Construction Permit Application (MKE Area 2)

September 2024

Prepared for:

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Racine, Wisconsin
Racine County

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1.0 INTRODUCTION

Microsoft Corporation (Microsoft) is currently developing three data centers in the Village of Mount Pleasant, Wisconsin. Microsoft is currently constructing the MKE 3B 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. In June 2024, Microsoft proposed to construct the MKE16/17 Data Center located directly west of, and adjacent to the permitted MKE 3B Data Center; the MKE16/17 permit is currently being worked on with Wisconsin DNR (draft construction permit 24-DMM-092 and draft operation permit 25230249A-F02). As part of this permit application, Microsoft is proposing to construct MKE Area 2, located on approximately 792 acres north of Braun Road, east of Wisconn Valley Way, west of County Road H, and south of Durand Avenue in Mount Pleasant, Wisconsin. The MKE Area 2 site would be located across Braun Road to the north and approximately one-quarter of a mile down Braun Road to the west from the MKE 3A land parcel. The MKE Area 2 site will consist of six (6) data center buildings (MKE 09, MKE 10, MKE 11, MKE 12, MKE 13, and MKE 14), which will utilize diesel fired internal compression emergency generators to provide emergency backup power. Since the proposed MKE Area 2 site is adjacent to MKE 3A and MKE 3B site, the three sites would be considered a single source for air permitting. Although Microsoft considers the MKE Area 2 project as separate from the MKE 3A and MKE 3B projects, the MKE Area 2 project is conservatively assumed to be aggregated with the Area 3A and 3B projects.

1.1 PURPOSE

This application is for the construction and operation of MKE Area 2 that will consist of the following:

- Six data center buildings,
- One-hundred and forty-six (146) internal compression emergency generators rated at 3,000 kilowatts (eKW) equipped with selective catalytic reduction (SCR) control devices,
- Three (3) administrative internal compression emergency generators rated at 500 eKW,
- Two (2) emergency fire pumps rated at 236 eKW.

As described below, Microsoft is proposing to accept enforceable limits (annual fuel usage) to limit potential to emit (PTE) of nitrogen oxides (NOx) to be less than 100 tons per year (tpy) for MKE Area 2, MKE 3A, and MKE 3B combined to remain a synthetic minor facility with respect to Title V.

1.2 CONSTRUCTION PERMIT APPLICATION

Microsoft is required to obtain a construction permit for MKE Area 2 under NR 406, Wisconsin Administrative Code (Wis. Adm. Code). Total facility maximum theoretical emissions (MTE) calculations for MKE 3A, MKE 3B and MKE Area 2 combined (facility) result in emissions above 100 tpy of NOx. Microsoft is proposing to install SCR controls on the internal compression emergency generators rated at 3,000 eKW and limit annual fuel usage to limit PTE of NOx from the facility to be less than 100 tpy. The

PTE of MKE 3A and MKE 3B are currently less than Title V major source thresholds, the facility will control NOx emissions with SCR operation and limit fuel usage for MKE Area 2 for the facility to remain below the major source thresholds.

As this is the first Construction Permit for MKE Area 2 site, 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.

Microsoft requests a construction period of up to 42 months to allow for the construction of the six (6) datacenter buildings (MKE09-MKE14).

1.3 PERMIT REQUEST

Microsoft 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 be less than 100 tpy to 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 National Emissions Standards for Hazardous Air Pollutants (NESHAP) ZZZZ and New Source Performance Standard (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

2.0 FACILITY INFORMATION

2.1 SITE LOCATION

MKE Area 2 is located on approximately 792 acres north of Braun Road, east of Wisconn Valley Way, west of County Road H, and south of Durand Avenue in Mount Pleasant, Wisconsin. Appendix A provides the plant location map and site map. MKE Area 2 would be located across Braun Road and approximately one-quarter of a mile to the west of MKE 3A (draft construction permit 24-DMM-092 and draft operation permit 25230249A-F02), 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 ozone for which National Ambient Air Quality Standards (NAAQS) have been promulgated.

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

MKE Area 2 will consist of six data centers, one-hundred and forty-six (146) diesel fired internal compression emergency generators rated at 3,000eKW; three (3) admin internal compression emergency generators rated at 500eKW; and two (2) internal compression emergency generator fire pump engines rated at 236eKW. The internal compression emergency generators rated at 3,000eKW will be EPA Tier 2 certified with SCR control equipment to reduce potential NOx emissions. The internal compression emergency generators rated at 500 eKW and the fire pump engines will be EPA Tier 2 certified. 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) as they will each be less than 10,000 gallons.

The engines will use traditional ultra-low sulfur diesel fuel and will also be equipped to utilize renewable diesel that will meet ASTM D975-S15 and NSPS fuel specifications. 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 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 is exempt from air permitting.

The following table provides a summary of all the significant emission sources at MKE Area 2.

Table 1 – Summary of all significant emission sources at MKE Area 2

Application Identifier	Facility Identifier	Source Identifier	Source Description	Size (kWe)	SCR Control (Yes/No)
New	MKE09	P85 – P114	Cummins C3000 D6e	3000	Yes
New	MKE09	P115	John Deere [JU6H-UFADP0]	236	No
New	MKE10	P116 – P135	Cummins C3000 D6e	3000	Yes
New	MKE10	P136	Cummins 500DFEK	500	No

New	MKE11	P137 – P142	Cummins C3000 D6e	3000	Yes
New	MKE12	P143 – P172	Cummins C3000 D6e	3000	Yes
New	MKE13	P173 – P202	Cummins C3000 D6e	3000	Yes
New	MKE13	P203	Cummins 500DFEK	500	No
New	MKE14	P204 – P233	Cummins C3000 D6e	3000	Yes
New	MKE14	P234	Cummins 500DFEK	500	No
New	MKE14	P235	John Deere [JU6H-UFADP0]	236	No

Microsoft is proposing the following limits with the goal of maintaining minor source status for the facility comprised of MKE Area 2, MKE 3A, and MKE 3B.

