1000-291	2 / engine
SCR Control System	**ACIS-3**	**1 / engine**
SCR Controller	SP-A3C-60-22070041	1 / engine
• Overall Dimensions	W 24.110 in x H 31.535 in x D 12.442 in	
• Weight	76 lbs	
Dosing Box	SEN60-U-WT	1 / engine
• Overall Dimensions	W 15.75 in x H 15.75 in x D 6.562 in	
• Weight	28 lbs	
Reactant Pump	SP-VPNU75-UL-23080035	1 / engine
• Overall Dimensions	W 19.685 in x H 15.906 in x D 23.031 in	
• Weight	88 lbs	
Reactant Filter	FILTER115	1 / engine
Injector	DEN75-500-U	1 / engine
• Weight	11 lbs	
Differential Pressure Sensor	PT.040	1 / engine
Bypass Probe	NP-14	2 / engine
Temperature Sensor	TT-14-FLEX60-32-1112	2 / engine
Air Compressor	SP-CA75-ULC-19030058	1 / engine

	Model Number	Quantity
• Overall Dimensions	W 21.445 in x H 26.772 in x D 15.748 in	
• Weight	82 lbs	
NOx Sensor	NOX-24V	2 / engine
Wiring Harness	WH-NOX-24V-50-SL	2 / engine
• Overall Length	600 in	
Commissioning & Startup	**Commissioning & Startup**	**1 / engine**
Analyzer Charges	Analyzer Charges	1 / engine
Expense Charges	Expense Charges	1 / engine
Labor Charges	Labor Charges	1 / engine
Emission Insulation Blanket	**FACINS-M3-24-24**	**1 / engine**
Emission Insulation Blanket	FACINS-M3BZ-24-24-TBD	1 / engine
Freight	**SP-FREIGHT**	**1 / engine**

Optional Content MIRATECH Scope of Supply & Equipment Details

	Model Number	Quantity
Reactant Tank System	**SP-RTS-350-TBD**	**1 / engine**
Reactant Tank Level Indicator	TLI	1 / engine
Reactant Tank System	SP-RTS-350-TBD	1 / engine

Customer Scope Of Supply

- Support Structure
- Attachment to Support Structure (Bolts, Nuts, Levels, etc.)
- Design for Structural Support and Thermal Expansion
- Expansion Joints
- Exhaust Piping
- Inlet Pipe Bolts, Nuts, & Gasket
- Outlet Pipe Bolts, Nuts, & Gasket
- Insulation for Exhaust Piping
- Component Installation Including External Tubing and Wiring
- Isolated Engine Load Signal to MIRATECH Equipment (4-20 mA)
- Dry Contact (N.O.) for Engine Run Signal to MIRATECH Equipment
- Reactant Storage Tank

Special Notes & Conditions

1. Carbon steel is suitable for temperatures up to 900° F / 482° C continuously, when covered with external insulation or a heat shield. For continuous operation above 900° F / 482° C, where the equipment is externally insulated or has a heat shield, stainless steel should be used.

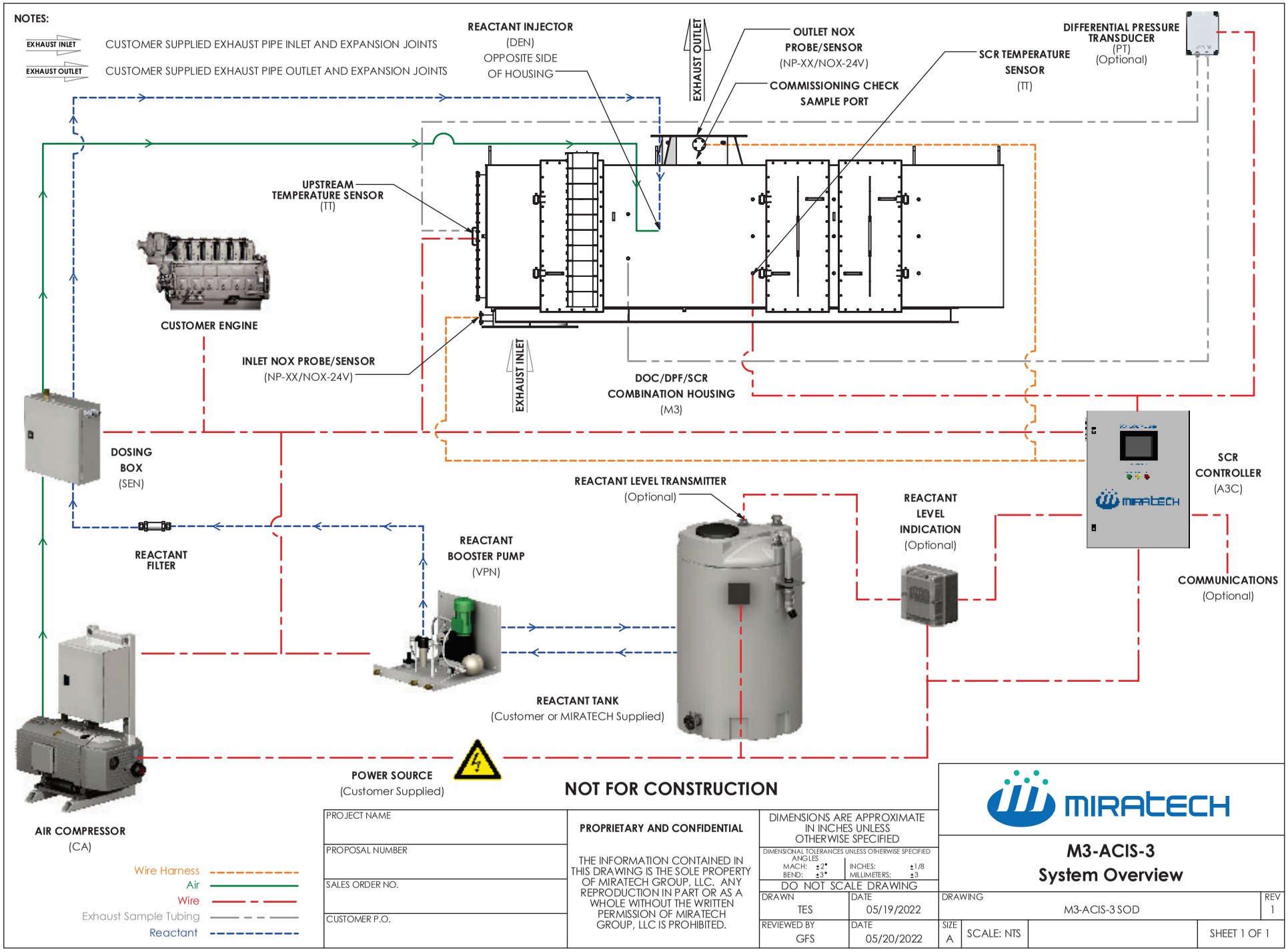
2. Diesel Particulate Filters depend on exhaust temperature to keep soot regenerated and the filter back pressure within acceptable levels. If the engine will be operated consistently at low loads/low exhaust temperatures, the customer should make provisions to add load via facility operations or a load bank. Refer to the included *Guidelines for Successful Operation of LTR™ DPF*.

- A packed silencer installed upstream of the MIRATECH catalyst system will void MIRATECH's limited warranty.
- Final catalyst housings are dependent on engine output and required emission reductions. Changes may be made to optimize the system design at the time of order.
- Any drawings included with this proposal are preliminary in nature and could change depending on final product selection.
- Any sound attenuation listed in this proposal is based on housing with catalyst elements installed.
- Any emission reductions listed in this proposal are based on housing with catalyst elements installed.
- MIRATECH will confirm shipping location upon placement of order.

NOTES:

EXHAUST INLET — CUSTOMER SUPPLIED EXHAUST PIPE INLET AND EXPANSION JOINTS

EXHAUST OUTLET — CUSTOMER SUPPLIED EXHAUST PIPE OUTLET AND EXPANSION JOINTS



Wire Harness
Air
Wire
Exhaust Sample Tubing
Reactant

NOT FOR CONSTRUCTION

PROJECT NAME	
PROPOSAL NUMBER	
SALES ORDER NO.	
CUSTOMER P.O.	

DIMENSIONS ARE APPROXIMATE IN INCHES UNLESS OTHERWISE SPECIFIED

DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED
ANGLES MACH: ±2° BEND: ±3° | INCHES: ±1/8 MILLIMETERS: ±3

DO NOT SCALE DRAWING

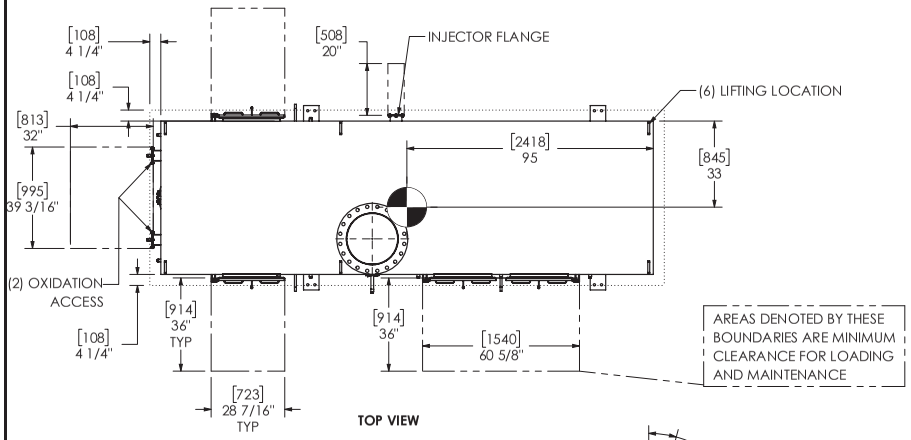
DRAWN	TES	DATE	05/19/2022
REVIEWED BY	GFS	DATE	05/20/2022

MIRATECH

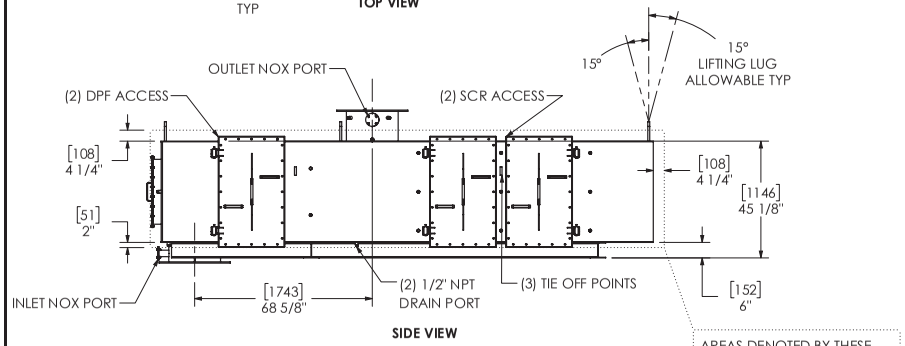
M3-ACIS-3
System Overview

DRAWING	M3-ACIS-3 SOD				REV 1
SIZE A	SCALE: NTS				SHEET 1 OF 1

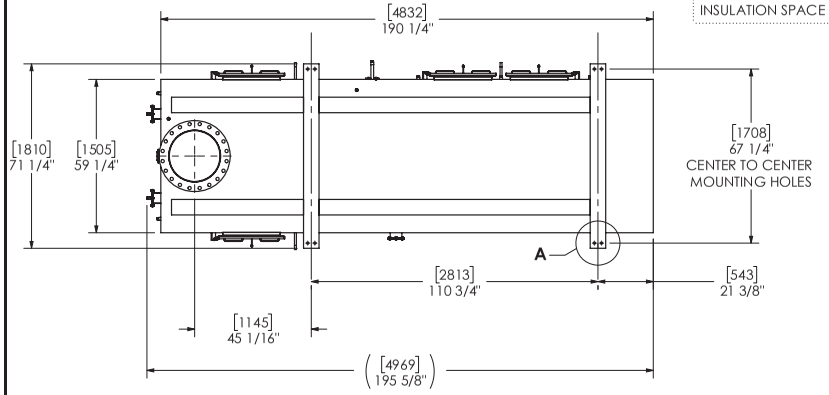
Note - this unit's injector is 19.6875" long.