- Units P01-P39 (MKE 3B), P43-P81 (MKE 3A), P85-P114, P116-P135, P137-P202, and P204-P233 (3000 ekW core engines): No more than 403,797 gallons per month of diesel and renewable diesel fuel used in all engines combined, calculated on a 12-month rolling average basis. This is equivalent to 4,845,568 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 (MKE 3A) (1000 ekW admin engines): No more than 626 gallons per month of diesel and renewable diesel fuel used in all engines combined, calculated on a 12-month rolling average basis. This is equivalent to 7,509 gallons per year.

- Units P40 (MKE 3B), P136, P203, and P234 (500 eKW admin engines): No more than 1,203 gallons per month of diesel and renewable diesel fuel used in all engines combined, calculated on a 12-month rolling average basis. This is equivalent to 14,435 gallons per year.

- Units P41 (MKE 3B), P42 (MKE 3B), P83 (MKE 3A), and P84 (MKE 3A) (fire pump engines): No more than 211 gallons per month of diesel and renewable diesel fuel used in 130 hp fire pump engines combined, calculated on a 12-month rolling average basis. This is equivalent to 2,538 gallons per year.

- Units P115 and P235 (fire pump engines): No more than 179 gallons per month of diesel and renewable diesel fuel used in 316 hp fire pump engines combined, calculated on a 12-month rolling average basis. This is equivalent to 2,142 gallons per year.

2.3 EMISSIONS CALCULATIONS

The MTE and PTE calculations for each significant emissions source are included in Appendix B of this construction application. The emissions calculations for the 3,000 eKW engines with SCR control equipment account 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 for the SCR to be operational. The catalyst must be pre-heated for the desired NOx emission reduction to occur. The calculations assume 50 startups per year for maintenance and each startup is 10 minutes. This assumption is per engine equipped with SCR.

3.0 REGULATORY APPLICABILITY SUMMARY

MKE Area 2 will be 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 Part 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 MKE Area 2 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 MKE Area 2 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 NSPS Subpart IIII as applicable to the MKE Area 2 site 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)

NSPS Subpart JJJJ applies to stationary spark ignition internal combustion engines (SI ICE). MKE Area 2 will not have any spark ignition internal combustion engines. As such, NSPS 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, NSPS 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 MKE3A, MKE3B and MKE Area 2 facility 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 MKE Area 2. As new stationary RICE located at an area source of HAP, the emergency generators meet the requirements of NESHAP Subpart ZZZZ by meeting the requirements of 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 MKE Area 2 has been included in Appendix C.

3.3 COMPLIANCE ASSURANCE MONITORING (CAM)

Enhanced monitoring requirements have been adopted into 40 CFR Part 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.

Because the source is not a Part 70 major source, the requirements of CAM do not apply.

3.4 STATE REGULATIONS

3.4.1 NOx Reasonably Available Control Technology (RACT) Analysis

Emissions of 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. NOx RACT requirements apply to sources with maximum theoretical NOx 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 MKE Area 2 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 will be EPA Tier 2 certified with SCR control equipment.

3.4.2 NOx Emissions Performance Program General Provisions

The proposed emergency engines P85-P114, P116-P135, P137-P202, and P204-P233 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 Part 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 with an exception for emission units, operations or activities that are regulated by an emission standard promulgated under section 112 of the Clean Air Act, in accordance with NR 445.01(1)(b). Emission standards promulgated under section 112 of the Act include National Emission Standards for Hazardous Air Pollutants (NESHAPs) in 40 CFR Part 61 and 63. As described above, the MKE Area 2 emergency engines will be subject to NESHAP Subpart ZZZZ, therefore no requirements will apply to the engines under NR 445.07 or NR 445.08.

Additionally, NR 445 includes specific provisions for compression ignition engines under NR 445.09. However, the emergency engines at MKE Area 2 are emergency units that will provide an essential service as defined under NR 445.02(6)(c) (asset protection in emergency) and are therefore exempt from the requirements of NR 445.09, per NR 445.09(1)(b).

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 particulate matter less than 10 microns (PM10), primary particulate matter less than 2.5 microns (PM2.5), sulfur dioxide (SO2), NOx, carbon monoxide (CO) and volatile organic compounds (VOC). Microsoft 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 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 - MKE Area 2 Data Center	7374 (518210)	252302490
4. Street Address (where pollution sources are/will be located)	**5.** ○ City ○ Town ◉ Village	**6. County**
N of Braun Rd, E. of Wisconn Valley Way	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: 03/31/2025 (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 or 25230249A-F02 (when issued)

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

Christa Markgraff
Print or type name of Responsible Official

EAST Region Leader - AMER
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:	52NUT
Document Description:	
File Name:	252302490_25230249A-F03_24_XXX_238_Emailed_Application_Need_SIG.pdf
File Size [KB]:	32240
Wisconsin User ID (WAMS):	cmarkgr
User Name:	Christa Markgraff
User Verified Status:	
Temporary PIN Sent To:	CMARKGRAFF@microsoft.com
Signature ID:	52NS0
Signature Date/Time:	9/20/2024 4:20:58 PM
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
Temporary PIN Hash Value:	5E186399C7A65B3CFB021A40CCA12D3B0D08DEABED3CE99A1EE1AB6AE65B43EA1C0124BD4D32F7A27EA61659552D737AC09E5A22ECA45D266176A5A4CD3F1FDF		
Public Key Value:	0602000000A400005253413100080000010001004 9C75BBDE603CFE8DC2AFD00396DC232A94036FF12A1983BA31A66B129AC9BA7D7743AECA0BF77373E9A264E8A5AA9B7F264785E5028CC14F542B2237083ECCAF4BEB3895A11FC3F7CD655626E02005E9BAC3DD3AC4BC83C3B3B21C33A0EAE931E41ABC710D819C48B86733C0D8305BF34A7A53EB320CF836B75F8A7B2DD78AC8614EAE71D494F99BC221CB659C661DAD089EA1B37D056A582F207D44997F7B58619143266ADAC718E36802CBF3FF7B248F7027B1FD6A4DC68839C2C2413583816A5002E662A89AABF00EB55CF039217F3DB2F92738234D71FB926E2EB4096A945C167088BE1114F9667FBA9AF0BEBD019AA48071104F0501D1AB9AD80A8C6BD		
Document Hash Value:	7E1714A471C4B2E6ED14408285E1B8D1653FA62D7FC2B170976E370F6D746D2FD9864EDEFE4A914BA380811F8F0DCB0F6C0814AEDD3C5F23A858AB2F39D24FE9		
Document Signature Value:	AD259EC8E2132FF0C8D0683B789B4BF3EAAEB7FE8A6512C6ACC4270A84ACF27CB2D6A9479A931206E88CF6C5876D6074FD199386AA42C672C79E70EAB350F45963BF49C45B0D31268441C1B68A02310F5B34E3A72BB682D044DD721DDAE82426F8C574187108501D133B123253F2FCAC9CEE23BD6B2ADBD5E9E7A3466D13119A4119BAEBFFA17EE73B1E2CD928CF3BB03D02787370C0B449FDE9EC948A3FBDAE04E767BBEC09FF88DBD131BA5F87F57A20331580A8DF2D2C34265047F944F2D30749C99B6D457D7FD1636CF48852D57FA40C9EB47A1F263B9B0D71D0B95F3C1B54C7F0EC5D0E9C9A309CD306122EEE4D0300C6F7D49E1229921C19AB492A0F2F		

State of Wisconsin
Department of Natural Resources
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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:

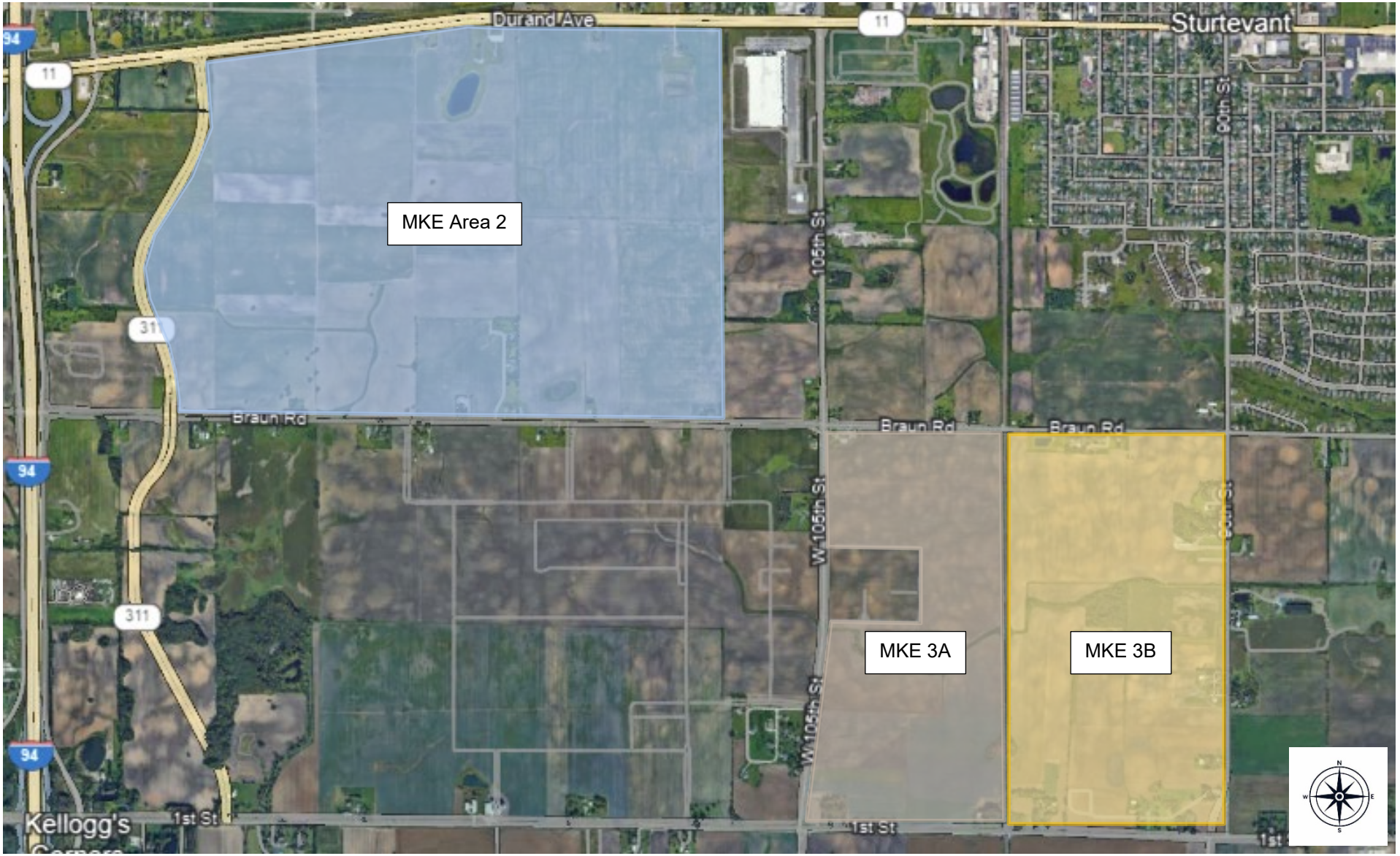
- ☒ 1. A layout (blueprint, plan view, annotated aerial photograph, or graphic submitted for land use zoning approvals) including all buildings occupied by or located on the site of the facility.
- ☒ 2. The maximum height, and eave height, of each building and solid structure (excluding stack height).
- ☒ 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: September 2024