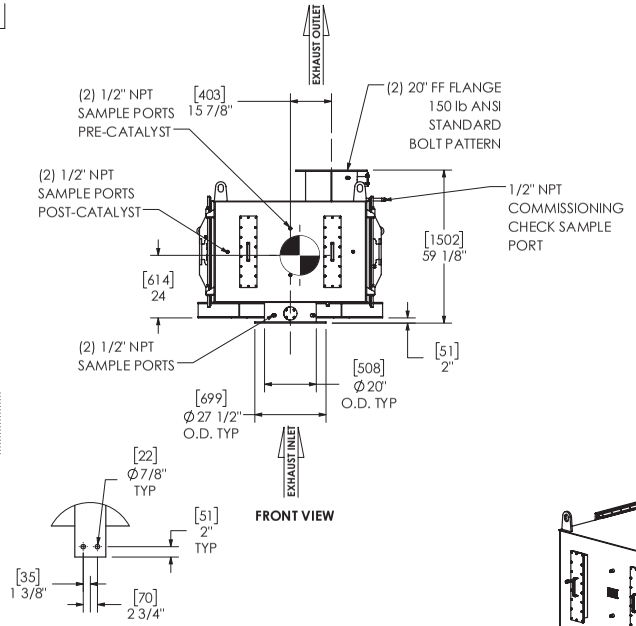
TOP VIEW



SIDE VIEW

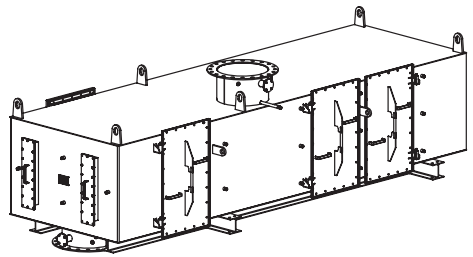


BOTTOM VIEW



FRONT VIEW

DETAIL A
SCALE 1 : 24



WEIGHTS (APPROXIMATE)	
EMPTY HOUSING	5032 lb
ONE (1) FULL SCR CATALYST LAYER	420 lb
TWO (2) FULL SCR CATALYST LAYERS	840 lb
ONE (1) FULL DPF LAYER	420 lb
TWO (2) OXIDATION ELEMENTS	48 lb
INSULATION AND SHEATHING	1039 lb
HOUSING HAS CAPACITY FOR TWO (2) FULL SCR CATALYST LAYERS	

NOTES:

- DO NOT USE EQUIPMENT TO SUPPORT OTHER PARTS OF THE EXHAUST SYSTEM WITHOUT PROPER REINFORCEMENT
- CUSTOMER MOUNTING STRUCTURE TO BE SLOTTED TO ALLOW FOR METAL EXPANSION
- LIFTING HOUSING REQUIRES USE OF ALL (6) LIFTING LOCATIONS

MATERIAL CONSTRUCTION:

- CARBON STEEL

PAINT:

- HIGH TEMPERATURE DARK GRAY (MIRATECH COATING SYSTEM 2)

PROJECT NAME	
PROPOSAL NUMBER	
SALES ORDER NO.	
CUSTOMER P.O.	

DIMENSIONS ARE APPROXIMATE IN INCHES UNLESS OTHERWISE SPECIFIED

DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED
ANGLES: MACH: ±0° BEND: ±3°
INCHES: ±1/8
MILLIMETERS: ±3

DO NOT SCALE DRAWING

DRAWN	DATE	DRAWING	REV
JDS	05/12/2022	M3-24-24-20PF-J SD	0
REVIEWED BY: MSC	DATE: 05/12/2022	SIZE: B	SCALE 1:48	SHEET 1 OF 1

MIRATECH

M3-24-24-20PF-J
Sales Drawing

Renewable Hydrocarbon Diesel Certificate of Analysis

202009256022 COA

Lot Number:	750-200925-T6022	Product Type:	Renewable Hydrocarbon Diesel

Analysis of REG-9000/RHD

Property	Value	ASTM D975 No. 2-D Limit	REG-9000® Limit*	Units	Test Method (current revision)
Cloud point:	-11	Report	Report	**°C**	D5771
Water & Sediment:	<0.05	0.05, max	0.05, max	**% volume**	D2709
Conductivity:	60	25, min	25, min	**pS/m**	D2624
Appearance:	Clear & Bright	Clear & Bright	Clear & Bright	**N/A**	D4176, Procedure 1
API Gravity @ 60°F:	49.3	N/A	Report	**N/A**	D4052
Specific gravity @ 60°F:	0.7827	N/A	Report	**N/A**	D4052
Flash point:	65.1	52, min	52, min	**°C**	D93A
Total Sulfur:	<1	15, max	2, max	**ppm (mg/kg)**	D5453
Ramsbottom Carbon:	0.05	0.35, max	0.35, max	**% mass**	D524
Ash:	<0.001	0.01	0.01	**% mass**	D482
Kinematic Viscosity at 40 °C:	3.2	1.9 – 4.1	1.9 – 4.1	**mm^2/sec**	D445
Copper Corrosion (3 hrs at 50 °C):	1a	No. 3	No. 1b	**N/A**	D130
Distillation Temperature, at 90%:	301	282 – 338	282 – 338	**°C**	D86
Cetane Index:	94	40, min	65, min	**N/A**	D4737, Procedure A

Notes:

1. ASTM D1319 test detection limits for Aromatics is 5-99 % volume, since REG Geismar's renewable diesel is lower than 5 % volume, this testing was discontinued in the REG Geismar lab
2. Based on a customer's purchase requirements, an optional lubricity additive may be injected into the RHD at the time of shipment to bring the lubricity to < 520 microns
3. This product conforms to the most recent version of ASTM D975

Prepared by:	Keith Gill	Lab Supervisor	Geismar, LA	09/25/2020
	Name	Title	Location	Date

Please contact Inside Sales at Renewable Energy Group, Inc. at (888)734-8686 with any questions or comments about this product.

CATERPILLAR®

Electric Power Division
P.O. Box 610- AC6109
Mossville, IL 61552

6/28/2021

Mycah Gambrell-Ermak
Energy & Sustainability Division,

RE: **Regarding Caterpillar engine emissions from renewable/alternative fuels**

Ms. Gambrell-Ermak,

This letter conveys our emissions experience with Hydrotreated Vegetable Oil (HVO) renewable fuel. Based on our scientific judgment, the chemical attributes of HVO as a fuel, general experience, and available test data, emissions from Caterpillar engines running on a HVO fuel should be comparable, if not lower, to that of the same engine model running on a petroleum diesel. Any given HVO fuel would be expected to meet the fuel specifications prescribed in Caterpillar Commercial Engine Fluid Recommendations (SEBU6251).

Based on the above, HVO fuel-fired Caterpillar engine emissions are expected to be the same or lower than diesel fuel-fired Caterpillar engine emissions provided in Caterpillar's "rated speed potential site variation emissions data (PSV)." PSV data should be used for onsite performance testing validation.

Sincerely,

Evan Hodgen
Electric Power Technical Sales Support Manager
Caterpillar Inc.
(765)448-2645
Hodgen_Evan@cat.com

HVO RD99 Testing on Caterpillar C175-16

HVO (RD99) fuel testing on Caterpillar C175-16 Operational and Performance Test

Engine Emissions and Load Comparisons

Test Date: November 5 & 6, 2020
Type of Test: Transient Response Test / Load Test / Emissions Testing

Project Number: EP03524
Engine Serial Number: TB800180
Generator Serial Number: G7J06324

Engine Model: C175-16
Max Power: 3140 KW
Voltage: 480 Volts
Current: 3975 Amps

Summary of Test Results for Diesel vs. RD99 Fuel

The following report encompasses results from a series of tests used for evaluation of exhaust emissions and performance of HVO C175-16 Generator Set using #2 Diesel and Alternative RD99 Fuel. The transient response test results demonstrate that the Genset is able to pick up the 0 to100% block load and stabilize voltage and frequency in 6.54 seconds on #2 ULSD Fuel and 7.67 Seconds on RD99 Fuel.

Transient response and Emissions load test were conducted on a C175-16 genset rated at 480V 60Hz 0.95pf 3100kW without fan, 3000kW with engine mounted fan. The testing was conducted in a test cell in Griffin, GA at the YES facility, overseen by Caterpillar, with the purpose of comparing genset perform during transient load application and emissions on both diesel and RD99 fuel. The full set of test data was provided to the client for their records. Below is a high-level summary of the results including a reduced data set. The requirements for the RD99 fuel specification were determined during meetings between Caterpillar, client, and the fuel vendor and is documented outside of this summary of results.

Transient Response

Testing indicated that there was not a significant difference in genset transient response performance between the two fuels. Despite RD99 having a lower energy content, the engine fuel system was capable of dynamically adjusting flow rates to provide a similar transient performance. Operation on RD99 should not negatively impact operation during load acceptance. A table with the comparison at each load step is provided in Appendix A.

Emissions Data

Testing was conducted on both fuels for one hour at each 25%, 50% and 75% load and for 3 hours at 100% load. RD99 did show a reduction in PM and CO across all load steps. A reduction of NOx was experienced at part load steps, but the 100% load point was essentially the same between both fuels. A table with the comparison at each load point is provided in Appendix B.

Engine Oil Sample Analysis

Engine oil sample analysis were performed before and after testing on both fuels. The results of wear metals were consistent with a new engine moving through its break in cycle and did not indicate any areas for concern.

Fuel Sample Analysis

Fuel samples were taken for both fuels and have been provide outside of this summary to document the fuel characteristics.

Appendix C – Test Procedure

Test Details
November 4, 2020 – Yancy CAT test facility

4 hour load run on Diesel
20 hour load run on R99
Transient on both fuels

Emissions data

Analytes	EPA Method	Run Duration	Number of runs per test
Oxygen (O2)	3A	60 Min	1
Nitrogen oxides (NOx)	7E	60 Min	1
Carbon monoxide (CO)	10	60 Min	1
Visual emissions (opacity)	9	60 Min	1

Test Procedure:

The tests, as specified in test procedure provided to the customer, are conducted at Yancey Engineered Solutions Test Laboratory. The Genset is set up in Test Cell 2 with the following temporary connections; 24v Battery, 240 VAC Shore Power, Fuel supply and return.

1. Perform Pretest activities for Testing with #2 Diesel Fuel. Obtain Engine Oil and #2 Diesel Fuel Samples for Analysis.
2. Perform Transient Tests with #2 Diesel Fuel as per Test procedure. Load Percentages 0-75-0-50-100-50-75-100-75-50-0-100-0.
3. Operate the Genset on #2 Diesel Fuel at load percentages 25-50-75-100 for Emissions sampling and data collection.
4. Perform Pretest activities for Testing with RD99 Fuel. Obtain Engine Oil Sample for Analysis. Top off Oil Level and Record quantity as necessary.
5. Operate the Genset on RD99 Fuel for 14 Hours Continuously at 100 percent load and collect operating data.
6. Operate the Genset on RD99 Fuel at load percentages 25-50-75-100 for Emissions sampling and data collection.
7. Perform Transient Tests with RD99 Fuel as per Test procedure. Load Percentages 0-75-0-50-100-50-75-100-75-50-0-100-0.
8. Operate the Genset on RD99 Fuel for 3 Hours Continuously at 100 percent load and collect operating data.
9. Obtain Oil Sample for analysis.

Test Instrumentation:

Load bank	Creschic 6.25 Mva Resistive/Reactive.
Computer Software	Caterpillar- Electronic Technician
	Dran View 6 Enterprise
Data Recorder	Dranetz PX5, calibration date: 1/20/2020

Test Fuel:

#2 ULSD Fuel- Test Lab Analysis
RD99 Fuel- Test Lab Analysis

Advanced Industrial Resources, Inc.