FACILITY PLOT PLAN
MKE AREA 2, MKE 3A, and MKE 3B DATA CENTER – RACINE, WI

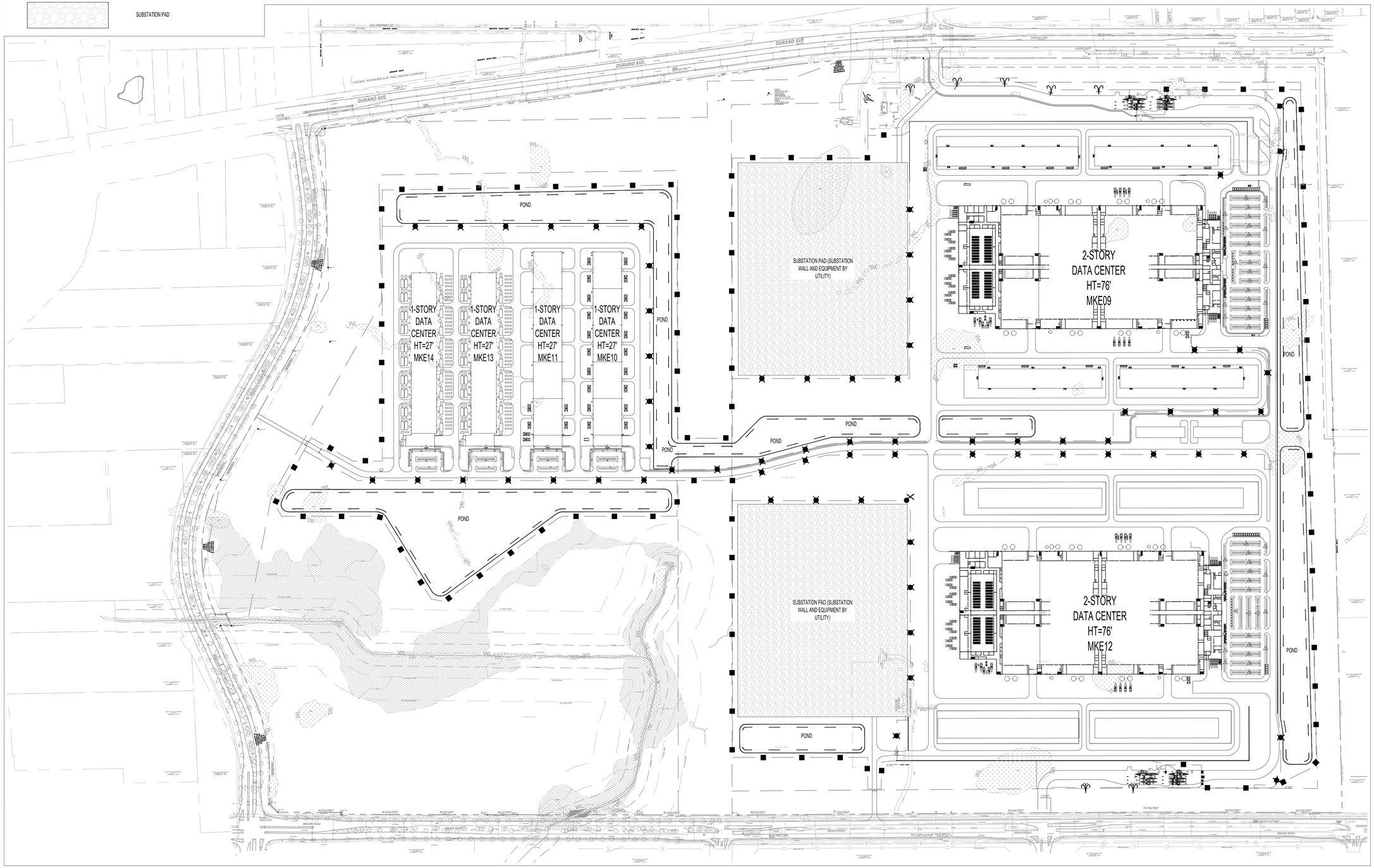
LEGEND

- 10' METAL FENCE
- 8' TALL CHAIN LINK FENCE
- EXISTING WETLANDS
- EXISTING FLOODPLAIN
- SUBSTATION PAD

GENERAL NOTES:

1. Proposed development will show conformance with Chapter 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 90-430-5.
3. Proposed development will show conformance with Chapter 90 Article 400 regulations at Final Site Plan.
4. Depicted property line subject to active Certified Survey Map (CSM).

MKE Area 2 SITE MASTER PLAN



CONFIDENTIAL - TRADES SECRET INFORMATION - EXEMPT FROM RELEASE UNDER FOIA
(5 U.S.C. §552 (b)(4)) AND WISCONSIN'S PUBLIC RECORDS LAW (Wis. Stat. §§ 19.31-19.39)

0' 150' 300' 600'
SCALE: 1" = 300'

Dewberry

Dewberry Engineers Inc.
1503 Edwards Ferry Road
Suite 200
Leesburg, VA 20176-6680
703.771.8004

MKE AREA 2

MT. PLEASANT, WISCONSIN

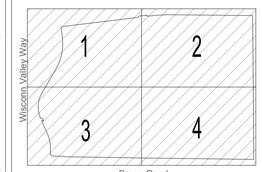
Design	LUDYK ROMAN, MAI-KHANH HUMBLE, NICK COLAVITA, PEYTON STONE,
Drawn	LUDYK ROMAN, MAI-KHANH HUMBLE, NICK COLAVITA, PEYTON STONE, ELLEN LEWIS
Checked	DAVID WEEMS
Date	JULY, 2024

Registration

Sector Key Plan

PLAN

Durand Ave



Revisions

No.	Date	Description

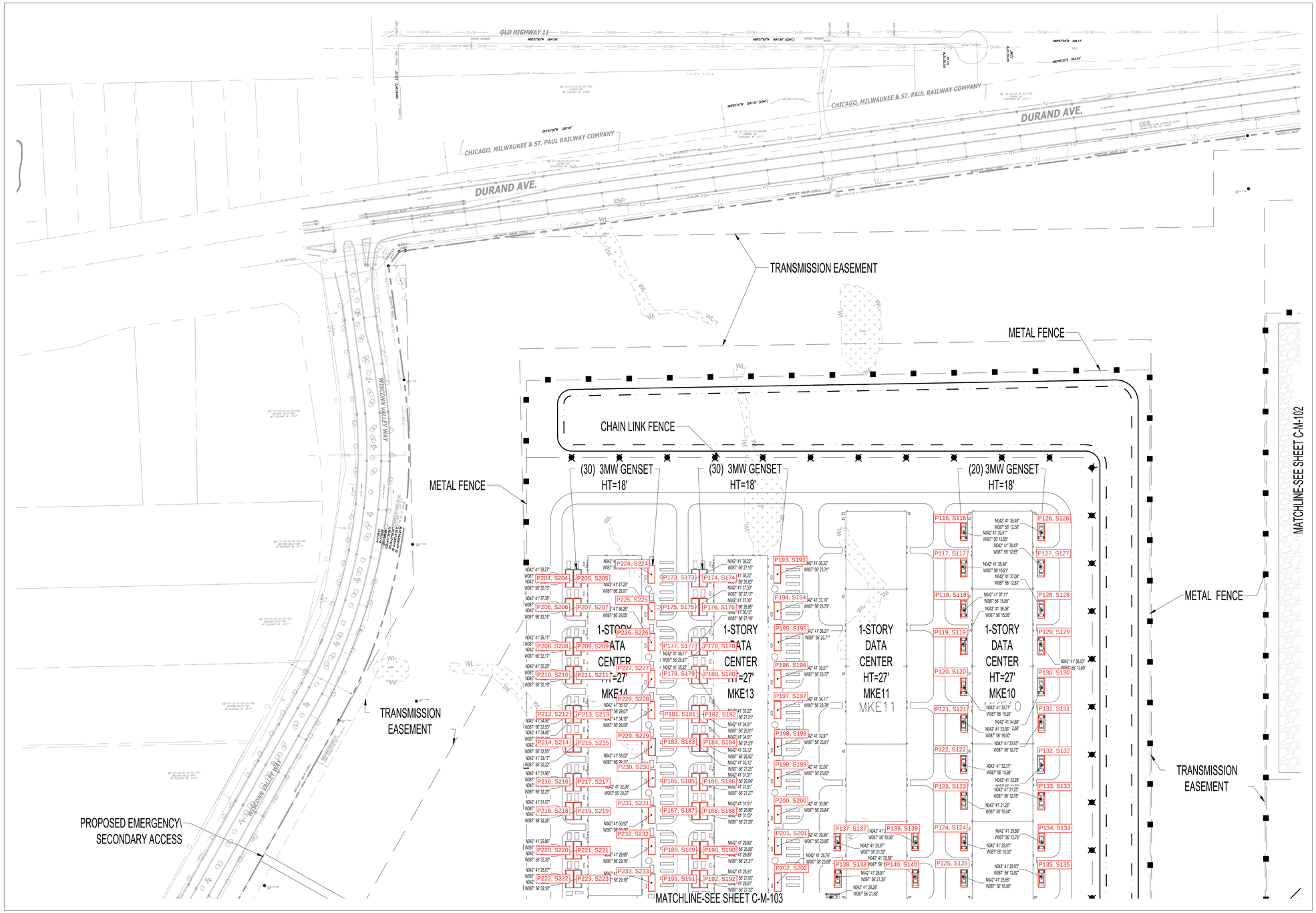
Package
MKE09/11

Sheet Title/Number

CIVIL
AIR PERMIT
OVERALL

C-M-100

MKE10, MKE11, MKE13, and MKE14 SITE MAP



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Leesburg, VA 20176-6680
703.771.8004

MKE AREA 2

MT. PLEASANT, WISCONSIN

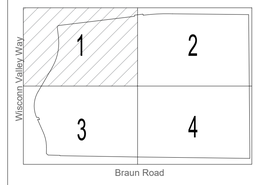
Design	LUDYK ROMAN, MAI-KHANH HUMBLE, NICK COLAVITA, PEYTON STONE,
Drawn	LUDYK ROMAN, MAI-KHANH HUMBLE, NICK COLAVITA, PEYTON STONE, ELLEN LEWIS
Checked	DAVID WEEMS
Date	JULY, 2024

Registration

Sector Key Plan

PLAN

Durand Ave



Revisions

No.	Date	Description

Package
MKE09/11

Sheet Title/Number
CIVIL
AIR PERMIT

C-M-101

CONFIDENTIAL - TRADES SECRET INFORMATION - EXEMPT FROM RELEASE UNDER FOIA
(5 U.S.C. §552 (b)(4)) AND WISCONSIN'S PUBLIC RECORDS LAW (Wis. Stat. §§ 19.31-19.39)

MKE10, MKE11, MKE13, and MKE14 SITE MAP (Cont'd)

Dewberry

Dewberry Engineers Inc.
1503 Edwards Ferry Road
Suite 200
Leesburg, VA 20176-6680
703.771.8004

MKE AREA 2

MT. PLEASANT, WISCONSIN

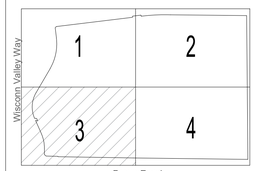
Design	LUDYK ROMAN, MAI-KHANH HUMBLE, NICK COLAVITA, PEYTON STONE,
Drawn	LUDYK ROMAN, MAI-KHANH HUMBLE, NICK COLAVITA, PEYTON STONE, ELLEN LEWIS
Checked	DAVID WEEMS
Date	JULY, 2024