Test Results

Yancy

Griffin, GA

Generator #2 Diesel

		Units	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Averages
Genset Load		% of full load	25	50	75	100	100	100	**100**
Test Date			05-Nov-20	05-Nov-20	05-Nov-20	05-Nov-20	05-Nov-20	05-Nov-20	**05-Nov-20**
Start Time			9:10	10:48	12:10	13:35	14:50	16:10	**Runs**
End Time			10:16	11:52	13:14	14:40	15:54	17:15	**4, 5, 6**
P_m	Pressure of meter gases	inches Hg	30.27	30.30	30.27	30.24	30.21	30.20	**30.22**
P_s	Pressure of stack gases	inches Hg	30.18	30.20	30.18	30.14	30.11	30.10	**30.12**
$V_{m(std)}$	Volume of gas sample	dscf	37.35	39.54	36.09	37.10	36.31	39.26	**37.56**
$V_{w(std),meas}$	Meas. volume of water vapor	scf	2.26	2.40	2.17	2.54	2.64	2.59	**2.59**
$B_{ws,meas}$	Measured moisture	dimensionless	0.057	0.057	0.057	0.064	0.068	0.062	**0.065**
$B_{ws,theo}$	Theoretical max. moisture		1.000	1.000	1.000	1.000	1.000	1.000	**1.000**
$B_{ws,act}$	Actual moisture		0.057	0.057	0.057	0.064	0.068	0.062	**0.065**
M_d	Mol. Wt. Of gas at DGM	lb./lb.-mole	29.48	29.50	29.59	29.66	29.66	29.65	**29.66**
M_s	Mol. Wt. Of gas at stack	lb./lb.-mole	28.83	28.85	28.93	28.92	28.87	28.93	**28.91**
v_s	Velocity of stack gas	ft./sec	42.42	85.13	96.59	119.90	120.96	121.60	**120.82**
A_n	Area of nozzle	ft^2	0.000491	0.000289	0.000241	0.000218	0.000218	0.000218	**0.000218**
A_s	Area of stack	ft^2	3.14	3.14	3.14	3.14	3.14	3.14	**3.14**
Gas Stream Flow Rates									
Q_a	Vol. Flow rate of actual gas	cfm	7,996	16,046	18,207	22,601	22,800	22,921	**22,774**
Q_w	Vol. Flow rate of wet gas	scfm	4,124	7,502	8,328	9,908	9,878	9,989	**9,925**
Q_w	Vol. Flow rate of wet gas	scfh	247,424	450,104	499,686	594,472	592,702	599,366	**595,513**
Q_{sd}	Vol. Flow rate of dry gas	dscfm	3,889	7,072	7,857	9,273	9,210	9,371	**9,285**
I	Isokinetic sampling ratio	percent	102.5	101.5	100.0	96.1	94.7	100.6	**97.1**
Process Data									
$P_{(product input)}$	Process	HP	1,126	2,148	3,151	4,159	4,160	4,166	**4,162**
$P_{(heat input)}$	Fuel firing rate	MMBtu/hr	9.8	18.0	23.8	31.3	31.1	31.0	**31.1**
Gas Stream Particulate Concentrations Method 5									
c_{PM}	Conc. Of PM in dry stack gas	mg/dscm	54.99	5.16	7.02	8.93	12.91	2.66	**8.17**
c_{PM}	Conc. Of PM in dry stack gas	gr/dscf	0.02402	0.00225	0.00307	0.00390	0.00564	0.00116	**0.00357**
Particulate Matter Mass Rates Method 5									
E_{PM}	Emission rate of PM	lb/hour	0.801	0.137	0.207	0.310	0.445	0.093	**0.283**
E_{PM}	Emission rate of PM	g/HP-hr	0.323	0.029	0.030	0.034	0.049	0.010	**0.031**
E_{PM}	Emission rate of PM	lb / MMBtu	0.0820	0.0076	0.0087	0.0099	0.0143	0.0030	**0.0091**
Gas Stream Particulate Concentrations Method 202									
c_{PM}	Conc. Of PM in dry stack gas	mg/dscm	17.06	21.35	18.15	24.04	18.67	9.04	**17.25**
c_{PM}	Conc. Of PM in dry stack gas	gr/dscf	0.00745	0.00932	0.00793	0.01050	0.00816	0.00395	**0.00753**
Particulate Matter Mass Rates Method 202									
E_{PM}	Emission rate of PM	lb/hour	0.249	0.565	0.534	0.835	0.644	0.317	**0.599**
E_{PM}	Emission rate of PM	g/HP-hr	0.100	0.119	0.077	0.091	0.070	0.035	**0.065**
E_{PM}	Emission rate of PM	lb / MMBtu	0.025	0.031	0.022	0.027	0.021	0.010	**0.0192**
Gas Stream Particulate Concentrations Methods 5 & 202									
c_{PM}	Conc. Of PM in dry stack gas	mg/dscm	72.06	26.50	25.17	32.96	31.59	11.70	**25.42**
c_{PM}	Conc. Of PM in dry stack gas	gr/dscf	0.0315	0.0116	0.0110	0.0144	0.0138	0.0051	**0.0111**
Particulate Matter Mass Rates Methods 5 & 202									
E_{PM}	Emission rate of PM	lb/hour	1.05	0.70	0.74	1.14	1.09	0.41	**0.88**
E_{PM}	Emission rate of PM	g/HP-hr	0.423	0.148	0.107	0.125	0.119	0.045	**0.096**
E_{PM}	Emission rate of PM	lb / MMBtu	0.1075	0.0389	0.0311	0.0366	0.0350	0.0132	**0.0283**
Sulfur Dioxide Concentrations Method 6C									
c_{SO2}	Conc. of SO_2 in dry stack gas	ppm	9.48	3.4	3.78	5.31	5.38	5.07	**5.25**
c_{SO2}	Conc. of SO_2 in dry stack gas	ppm @ 15% O_2	6.96	2.43	2.30	2.90	2.94	2.82	**2.89**
c_{SO2}	Conc. of SO_2 in dry stack gas	mg/dscm	25.23	8.96	10.07	14.13	14.31	13.48	**13.98**
c_{SO2}	Conc. of SO_2 in dry stack gas	gr/dscf	0.01102	0.00391	0.00440	0.00617	0.00625	0.00589	**0.00610**
Sulfur Dioxide Mass Rates Method 6C									
E_{SO2}	Emission rate of SO_2	lb/hour	0.37	0.24	0.30	0.49	0.49	0.47	**0.49**
E_{SO2}	Emission rate of SO_2	g/HP-hr	0.148	0.050	0.043	0.054	0.054	0.052	**0.053**
E_{SO2}	Emission rate of SO_2	lb / MMBtu	0.0376	0.0132	0.0124	0.0157	0.0159	0.0153	**0.0156**

Advanced Industrial Resources, Inc.

Test Results

Yancy

Griffin, GA

Generator #2 Diesel

		Units	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Averages
Genset Load		% of full load	25	50	75	100	100	100	**100**
Test Date			05-Nov-20	05-Nov-20	05-Nov-20	05-Nov-20	05-Nov-20	05-Nov-20	**05-Nov-20**
Start Time			9:10	10:48	12:10	13:35	14:50	16:10	**Runs**
End Time			10:16	11:52	13:14	14:40	15:54	17:15	**4, 5, 6**
Nitrogen Oxides Concentrations Method 7E									
c_{NOx}	Conc. of NO_x in dry stack gas	ppm	510.5	270.6	620.9	890.0	874.2	855.4	**873.2**
c_{NOx}	Conc. of NO_x in dry stack gas	ppm @ 15% O_2	374.6	195.4	377.7	486.6	477.1	476.1	**480.0**
c_{NOx}	Conc. of NO_x in dry stack gas	mg/dscm	976.4	517.6	1187.6	1702.3	1672.0	1636.0	**1670.1**
c_{NOx}	Conc. of NO_x in dry stack gas	gr/dscf	0.426	0.226	0.519	0.743	0.730	0.715	**0.729**
Nitrogen Oxides Mass Rates Method 7E									
E_{NOx}	Emission rate of NO_x	lb/hour	14.2	13.7	35.0	59.1	57.7	57.4	**58.1**
E_{NOx}	Emission rate of NO_x	g/HP-hr	5.73	2.90	5.03	6.33	6.29	6.25	**6.29**
E_{NOx}	Emission rate of NO_x	lb / MMBtu	1.46	0.76	1.47	1.89	1.85	1.85	**1.87**
Carbon Monoxide Concentrations Method 10									
c_{CO}	Conc. of CO in dry stack gas	ppm	360.4	89.2	116.1	78.6	74.6	65.3	**72.8**
c_{CO}	Conc. of CO in dry stack gas	ppm @ 15% O_2	264.5	64.4	70.6	43.0	40.7	36.3	**40.0**
c_{CO}	Conc. of CO in dry stack gas	mg/dscm	419.6	103.8	135.2	91.5	86.8	76.0	**84.8**
c_{CO}	Conc. of CO in dry stack gas	gr/dscf	0.1833	0.0454	0.0590	0.0399	0.0379	0.0332	**0.0370**
Carbon Monoxide Mass Rates Method 10									
E_{CO}	Emission rate of CO	lb/hour	6.11	2.75	3.98	3.18	3.00	2.67	**2.95**
E_{CO}	Emission rate of CO	g/HP-hr	2.46	0.58	0.57	0.35	0.33	0.29	**0.32**
E_{CO}	Emission rate of CO	lb / MMBtu	0.626	0.152	0.167	0.102	0.096	0.086	**0.095**
Total Hydrocarbon Concentrations (including methane) Method 25A									
c_{THC}	THC concentration (as methane)	ppm	12.20	5.63	2.04	2.48	2.15	3.15	**2.59**
c_{THC}	THC concentration (as methane)	ppm @ 15% O_2	8.95	4.06	1.24	1.35	1.17	1.75	**1.43**
c_{THC}	THC concentration (as methane)	mg/dscm	8.11	3.74	1.36	1.65	1.43	2.09	**1.72**
c_{THC}	THC concentration (as methane)	gr/dscf	0.00354	0.00164	0.00059	0.00072	0.00062	0.00091	**0.00075**
Total Hydrocarbon Mass Rates (including methane) Method 25A									
E_{THC}	THC emission rate (as methane)	lb/hour	0.1182	0.0992	0.0400	0.0572	0.0493	0.0735	**0.0600**
E_{THC}	THC emission rate (as carbon)	lb/hour	0.0886	0.0744	0.0300	0.0429	0.0370	0.0551	**0.0450**
E_{THC}	THC emission rate (as carbon)	lb / MMBtu	0.0121	0.0055	0.0017	0.0018	0.0016	0.0024	**0.0019**
Methane Concentrations Method 25A									
$c_{Methane}$	CH_4 concentration (as methane)	ppm	1.57	0.87	1.02	0.77	0.71	0.72	**0.73**
$c_{Methane}$	CH_4 concentration (as methane)	ppm @ 15% O_2	1.15	0.63	0.62	0.42	0.39	0.40	**0.40**
$c_{Methane}$	CH_4 concentration (as methane)	mg/dscm	1.04	0.58	0.68	0.51	0.47	0.48	**0.49**
$c_{Methane}$	CH_4 concentration (as methane)	gr/dscf	0.00046	0.00025	0.00030	0.00022	0.00021	0.00021	**0.00021**
Methane Mass Rates Method 25A									
$E_{Methane}$	CH_4 emission rate (as methane)	lb/hour	0.0152	0.0153	0.0199	0.0178	0.0163	0.0167	**0.0169**
$E_{Methane}$	CH_4 emission rate (as carbon)	lb/hour	0.0114	0.0115	0.0149	0.0134	0.0122	0.0125	**0.0127**
$E_{methane}$	CH_4 emission rate (as carbon)	lb / MMBtu	0.001168	0.000848	0.000836	0.000570	0.000525	0.000538	**0.000544**
Ethane Concentrations Method 25A									
c_{Ethane}	C_2H_6 concentration (as Ethane)	ppm	< 0.0502	< 0.0502	< 0.0501	< 0.0505	< 0.0507	< 0.0504	**< 0.0506**
c_{Ethane}	C_2H_6 concentration (as Ethane)	ppm @ 15% O_2	< 0.0368	< 0.0362	< 0.0305	< 0.0276	< 0.0277	< 0.0281	**< 0.0278**
c_{Ethane}	C_2H_6 concentration (as Ethane)	mg/dscm	< 0.0627	< 0.0627	< 0.0627	< 0.0632	< 0.0634	< 0.0630	**< 0.0632**
c_{Ethane}	C_2H_6 concentration (as Ethane)	gr/dscf	< 0.000027	< 0.000027	< 0.000027	< 0.000028	< 0.000028	< 0.000028	**< 0.000028**
Ethane Mass Rates Method 25A									
c_{Ethane}	C_2H_6 emission rate (as Ethane)	lb/hour	< 0.00091	< 0.00166	< 0.00184	< 0.00219	< 0.00219	< 0.00221	**< 0.00220**
c_{Ethane}	C_2H_6 emission rate (as carbon)	lb/hour	< 0.00073	< 0.00133	< 0.00147	< 0.00175	< 0.00175	< 0.00177	**< 0.00175**
c_{Ethane}	C_2H_6 emission rate (as carbon)	lb / MMBtu	< 0.00007	< 0.00009	< 0.00008	< 0.00007	< 0.00007	< 0.00007	**< 0.00007**
Total Hydrocarbon Mass Rates (excluding methane and ethane) Method 25A									
E_{THC}	THC emission rate (as carbon)	lb/hour	0.0765	0.0616	0.0136	0.0278	0.0230	0.0408	**0.0306**
E_{THC}	THC emission rate (as carbon)	g/HP-hr	0.0308	0.0130	0.0020	0.0030	0.0025	0.0044	**0.0033**

Notes:

1) lb/MMBtu results based on Method 19 Fd factor of 9190 for diesel oil combustion.

2) (<) indicates the result were below the detection limit and value used is the mininally detected value.

Advanced Industrial Resources, Inc.

Test Results

Yancy

Griffin, GA

Generator RD99 Diesel

		Units	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Averages
Genset Load		% of full load	25	50	75	100	100	100	**100**
Test Date			06-Nov-20	06-Nov-20	06-Nov-20	06-Nov-20	06-Nov-20	06-Nov-20	**06-Nov-20**
Start Time			7:55	9:28	10:43	11:58	13:12	14:25	**Runs**
End Time			9:00	10:31	11:47	13:04	14:17	15:30	**4, 5, 6**
P_m	Pressure of meter gases	inches Hg	30.26	30.20	30.18	30.17	30.15	30.11	**30.14**
P_s	Pressure of stack gases	inches Hg	30.16	30.09	30.09	30.07	30.05	30.01	**30.04**
$V_{m(std)}$	Volume of gas sample	dscf	38.26	39.85	36.47	40.85	40.46	38.16	**39.82**
$V_{w(std),meas}$	Meas. volume of water vapor	scf	2.21	2.54	2.73	2.68	2.92	2.45	**2.68**
$B_{ws,meas}$	Measured moisture	dimensionless	0.055	0.060	0.070	0.062	0.067	0.060	**0.063**
$B_{ws,theo}$	Theoretical max. moisture		1.000	1.000	1.000	1.000	1.000	1.000	**1.000**
$B_{ws,act}$	Actual moisture		0.055	0.060	0.070	0.062	0.067	0.060	**0.063**
M_d	Mol. Wt. Of gas at DGM	lb./lb.-mole	29.44	29.36	29.46	29.54	29.58	29.64	**29.59**
M_s	Mol. Wt. Of gas at stack	lb./lb.-mole	28.82	28.68	28.66	28.83	28.80	28.94	**28.86**
v_s	Velocity of stack gas	ft./sec	45.33	85.70	95.71	121.65	121.50	121.94	**121.70**
A_n	Area of nozzle	ft^2	0.000491	0.000289	0.000241	0.000218	0.000218	0.000218	**0.000218**
A_s	Area of stack	ft^2	3.14	3.14	3.14	3.14	3.14	3.14	**3.14**
Gas Stream Flow Rates									
Q_a	Vol. Flow rate of actual gas	cfm	8,544	16,154	18,041	22,931	22,902	22,986	**22,939**
Q_w	Vol. Flow rate of wet gas	scfm	4,386	7,597	8,294	10,167	10,086	10,041	**10,098**
Q_w	Vol. Flow rate of wet gas	scfh	263,182	455,846	497,638	610,029	605,151	602,478	**605,886**
Q_{sd}	Vol. Flow rate of dry gas	dscfm	4,147	7,142	7,716	9,541	9,407	9,436	**9,461**
I	Isokinetic sampling ratio	percent	98.5	101.3	102.9	102.8	103.3	97.1	**101.1**
Process Data									
$P_{(product input)}$	Process	HP	1,126	2,148	3,133	4,166	4,165	4,166	**4,166**
$P_{(heat input)}$	Fuel firing rate	MMBtu/hr	10.9	20.9	25.0	33.2	32.7	31.7	**32.5**
Gas Stream Particulate Concentrations Method 5									
c_{PM}	Conc. Of PM in dry stack gas	mg/dscm	43.01	2.85	4.77	3.42	3.48	2.51	**3.14**
c_{PM}	Conc. Of PM in dry stack gas	gr/dscf	0.01879	0.00125	0.00208	0.00150	0.00152	0.00110	**0.00137**
Particulate Matter Mass Rates Method 5									
E_{PM}	Emission rate of PM	lb/hour	0.668	0.076	0.138	0.122	0.122	0.089	**0.111**
E_{PM}	Emission rate of PM	g/HP-hr	0.269	0.016	0.020	0.013	0.013	0.010	**0.012**
E_{PM}	Emission rate of PM	lb / MMBtu	0.0615	0.0036	0.0055	0.0037	0.0037	0.0028	**0.0034**
Gas Stream Particulate Concentrations Method 202									
c_{PM}	Conc. Of PM in dry stack gas	mg/dscm	9.88	10.68	15.15	8.34	11.00	12.96	**10.77**
c_{PM}	Conc. Of PM in dry stack gas	gr/dscf	0.00431	0.00466	0.00662	0.00364	0.00480	0.00566	**0.00470**
Particulate Matter Mass Rates Method 202									
E_{PM}	Emission rate of PM	lb/hour	0.153	0.286	0.438	0.298	0.388	0.458	**0.381**
E_{PM}	Emission rate of PM	g/HP-hr	0.062	0.060	0.063	0.032	0.042	0.050	**0.042**
E_{PM}	Emission rate of PM	lb / MMBtu	0.014	0.014	0.018	0.009	0.012	0.014	**0.0118**
Gas Stream Particulate Concentrations Methods 5 & 202									
c_{PM}	Conc. Of PM in dry stack gas	mg/dscm	52.89	13.53	19.92	11.77	14.47	15.46	**13.90**
c_{PM}	Conc. Of PM in dry stack gas	gr/dscf	0.0231	0.0059	0.0087	0.0051	0.0063	0.0068	**0.0061**
Particulate Matter Mass Rates Methods 5 & 202									
E_{PM}	Emission rate of PM	lb/hour	0.82	0.36	0.58	0.42	0.51	0.55	**0.49**
E_{PM}	Emission rate of PM	g/HP-hr	0.331	0.076	0.083	0.046	0.056	0.060	**0.054**
E_{PM}	Emission rate of PM	lb / MMBtu	0.0757	0.0173	0.0230	0.0127	0.0156	0.0172	**0.0152**
Sulfur Dioxide Concentrations Method 6C									
c_{SO2}	Conc. of SO_2 in dry stack gas	ppm	3.38	2.3	4.40	5.67	6.44	6.20	**6.10**
c_{SO2}	Conc. of SO_2 in dry stack gas	ppm @ 15% O_2	2.38	1.46	2.50	3.00	3.42	3.40	**3.27**
c_{SO2}	Conc. of SO_2 in dry stack gas	mg/dscm	8.99	6.19	11.71	15.08	17.15	16.50	**16.24**
c_{SO2}	Conc. of SO_2 in dry stack gas	gr/dscf	0.00393	0.00270	0.00511	0.00658	0.00749	0.00721	**0.00709**
Sulfur Dioxide Mass Rates Method 6C									
E_{SO2}	Emission rate of SO_2	lb/hour	0.14	0.17	0.34	0.54	0.60	0.58	**0.58**
E_{SO2}	Emission rate of SO_2	g/HP-hr	0.056	0.035	0.049	0.059	0.066	0.064	**0.063**
E_{SO2}	Emission rate of SO_2	lb / MMBtu	0.0129	0.0079	0.0135	0.0162	0.0185	0.0184	**0.0177**

Advanced Industrial Resources, Inc.

Test Results

Yancy

Griffin, GA

Generator RD99 Diesel

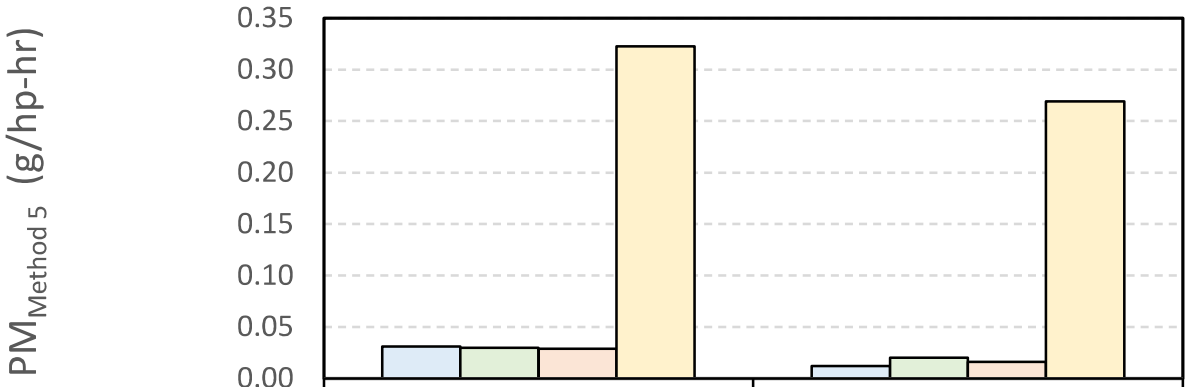
		Units	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Averages
Genset Load		% of full load	25	50	75	100	100	100	**100**
Test Date			06-Nov-20	06-Nov-20	06-Nov-20	06-Nov-20	06-Nov-20	06-Nov-20	**06-Nov-20**
Start Time			7:55	9:28	10:43	11:58	13:12	14:25	**Runs**
End Time			9:00	10:31	11:47	13:04	14:17	15:30	**4, 5, 6**
Nitrogen Oxides Concentrations Method 7E									
c_{NOx}	Conc. of NO_x in dry stack gas	ppm	516.4	236.9	555.0	812.5	823.6	859.7	**831.9**
c_{NOx}	Conc. of NO_x in dry stack gas	ppm @ 15% O_2	363.6	148.9	315.4	430.7	437.0	470.9	**446.2**
c_{NOx}	Conc. of NO_x in dry stack gas	mg/dscm	987.7	453.1	1061.5	1554.0	1575.3	1644.3	**1591.2**
c_{NOx}	Conc. of NO_x in dry stack gas	gr/dscf	0.431	0.198	0.464	0.679	0.688	0.718	**0.695**
Nitrogen Oxides Mass Rates Method 7E									
E_{NOx}	Emission rate of NO_x	lb/hour	15.3	12.1	30.7	55.5	55.5	58.1	**56.4**
E_{NOx}	Emission rate of NO_x	g/HP-hr	6.18	2.56	4.44	6.05	6.05	6.33	**6.14**
E_{NOx}	Emission rate of NO_x	lb / MMBtu	1.41	0.58	1.23	1.67	1.70	1.83	**1.73**
Carbon Monoxide Concentrations Method 10									
c_{CO}	Conc. of CO in dry stack gas	ppm	294.0	52.5	90.5	57.1	61.2	63.3	**60.6**
c_{CO}	Conc. of CO in dry stack gas	ppm @ 15% O_2	207.0	33.0	51.4	30.3	32.5	34.7	**32.5**
c_{CO}	Conc. of CO in dry stack gas	mg/dscm	342.3	61.1	105.3	66.5	71.3	73.8	**70.5**
c_{CO}	Conc. of CO in dry stack gas	gr/dscf	0.1495	0.0267	0.0460	0.0290	0.0311	0.0322	**0.0308**
Carbon Monoxide Mass Rates Method 10									
E_{CO}	Emission rate of CO	lb/hour	5.32	1.63	3.04	2.38	2.51	2.61	**2.50**
E_{CO}	Emission rate of CO	g/HP-hr	2.14	0.35	0.44	0.26	0.27	0.28	**0.27**
E_{CO}	Emission rate of CO	lb / MMBtu	0.490	0.078	0.122	0.072	0.077	0.082	**0.077**
Total Hydrocarbon Concentrations (including methane) Method 25A									
c_{THC}	THC concentration (as methane)	ppm	5.56	2.98	1.87	2.03	2.10	2.18	**2.10**
c_{THC}	THC concentration (as methane)	ppm @ 15% O_2	3.91	1.88	1.06	1.08	1.12	1.19	**1.13**
c_{THC}	THC concentration (as methane)	mg/dscm	3.70	1.99	1.24	1.35	1.40	1.45	**1.40**
c_{THC}	THC concentration (as methane)	gr/dscf	0.00162	0.00087	0.00054	0.00059	0.00061	0.00063	**0.00061**
Total Hydrocarbon Mass Rates (including methane) Method 25A									
E_{THC}	THC emission rate (as methane)	lb/hour	0.0575	0.0531	0.0359	0.0484	0.0493	0.0511	**0.0496**
E_{THC}	THC emission rate (as carbon)	lb/hour	0.0431	0.0398	0.0270	0.0363	0.0370	0.0384	**0.0372**
E_{THC}	THC emission rate (as carbon)	lb / MMBtu	0.0053	0.0025	0.0014	0.0015	0.0015	0.0016	**0.0015**
Methane Concentrations Method 25A									
$c_{Methane}$	CH_4 concentration (as methane)	ppm	1.62	0.79	< 0.49	< 0.48	< 0.45	< 0.45	**0.46**
$c_{Methane}$	CH_4 concentration (as methane)	ppm @ 15% O_2	1.14	0.50	< 0.28	< 0.26	< 0.24	< 0.25	**0.25**
$c_{Methane}$	CH_4 concentration (as methane)	mg/dscm	1.08	0.53	< 0.32	< 0.32	< 0.30	< 0.30	**0.31**
$c_{Methane}$	CH_4 concentration (as methane)	gr/dscf	0.00047	0.00023	< 0.00014	< 0.00014	< 0.00013	< 0.00013	**0.00013**
Methane Mass Rates Method 25A									
$E_{Methane}$	CH_4 emission rate (as methane)	lb/hour	0.0167	0.0141	< 0.0094	< 0.0115	< 0.0106	< 0.0107	**0.0109**
$E_{Methane}$	CH_4 emission rate (as carbon)	lb/hour	0.0125	0.0106	< 0.0070	< 0.0086	< 0.0080	< 0.0080	**0.0082**
$E_{methane}$	CH_4 emission rate (as carbon)	lb / MMBtu	0.001156	0.000675	< 0.000374	< 0.000346	< 0.000325	< 0.000336	**0.000335**
Ethane Concentrations Method 25A									
c_{Ethane}	C_2H_6 concentration (as Ethane)	ppm	< 0.0514	< 0.0491	< 0.0497	< 0.0492	< 0.0495	< 0.0492	**< 0.0493**
c_{Ethane}	C_2H_6 concentration (as Ethane)	ppm @ 15% O_2	< 0.0362	< 0.0309	< 0.0282	< 0.0261	< 0.0263	< 0.0269	**< 0.0264**
c_{Ethane}	C_2H_6 concentration (as Ethane)	mg/dscm	< 0.0643	< 0.0614	< 0.0621	< 0.0616	< 0.0619	< 0.0615	**< 0.0617**
c_{Ethane}	C_2H_6 concentration (as Ethane)	gr/dscf	< 0.000028	< 0.000027	< 0.000027	< 0.000027	< 0.000027	< 0.000027	**< 0.000027**
Ethane Mass Rates Method 25A									
c_{Ethane}	C_2H_6 emission rate (as Ethane)	lb/hour	< 0.00100	< 0.00164	< 0.00179	< 0.00220	< 0.00218	< 0.00217	**< 0.00218**
c_{Ethane}	C_2H_6 emission rate (as carbon)	lb/hour	< 0.00080	< 0.00131	< 0.00143	< 0.00176	< 0.00174	< 0.00173	**< 0.00174**
c_{Ethane}	C_2H_6 emission rate (as carbon)	lb / MMBtu	< 0.00007	< 0.00008	< 0.00007	< 0.00007	< 0.00007	< 0.00007	**< 0.00007**
Total Hydrocarbon Mass Rates (excluding methane and ethane) Method 25A									
E_{THC}	THC emission rate (as carbon)	lb/hour	0.0297	0.0279	0.0185	0.0259	0.0273	0.0286	**0.0273**
E_{THC}	THC emission rate (as carbon)	g/HP-hr	0.0120	0.0059	0.0027	0.0028	0.0030	0.0031	**0.0030**