Registration

Sector Key Plan

PLAN

Durand Ave



Revisions

No.	Date	Description

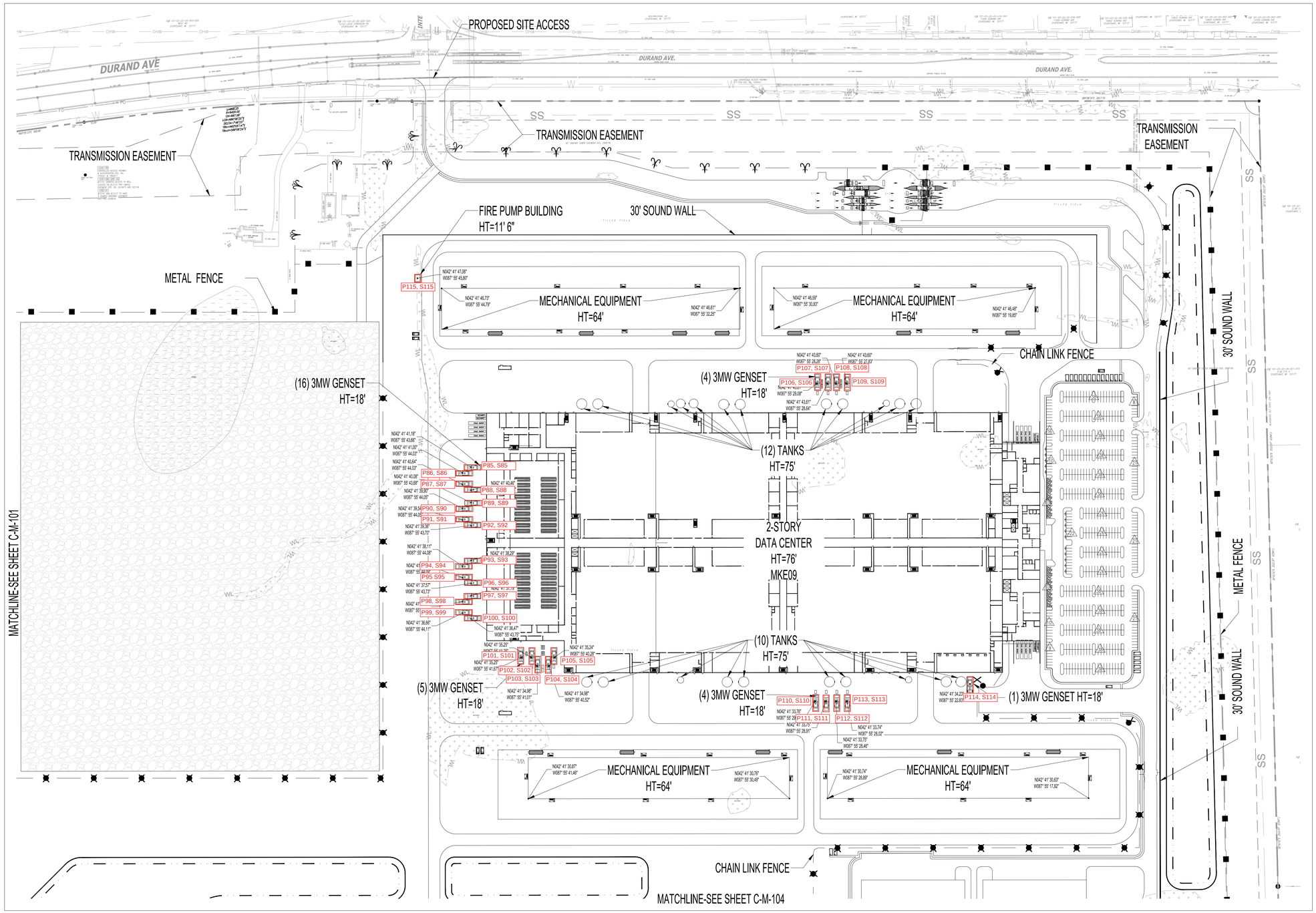
Package
MKE09/11

Sheet Title/Number
CIVIL
AIR PERMIT

C-M-103

CONFIDENTIAL - TRADES SECRET INFORMATION - EXEMPT FROM RELEASE UNDER FOIA
(5 U.S.C. §552 (b)(4)) AND WISCONSIN'S PUBLIC RECORDS LAW (Wis. Stat. §§ 19.31-19.39)

MKE09 SITE MAP



CONFIDENTIAL - TRADES SECRET INFORMATION - EXEMPT FROM RELEASE UNDER FOIA
(5 U.S.C. §552 (b)(4)) AND WISCONSIN'S PUBLIC RECORDS LAW (Wis. Stat. §§ 19.31-19.39)

Dewberry

Dewberry Engineers Inc.
1503 Edwards Ferry Road
Suite 200
Leesburg, VA 20176-6680
703.771.8004

MKE AREA 2

MT. PLEASANT, WISCONSIN

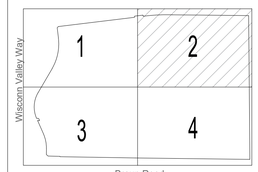
Design	LUDYK ROMAN, MAI-KHANH HUMBLE, NICK COLAVITA, PEYTON STONE,
Drawn	LUDYK ROMAN, MAI-KHANH HUMBLE, NICK COLAVITA, PEYTON STONE, ELLEN LEWIS
Checked	DAVID WEEMS
Date	JULY, 2024