Notes:

1) lb/MMBtu results based on Method 19 Fd factor of 9190 for diesel oil combustion.

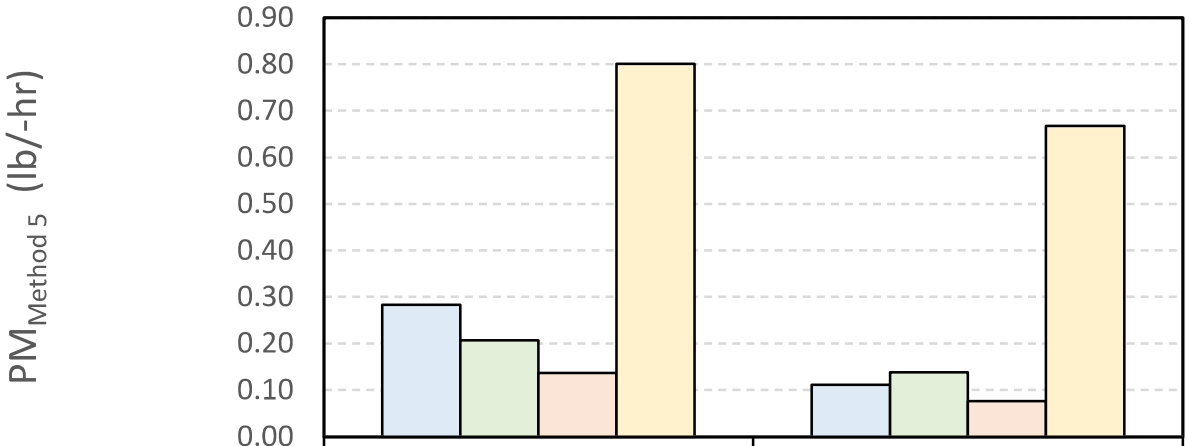
2) (<) indicates the result were below the detection limit and value used is the mininally detected value.

Emissions Test Comparisons - $PM_{Method\ 5}$ (g/hp-hr)



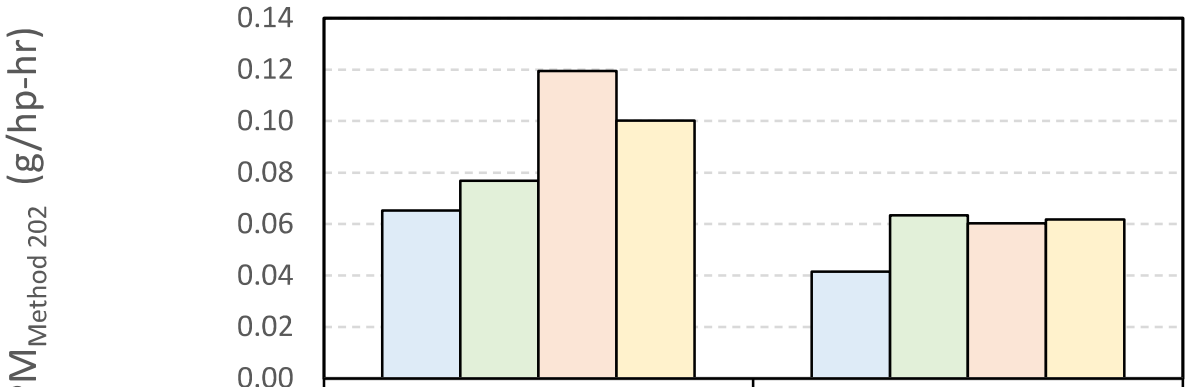
	#2 Diesel	RD99 Diesel
100% of Full Load	0.0308	0.0121
75% of Full Load	0.0297	0.0199
50% of Full Load	0.0288	0.0161
25% of Full Load	0.3227	0.2691

Emissions Test Comparisons - $PM_{Method\ 5}$ (lb/hr)



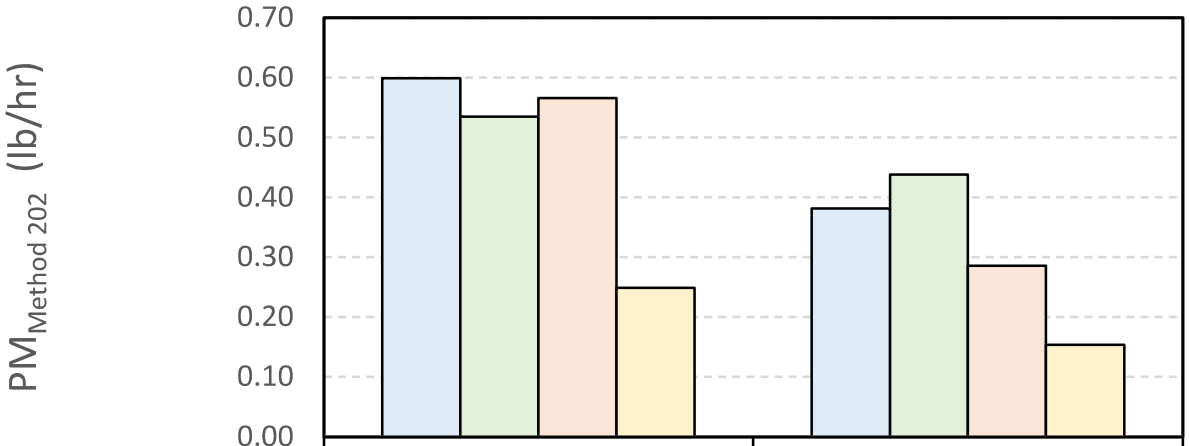
	#2 Diesel	RD99 Diesel
100% of Full Load	0.2829	0.1112
75% of Full Load	0.2066	0.1378
50% of Full Load	0.1366	0.0763
25% of Full Load	0.8010	0.6681

Emissions Test Comparisons - $PM_{Method\ 202}$ (g/hp-hr)



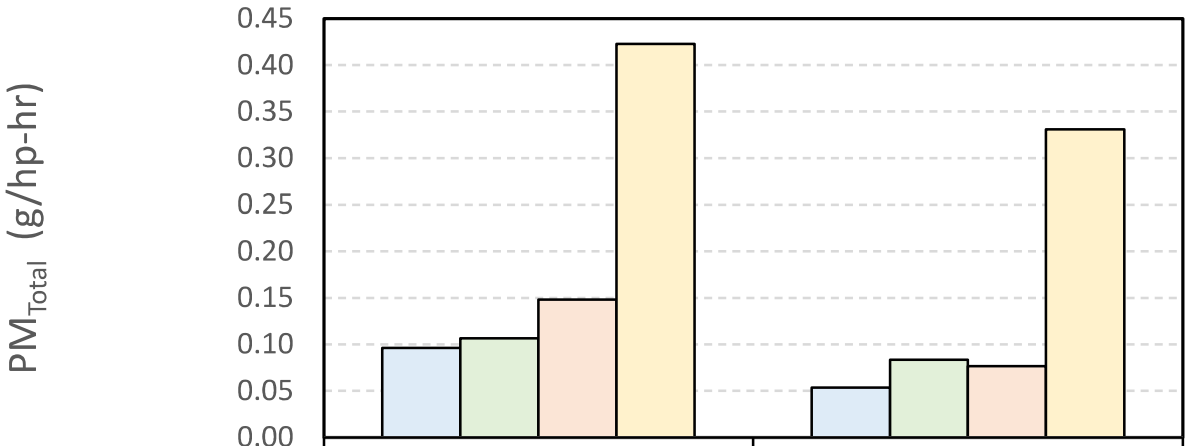
	#2 Diesel	RD99 Diesel
100% of Full Load	0.0653	0.0415
75% of Full Load	0.0769	0.0634
50% of Full Load	0.1194	0.0603
25% of Full Load	0.1001	0.0618

Emissions Test Comparisons - $PM_{Method\ 202}$ (lb/hr)



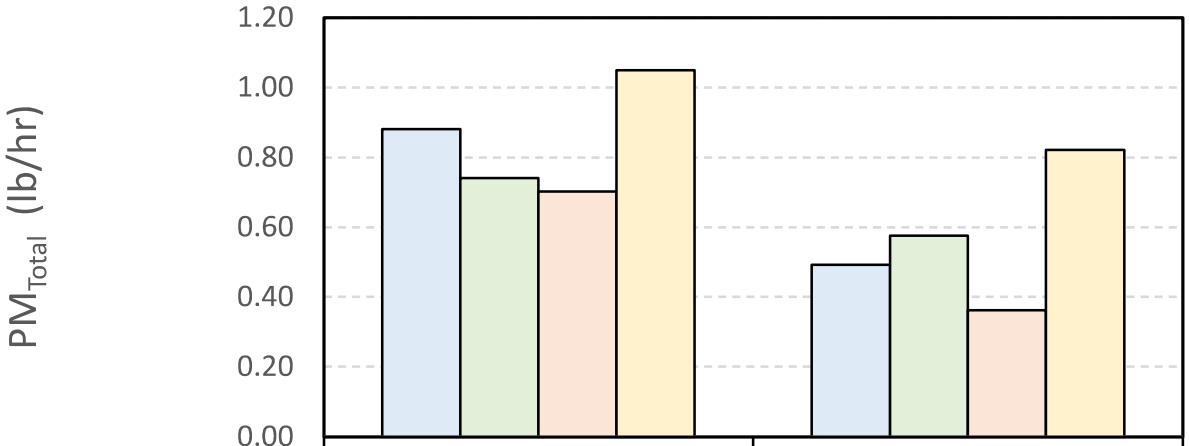
	#2 Diesel	RD99 Diesel
100% of Full Load	0.5988	0.3812
75% of Full Load	0.5342	0.4380
50% of Full Load	0.5654	0.2857
25% of Full Load	0.2486	0.1534

Emissions Test Comparisons - PM_{Total} (g/hp-hr)



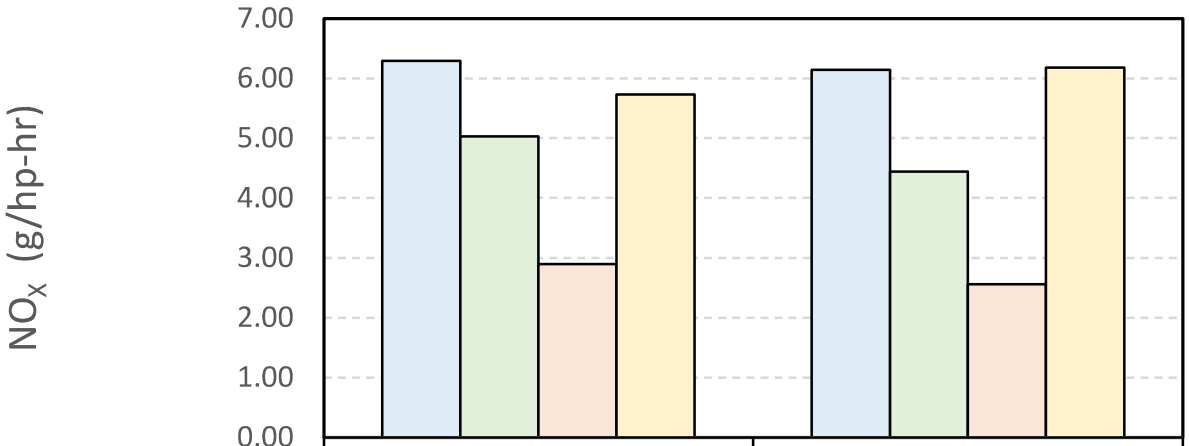
	#2 Diesel	RD99 Diesel
100% of Full Load	0.0961	0.0536
75% of Full Load	0.1066	0.0834
50% of Full Load	0.1483	0.0764
25% of Full Load	0.4228	0.3309

Emissions Test Comparisons - PM_{Total} (lb/hr)



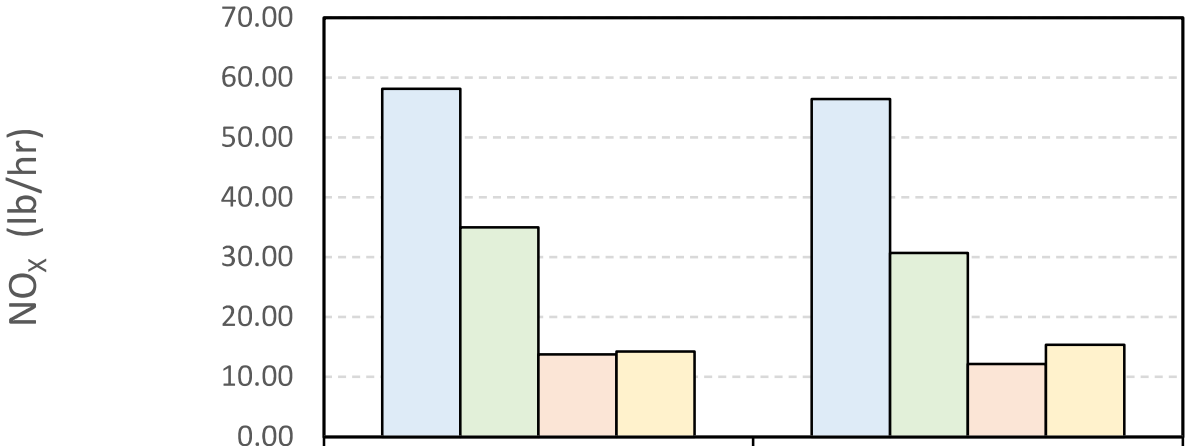
	#2 Diesel	RD99 Diesel
100% of Full Load	0.8817	0.4924
75% of Full Load	0.7409	0.5757
50% of Full Load	0.7021	0.3620
25% of Full Load	1.0495	0.8214

Emissions Test Comparisons - NO_X (g/hp-hr)



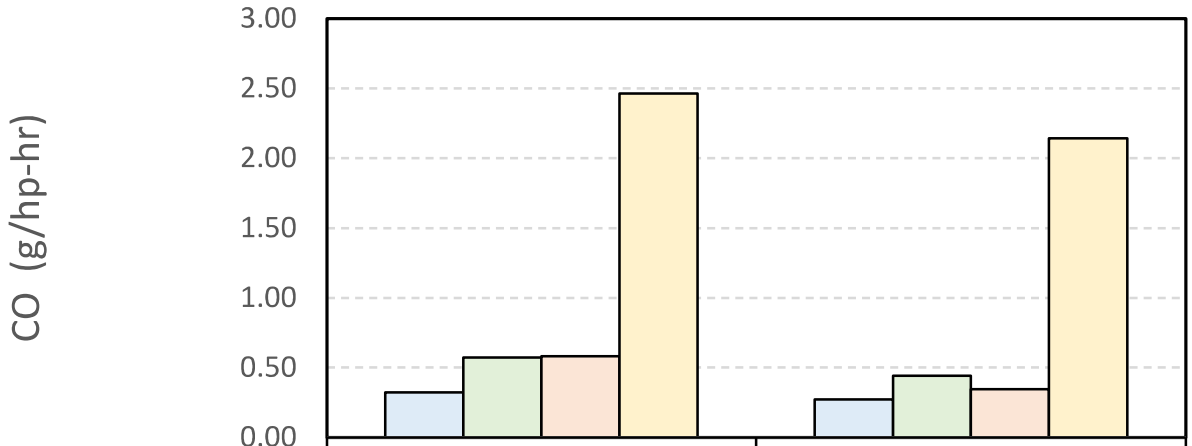
	#2 Diesel	RD99 Diesel
100% of Full Load	6.2908	6.1399
75% of Full Load	5.0312	4.4419
50% of Full Load	2.8958	2.5598
25% of Full Load	5.7292	6.1802

Emissions Test Comparisons - NO_X (lb/hr)



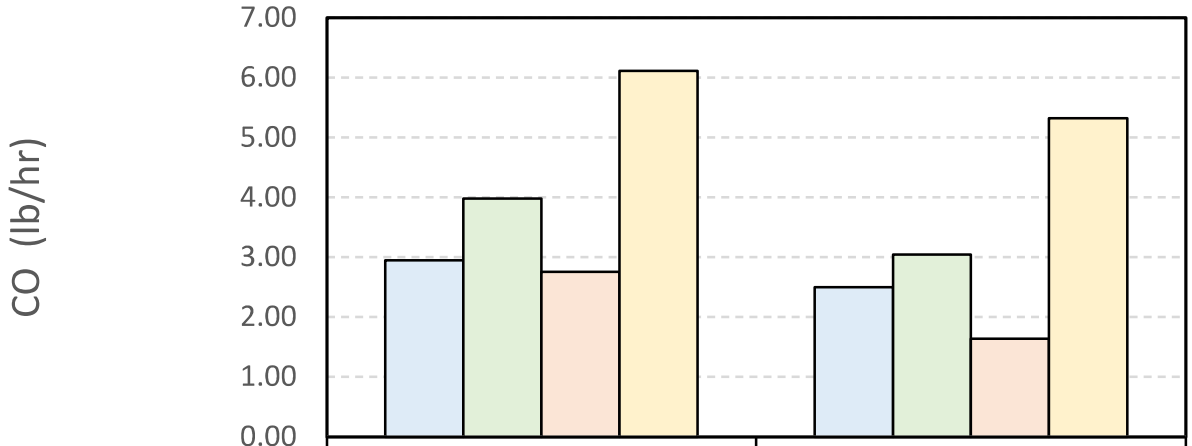
	#2 Diesel	RD99 Diesel
100% of Full Load	58.0785	56.3874
75% of Full Load	34.9503	30.6804
50% of Full Load	13.7131	12.1221
25% of Full Load	14.2221	15.3419

Emissions Test Comparisons - CO (g/hp-hr)



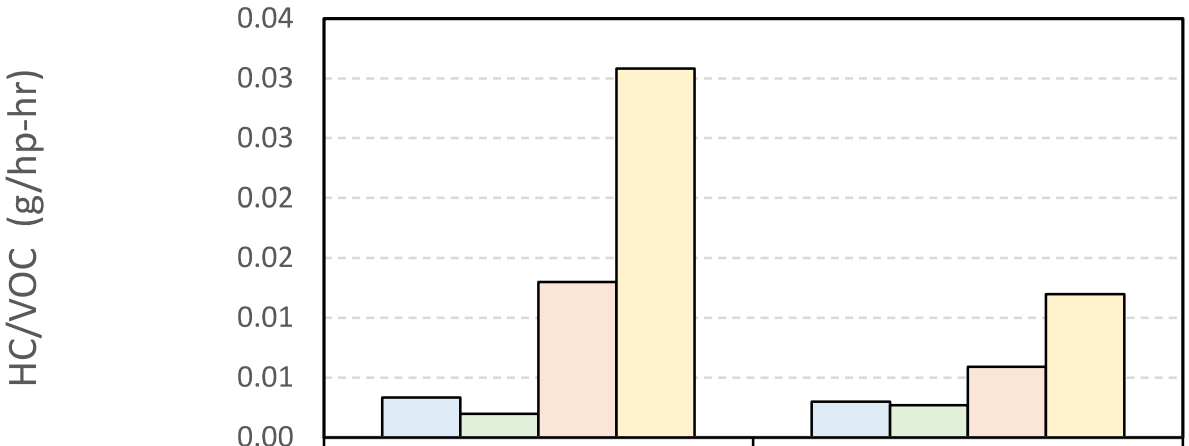
	#2 Diesel	RD99 Diesel
100% of Full Load	0.3212	0.2721
75% of Full Load	0.5726	0.4408
50% of Full Load	0.5809	0.3450
25% of Full Load	2.4619	2.1417

Emissions Test Comparisons - CO (lb/hr)



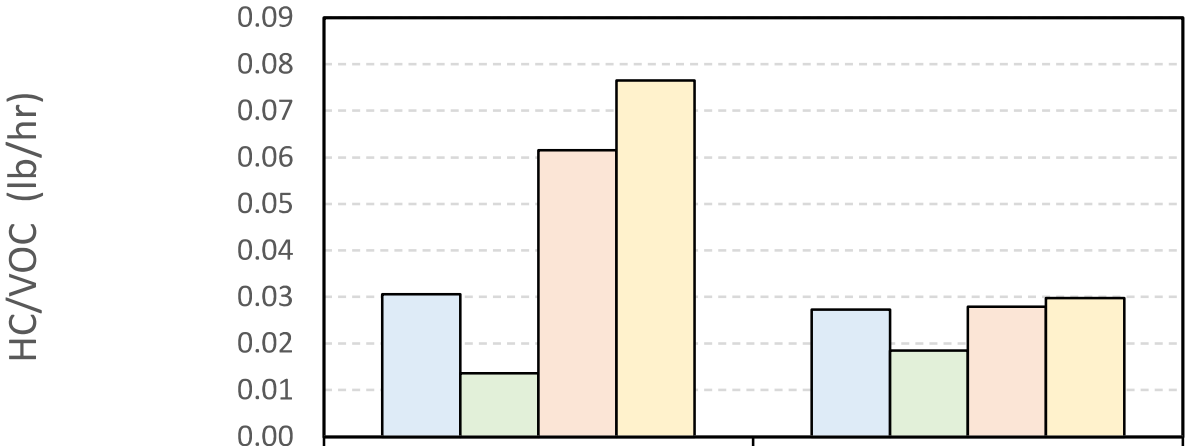
	#2 Diesel	RD99 Diesel
100% of Full Load	2.9471	2.4987
75% of Full Load	3.9776	3.0445
50% of Full Load	2.7510	1.6339
25% of Full Load	6.1115	5.3166

Emissions Test Comparisons - HC/VOC (g/hp-hr)



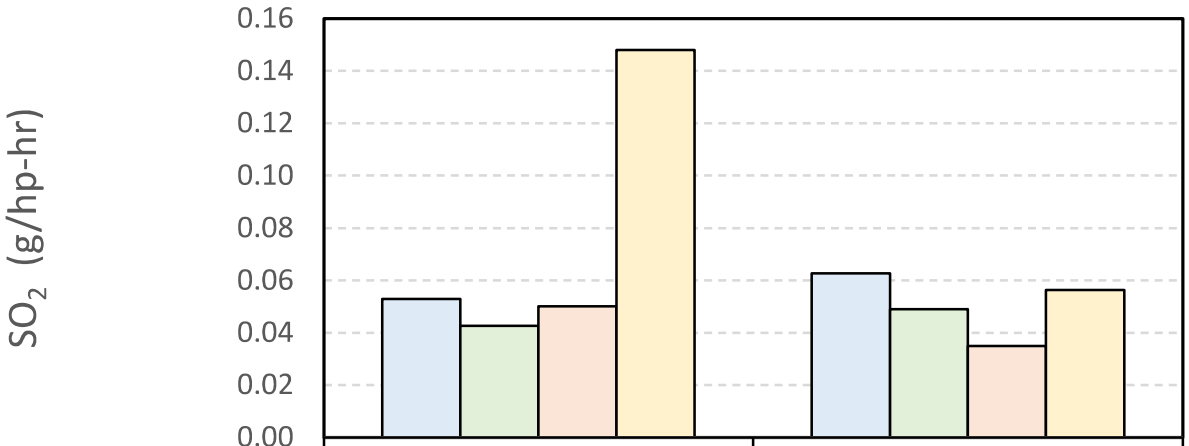
	#2 Diesel	RD99 Diesel
100% of Full Load	0.0033	0.0030
75% of Full Load	0.0020	0.0027
50% of Full Load	0.0130	0.0059
25% of Full Load	0.0308	0.0120

Emissions Test Comparisons - HC/VOC (lb/hr)