Registration

Sector Key Plan

PLAN

Durand Ave



Revisions

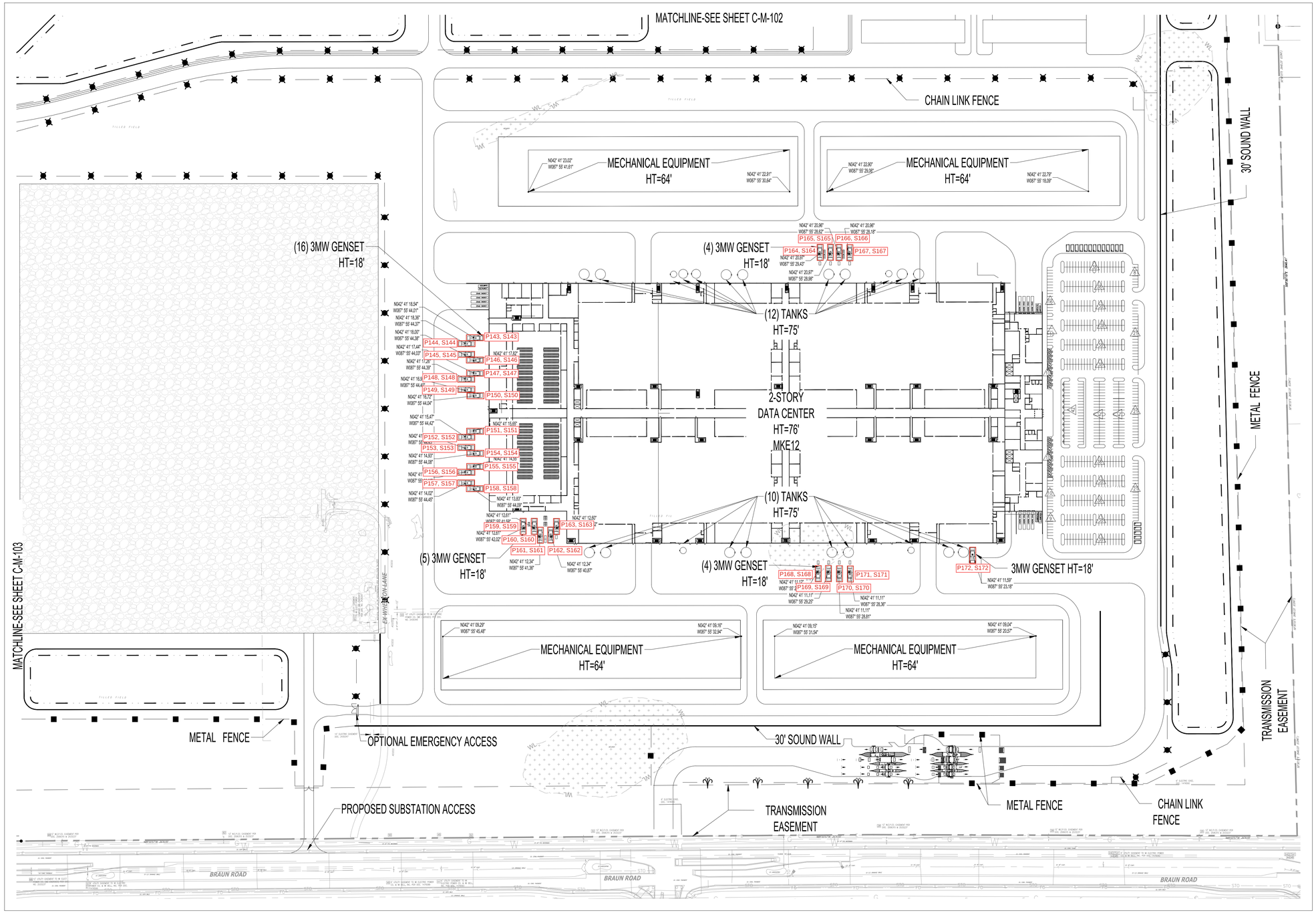
No.	Date	Description

Package
MKE09/11

Sheet Title/Number
CIVIL
AIR PERMIT

C-M-102

MKE12 SITE MAP



0' 50' 100' 150' 300'

SCALE: 1" = 150'

CONFIDENTIAL - TRADES SECRET INFORMATION - EXEMPT FROM RELEASE UNDER FOIA
(5 U.S.C. §552 (b)(4)) AND WISCONSIN'S PUBLIC RECORDS LAW (Wis. Stat. §§ 19.31-19.39)

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703.771.8004

MKE AREA 2

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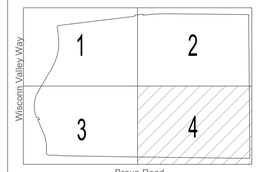
Drawn	LUDYK ROMAN, MAI-KHANH HUMBLE, NICK COLAVITA, PEYTON STONE, ELLEN LEWIS
Checked	DAVID WEEMS
Date	JULY, 2024