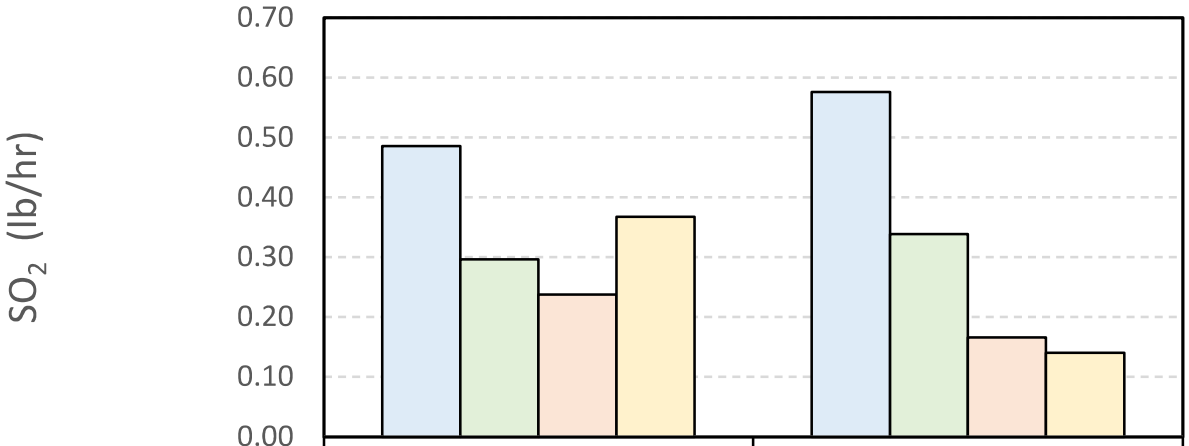
	#2 Diesel	RD99 Diesel
100% of Full Load	0.0306	0.0273
75% of Full Load	0.0136	0.0185
50% of Full Load	0.0616	0.0279
25% of Full Load	0.0765	0.0297

Emissions Test Comparisons - SO_2 (g/hp-hr)



	#2 Diesel	RD99 Diesel
100% of Full Load	0.0530	0.0627
75% of Full Load	0.0426	0.0490
50% of Full Load	0.0501	0.0350
25% of Full Load	0.1480	0.0563

Emissions Test Comparisons - SO_2 (lb/hr)



	#2 Diesel	RD99 Diesel
100% of Full Load	0.4860	0.5754
75% of Full Load	0.2963	0.3384
50% of Full Load	0.2374	0.1657
25% of Full Load	0.3675	0.1397

Appendix E

MALFUNCTION AND PREVENTION ABATEMENT PLAN FOR SCR

Malfunction Prevention and Abatement Plan

Prepared for:

Microsoft Corporation (MKE 16/17 and MKE 3B)
Mount Pleasant, Wisconsin
Racine County

Prepared by:

Stantec Consulting Services Inc.
10745 Westside Way
Suite 250
Alpharetta, Georgia 30009

March 28, 2024

MALFUNCTION PREVENTION AND ABATEMENT PLAN

MICROSOFT CORPORATION – MKE 16/17 DATA CENTER and MKE 3B DATA CENTER
Racine, Wisconsin

Section NR 439.11, Wis. Adm. Code, requires that owners or operators of direct or portable sources of air emissions prepare a Malfunction Prevention & Abatement Plan (MPAP) to prevent, detect and correct malfunctions or equipment failures which may cause any emission limitation to be exceeded or which may cause air pollution. The Wisconsin Department of Natural Resources (WDNR) may request the owner or operator to submit the MPAP for review and approval. The WDNR may amend the plan if deemed necessary for malfunction prevention or the reduction of excess emissions during malfunctions. The MPAP must be updated at least every 5 years.

Per NR 439.11:

1) The owner or operator of any direct or portable source which may emit hazardous substances or emits more than 15 pounds in any day or 3 pounds in any hour of any air contaminant for which emission limits have been adopted shall prepare a malfunction prevention and abatement plan to prevent, detect and correct malfunctions or equipment failures which may cause any applicable emission limitation to be violated or which may cause air pollution. The plan shall be in writing and updated at least every 5 years, and shall include:

    a) Identification of the individual responsible for inspecting, maintaining and repairing the air pollution control equipment.
    b) The maximum intervals for inspection and routine maintenance of the air pollution control equipment. The maximum interval for routine inspection and maintenance may not exceed that recommended by the manufacturer unless otherwise specified in a plan prepared under this section.
    c) A description of the items or conditions that will be checked.
    d) A listing of materials and spare parts that will be maintained in inventory.
    e) A description of the corrective procedures that will be taken in the event of a malfunction or failure which results in the exceedance of the applicable emission limitation. These corrective procedures shall achieve and maintain compliance with the applicable emission limitations as expeditiously as possible

but not longer than the time necessary to discontinue operation of the source consistent with safe operating procedures.

f) A description of the activities and maximum intervals for routine maintenance and inspection of instrumentation installed and operated to monitor the operation of air pollution control equipment as required under s. NR 439.055 (1). The maximum interval for inspection and routine maintenance may not exceed that recommended by the manufacturer of the instrumentation unless otherwise specified in a plan prepared under this section.

g) The calibration schedule for any device which monitors either a source or air pollution control equipment operational variables. The time between calibrations may not exceed one year or as specified in a plan prepared under this section, whichever is shorter.

h) Such other information as the department may deem pertinent.

2) The department may order any owner or operator to submit the plan required by sub. (1) for review and approval. The department may amend the plan if deemed necessary for malfunction prevention or the reduction of excess emissions during malfunctions.

3) No owner or operator may fail to carry out a plan required under sub. (1) or as amended under sub. (2).

4) All air pollution control equipment shall be operated and maintained in conformance with good engineering practices to minimize the possibility for the exceedance of any emission limitations.

Air pollution control equipment installed at the MKE 3B and MKE 16/17 Data centers consists of Selective Catalyst Reduction System (SCR) used to control NOx emissions from the emergency engines. The process specific plans are provided below.

SCR Maintenance Schedule and Milestones

1. Responsible Person: Operations Maintenance personnel is responsible for inspection, maintenance and repair of SCR.
2. The intervals for inspection and routine maintenance of SCR are listed below:
    a. Whenever SCR is in operation:

        i. Visual inspection of Dosing Box, Compressor, Urea Pump, SCR housing, OLC control panel.
        ii. Observe for leaks, unusual operation or noises. Monitor alarms and system parameters at HMI.

    b. Annual Maintenance:

Component	Maintenance to be performed
Air Compressor Suction Filter	Clean
Reactant Filter	Clean
Reactant Pressure	Check/adjust
Reactant Pulsation Dampener	Check/adjust pressure
Reactant Injector	Clean and adjust
Dosing Box Air Pressure Switch	Check operation
Compressor Vanes	Check/Replace if needed
Enclosure Filters	Clean
Reactant Pump	Clean
Dosing Box 3-Way Valve	Check operation
System Operation and Performance	Check

    c. Biennial Scheduled Maintenance:

Component	Maintenance to be performed
Enclosure Filters	Replace
Reactant Pump	Replace diaphragms

SCR Catalyst	Inspect and Vacuum Clean (in place)
OXI Catalyst	Inspect and Chemical Wash
Check/Adjust Load Curve if needed	

d. Miscellaneous Maintenance Checks:
    i. The mechanical condition of the engine can have significant effect on the performance of the SCR. The engine will be operated and maintained according to manufacturer's recommendations.
    i. Catalyst material should be visually inspected for damage or poisoning.
    ii. After the first thermal cycle to 80% of maximum temperatures, the external bolts should be checked to ensure they are tight.
    iii. The SCR System CBL Converter Housing and filters should be inspected periodically for leaks, physical damage and fouling.
    iv. When the catalyst reach their maintenance time, usually 4000 or 8000 hours, they will need to be cleaned.

2. Inspections will be maintained by written record of the observation and any action resulting from the inspection. Inspection records will be kept for five years and available upon request.
3. A stock of critical spare parts for SCR will be maintained onsite to replace or repair any equipment. A list of critical spare parts will be maintained onsite and obtained from the vendor once the equipment has been installed on-site. Additionally, other non-critical spare parts will be ordered from Miratech when necessary.
4. The non-emergency operation of the emergency engines will not be performed when the SCR has a malfunction. Non-emergency operations will only occur when the SCR is operational.
5. An operation and maintenance manual will be maintained on-site.

Appendix F

PETITION FOR ALTERNATE TO THE REQUIREMENTS UNDER NR 428.04(3)(B), WIS. ADM. CODE

Stantec
6080 Tennyson Parkway, Suite 200
Plano, TX 75024

March 28, 2024

Attention: Dave Minkey
State of Wisconsin
Department of Natural Resources
2984 Shawano Avenue
Green Bay, WI 54313-6727

Dear Dave Minkey,

Reference: Petition for alternate monitoring requirements for the NOx limit in NR 428.04(2)(h)1., Wis. Adm. Code under NR 428.04(3)(b), Wis, Adm. Code.

Microsoft Corporation proposes the MKE16/17 Data Center, located on approximately 242 acres south of Braun Road, east of W. 105th Street, west of a Canadian Pacific Railroad line, and north of County KR (1st Street) in Mount Pleasant, Wisconsin. The proposed emergency engines P43-82 are greater than 1,000 brake-horsepower (bhp) and therefore are subject to NR 428.04 (3), Wis. Adm. Code (summarized below).

NR 428.04 (3) Monitoring requirements: The owner or operator of each NOx emissions unit subject to the requirements of sub. (2) shall comply with the monitoring requirements of subch. III.

NR 428.07 Subchapter III:

1. *Install all monitoring systems required under s. NR 428.08 for monitoring NOx emissions. This includes all systems required to monitor NOx emission rate, NOx concentration, heat input and flow, in accordance with ss. NR 428.08 and 439.09.*
2. *Install all monitoring systems for monitoring heat input, if required under this chapter, for developing NOx emission rate determinations expressed in pounds per million Btu.*
3. *Successfully complete all certification tests and meet all operating specifications of this subchapter and 40 CFR parts 60 and 75 as applicable to the monitoring systems required for an emissions unit under subds. 1. and 2.*
4. *Record and report data from the monitoring systems under subds. 1. and 2.*

Microsoft is requesting approval for an alternative to the requirement of NR 428.07 which requires installation of monitoring systems.

The NR 428.04 2(h) limitation for a compression ignition unit with a maximum design power output of 1,000 hp or greater is 6.9 grams per brake horsepower-hour. Since the engines will be constructed after June 11, 2005, 40 CFR 60 Subpart IIII – Standard of Performance for Stationary Compression Ignition Internal Combustion Engines (CI ICE) applies. Per 40 CFR 60.4205 (b), the emergency engines will meet Tier 2 emission standards. The NMHC + NOx [1] emission standard for Tier 2 engines greater than 750 bhp is 6.4 grams per brake horsepower-hour. By meeting the requirements for NSPS IIII for a certified emergency

Reference: **Petition for alternate monitoring requirements for the NOx limit in NR 428.04(2)(h)1., Wis. Adm. Code under NR 428.04(3)(b), Wis, Adm. Code.**

engine, the emergency engines will comply with the NR428.04 2(h) limitation. Furthermore, the engines will have add-on Selective Catalytic Reduction (SCR) to further reduce NOx emissions.

Alternative Requested: Due to the emergency engine limited run-times and EPA Tier 2 certifications, Microsoft is requesting the emergency engines not require monitoring systems as described in (NR 428.07), as Tier 2 certified engines meet the NR 428.04 2(h) emission rate limitation as described above.

Microsoft is proposing to adhere to the NSPS IIII maintenance, testing, monitoring, recordkeeping and reporting requirements as an alternative monitoring requirement for the proposed emergency engines. The monitoring requirements for owner or operator of a stationary CI internal combustion engine is outlined in 40 CFR 60.4211. Following are the requirements:

1. Operate and maintain the stationary CI internal combustion engine and control device according to the manufacturer's emission-related written instructions;
2. Change only those emission-related settings that are permitted by the manufacturer; and
3. Meet the requirements of 40 CFR part 1068 (as applicable)

Microsoft will meet all the requirements of NSPS IIII by purchasing emergency engines certified to the emission standards in 40 CFR 60.4204 (b) (Tier 2 emission standard). The emergency engines will be installed, configured, and maintained according to the manufacturer's emission-related specifications.

Regards,

Stantec Consulting Services, Inc.

Sneha Raghavan

Sneha Raghavan
Senior Regulatory Compliance Specialist
Phone: 817-203-0661
sneha.raghavan@stantec.com

Note 1: NOx portion of the NOx + NMHC is 95% per ARB. Reference: Baaqmd Emission Factors for Diesel Engines. (n.d.). https://www.baaqmd.gov/~/media/Files/Engineering/policy_and_procedures/Engines/EmissionFactorsforDieselEngines.ashx

Appendix G

ENVIRONMENTAL QUESTIONNAIRE

Environmental Analysis Questionnaire
Wisconsin Department of Natural Resources
Air Management Program

I. Applicant Information:

Applicant: **Microsoft Corporation – MKE16/17 Datacenter**

Address: **South of Braun Road, East of W. 105th Street, West of a Canadian Pacific Railroad line, and North of County KR (1st Street) in Mount Pleasant, Wisconsin**

Contact Information: Tel: **(630) 327-5430** E-mail: **cmarkgraff@microsoft.com**

Title of Proposal: **Air Pollution Control Permit Application**

Location: County: **Racine** City/Town/Village: **City of Mount Pleasant**

Township Range Section(s):

☒ Attach any maps, plans and other descriptive material.

II. Brief overview of the proposal:

Microsoft Corporation (Microsoft) is proposing to construct a datacenter (MKE16/17) datacenter located located on approximately 242 acres south of Braun Road, east of W. 105th Street, west of a Canadian Pacific Railroad line, and north of County KR (1st Street) in Mount Pleasant, Wisconsin. There will be two datacenter buildings (MKE16 and MKE17), which will utilize internal compression emergency generators to provide emergency backup power. MKE16/17 datacenter that will have thirty-nine (39) core internal compression emergency generators rated at 3000 eKW and one (1) administrative internal compression emergency generator rated at 500 eKW. The campus will also have two (2) emergency firewater pumps rated at 130 HP.

III. Purpose and need (include history and background as appropriate):

The purpose of the MKE16/17 Data Center project is to generate cloud storage and operational capacity in support of Microsoft's platform. The Microsoft (Applicant) offers a complete cloud platform that hosts applications, streamlines new application development, and integrates the cloud services needed to develop, test, deploy, and manage applications and online services, all while taking advantage of the efficiencies of cloud computing.

In the last few years, the workplace has shifted to a hybrid model which has led to a massive increase in the need for remote data storage and processing. Applicant develops, manufactures, licenses, and supports a range of services, devices, and software products and platforms. In the web search portal business, the Applicant provides access to the Internet and operates websites that provide access to a wide variety of online services. Competitors will primarily include other cloud services providers.

The limited presence of data centers in Wisconsin limits the expansion and advancement of the information technology industry in this region. The Project is needed to address expanding customer demand for these services in the region as teleworking capacities, cloud-based storage and operating platforms, gaming and contactless living behaviors have increased in recent years.

The emergency generators provide an essential service. During an emergency situation, the generators are critical for maintaining temperature and ventilation of data center equipment to avoid equipment failure or other malfunction. In addition, the generators maintain data access and communications that are critical during an emergency situation for public and private infrastructure services, such as those necessary for continued function of hospitals, fire departments, police departments and other emergency preparedness and response services.

IV. Authorities and approvals (list local, state and federal permits or approvals required):

Please list all other approvals required for this project. If additional approvals are required, you should also consider these under sections V. and VI. below.

Wisconsin Department of Natural Resources permits:

- WDNR Wetland Individual Permit IP-SE-2024-52-00815
- WDNR Stormwater Pond General Permit Pending Submission
- General Permit to Discharge Under the Wisconsin Pollutant Discharge Elimination System Pending Submission
- WDNR Air Pollution Control Permit Application

V. Environmental analysis:

A. Analysis of affected environment and probable impacts (primary, secondary and cumulative)

Have you researched to determine if there are any of the following on the affected property or that may be affected by actions resulting from the project? Briefly describe any existing features or resources that may be affected by the proposal and the probable impacts on those features. Provide any supporting information that demonstrates that you have done this.

Note: A Wisconsin Rapid Assessment Methodology (WRAM) form was completed by DNR staff during the wetland permitting process and a copy is attached to this form.

☒ 1. Physical environment (land use, geologic, soils and topographic)

The site is within the municipal boundary of the Village of Mount Pleasant. It is zoned Business Park (BP) and is also located within the Tax Increment District Number 5 (TID 5). From an environmental perspective, the site is comprised of former agricultural fields previously under soybean and corn production during the growing season, transmission line corridor, mesic forest, wooded fencerows, and wetlands. It is bisected by Lamparek Creek that runs in an east-west direction across the central portion of the site. The site is located to the east of W. 105th Street, west of a Canadian Pacific Railroad line, and north of County KR (1st Street). Older aerial imagery shows several residential homes in the northwest, southwest, and southeastern portions of the site that have since been removed. The site contains gradual, rolling hills with topographic highs of approximately 732 feet mean sea level (msl) to topographic lows of approximately 700 feet msl on the east side of the site along Lamparek Creek.

☒ 2. Physical environment (surface waters, groundwater resources and wetlands)

A wetland delineation was conducted in June 2023 using the criteria and methods outlined in the Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1 (1987) and applicable Regional Supplements to the Manual. Additionally, a review of U.S. Department of Agriculture Farm Service Agency (FSA) National Agriculture Imagery Program (NAIP) aerial

imagery and other available aerial imagery was conducted for the Project Area to assist in the wetland delineation by identifying wetness signatures.

Nine (9) wetlands, one open water feature and one waterway were identified in the Project Area. Wetlands were categorized based on Eggers and Reed Wetland Plants and Plant Communities of Minnesota and Wisconsin, Version 3.2 (2011). There was a combined total of 15.39 acres of wetland within the Project Area. Wetlands were composed of fresh (wet) meadow, hardwood swamp, seasonally flooded basin, shallow marsh, and degraded wet meadow wetland communities. Some delineated wetlands contain more than one wetland community type. An Approved Jurisdiction Determination (AJD) request was submitted to the U.S. Army Corps of Engineers (USACE) on behalf of the Applicant to verify federally jurisdictional wetlands on site. Approximately 6.42 acres of wetlands are expected to qualify as Federally isolated. When USACE determines a wetland to be isolated, the wetland is not under federal jurisdiction; therefore, no federal permit is required. One open water feature, an artificial pond, was identified in the southern portion of the Project Area. One waterway named Lamparek Creek is an intermittent stream and was mapped in the central portion of the Project Area. The waterway is immediately adjacent to Wetlands W1 and W2, and flows east beyond the Project Area, where it eventually connects to the North Branch Pike River.

☒ 3. Biological environment - threatened/endangered resources (NHI)

A review of federally threatened and endangered species was conducted in July of 2023 during the planning phase of the project. A review of federally threatened and endangered species was conducted using the U.S. Fish and Wildlife Service (USFWS) Information, Planning, and Conservation (IPaC) system. Four federally protected species were identified.

1. Northern long-eared bat (*Myotis septentrionalis*), Endangered.
   The USFWS IPaC database listed the northern long-eared bat as an Endangered species that may be present in the Project Area. While the Wisconsin Department of Natural Resources Natural Heritage Inventory (NHI portal) database determined that this project site is more than 150 feet from a known maternity roost tree AND is more than ¼ mile from a known hibernacula, the central hardwood swamp wetland, may be adequate roosting and foraging habitat for this species, however this area has been avoided.
2. Tricolored bat (*Perimyotis subfluvus*), Proposed Endangered - The IPaC database listed this species as potentially present in the search area. The tricolored bat is not currently listed.
3. Red knot (*Calidris canutus rufa*), Threatened - Suitable habitat for red knot is not present onsite; therefore, no impacts to this species are anticipated as a result of the proposed project.
4. Monarch butterfly (Danus plexippus), Candidate - Candidate species are not protected by the take prohibitions of Section 9 of the ESA.

Wisconsin Department of Natural Resources Natural Heritage Inventory (NHI portal) results and subsequent Endangered Resources Review listed three endangered resources within a 2-mile radius of the project area. Two of the resources were Blanchard's cricket frog (*Acris blanchardi*) and Blanding's turtle (*Emydoidea blandingii*). Based on lack of suitable habitat within the Project Boundary or historical last observation, no impact to these species is anticipated as a result of the proposed project. The remaining resource, prairie crayfish (*Procambarus gracilis*) had the highest possibility of being present within the Project Area. No specimens were identified.

☒ 4. Biological environment – Aquatic species and habitats

Included in information provided under the answers to 2 and 3 above and the WRAM completed by DNR.

☒ 5. Biological environment – Terrestrial species and habitats

Included in information provided under the answers to 2 and 3 above and the WRAM completed by DNR.

☒ 6. Social and economic – environmental justice and economic impacts including traffic, public safety, noise and visual change impacts on neighboring or other populations

Social and economic features of the project have been and continue to be assessed by the Village of Mount Pleasant as the local regulatory agency. As noted above, the project site is located within the Village's Business Park zoning district and within the TID 5 District. The TID was created under the authority provided by Wis. Stat. § 66.1105 and is designated as an "Industrial District." The Mount Pleasant datacenter project meets the objectives of the TID 5 Project Plan, the Mount Pleasant 2035 Master Plan, and the Racine County Multi-Jurisdictional Comprehensive Plan, and adheres to the Village of Mount Pleasant Zoning and Development Codes. The project will yield significant economic benefit through the generation of tax revenue and other direct community investments. The Development Agreement executed amongst Microsoft, Racine County, and the Village of Mount Pleasant in April 2023 guarantees a minimum investment by Microsoft of $1B in the Mount Pleasant datacenter campus.

Traffic

A draft Traffic Impact Analysis (TIA) was prepared for the project and will be reviewed and submitted to the Village of Mount Pleasant to support early entitlement/permitting efforts. The draft TIA identified no significant adverse impacts of the project on traffic. Intersections located within the draft TIA study area are anticipated to function safely and effectively with the development assumptions and with the recommended modifications if properly designed and constructed through the design year of the project.

Noise

A noise study has been completed for the Mount Pleasant datacenter campus to ensure that the facility can meet the Village of Mount Pleasant's noise ordinance (Village Code § 90-450.070) under all operating scenarios. Overall, the project will have negligible impact on noise and will meet the Village's noise ordinance under all operating scenarios.

Visual Impacts

The project has been designed to meet or exceed the Village of Mount Pleasant's zoning code and screening criteria as specified in Village Code § 90-430. Overall, visual impacts of the project have been minimized to the greatest extent possible, exceed local regulatory requirements. **Public Safety**

The project will have a negligible impact on public safety.

☒ 7. Social and economic - archaeological/historical sites

A Phase I Cultural Resources review was conducted in July 2023 and field work was conducted in June 2023. There was one previously identified isolated archaeological site within an existing transmission line corridor. As the site is an isolated find, it is not considered eligible for listing on the NRHP, but this finding was not evaluated by Wisconsin SHPO. A shovel test probe within the boundary of the site demonstrated that the soil is heavily disturbed. It is unlikely that intact cultural resources still exist at this site.

All three historic structures within the 1-mile buffer are extant, and only one has a partial view of the Project Area. Direct impacts to these three structures would not occur based on their distance from the Project Area. Indirect (visual) impacts could occur to these two historic structures, but intervening tree cover and more modern structures provide some level of visual screening to reduce potential visual impacts.

☒ 8. Other special resources (e.g., State Natural Areas)

A shoreland buffer is required to be maintained along Lamparek Creek (75 feet on each side of the creek). A FEMA designated 100-year floodplain area exists along Lamaparek Creek on the eastern side of the property.

B. Analysis of alternatives

Briefly describe the impacts of no action and of alternatives to the project that would decrease or eliminate adverse environmental impacts.

Please see attached alternatives analysis that was submitted in support of the wetlands permit application.

VI. Other considerations and assessing the need for an Environmental Impact Statement (EIS)

A. Does the Project meet any of the following criteria under s. NR 150.20(4)(b)? All of the following are considerations for whether an Environmental Impact Statement may be prepared. Check all that potentially apply.

☒ 1. The project involves multiple Department actions.

☐ 2. The project may be in conflict with local, state or federal environmental policies [NR 150.20(4)(b)2. Wis. Adm. Code].

☐ 3. The project may set precedent for reducing or limiting environmental protection [NR 150.20(4)(b)3. Wis. Adm. Code].

☐ 4. The project may result in deleterious effects over large geographic areas [NR 150.20(4)(b)4. Wis. Adm. Code].

☐ 5. The project may result in long-term deleterious effects that are prohibitively difficult or expensive to reverse [NR 150.20(4)(b)5. Wis. Adm. Code].

☐ 6. The project may result in deleterious effects on especially important, critical, or sensitive environmental resources [NR 150.20(4)(b)6. Wis. Adm. Code].

☐ 7. The project involves broad public controversy [NR 150.20(4)(b)7. Wis. Adm. Code].

☐ 8. The project may result in substantial risk to human life, health, or safety [NR 150.20(4)(b)8. Wis. Adm. Code].

B. For all boxes checked in A. above, describe the criteria in more detail below.

Project requires multiple permits from the DNR as described in Section IV above; however, the project is not complex and is limited to a relatively small area.