Registration

Sector Key Plan

PLAN

Durand Ave



Revisions

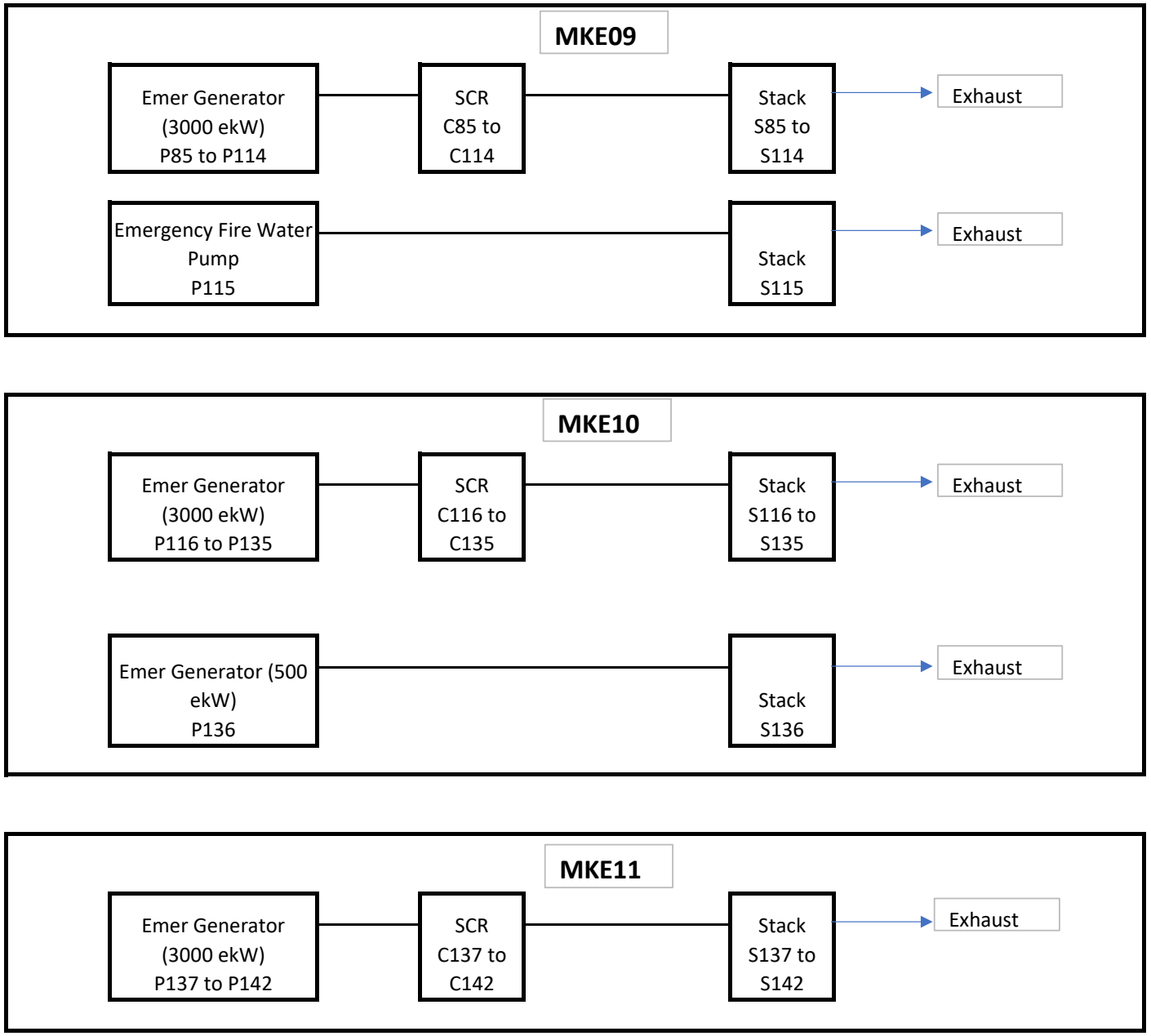
No.	Date	Description

Package
MKE09/11

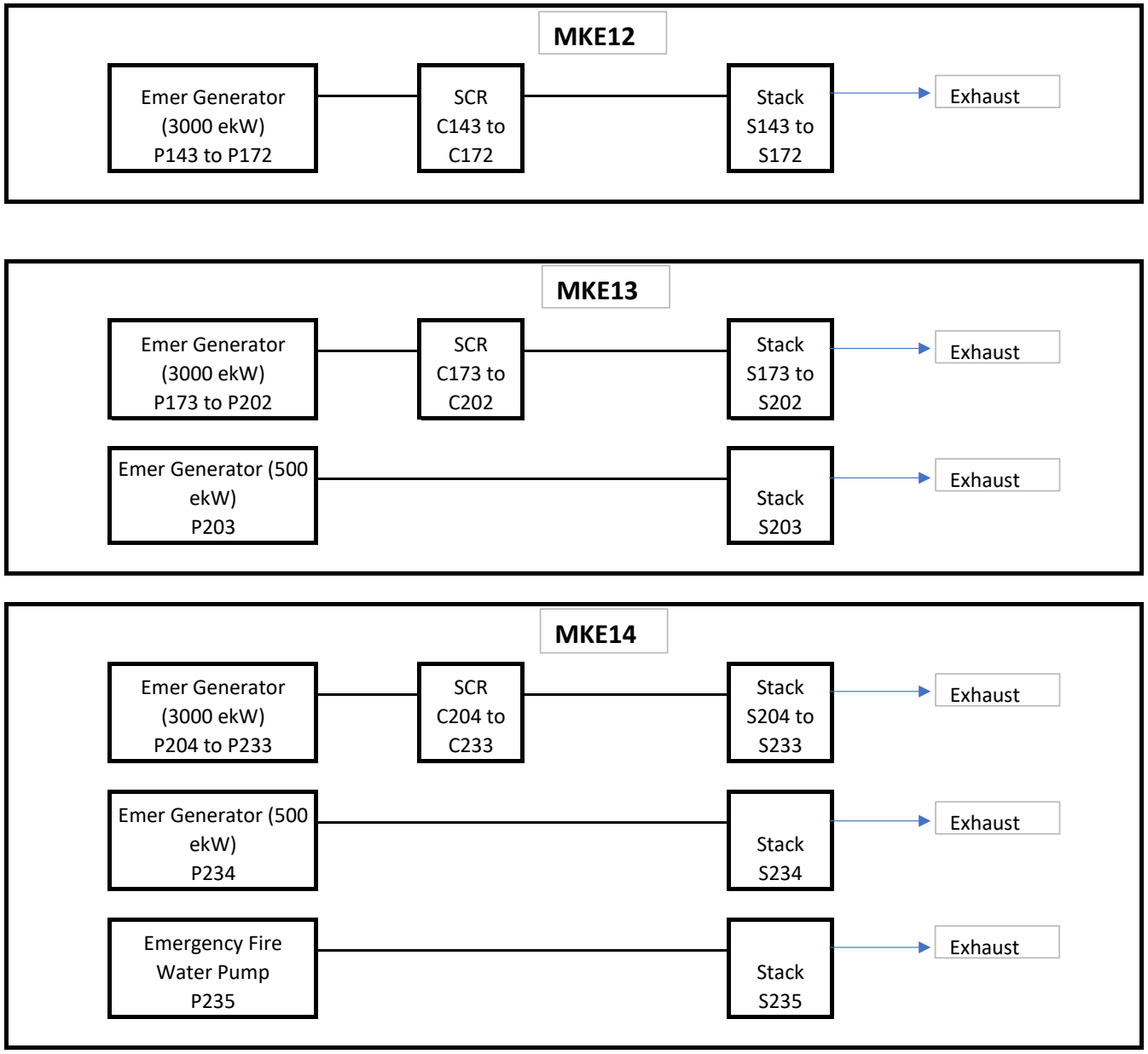
Sheet Title/Number
CIVIL
AIR PERMIT

C-M-104

MKE Area 2 Data Center Process Flow Diagram



MKE Area 2 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 six (6) buildings located in Racine County, Wisconsin. The campus will be comprised of data centers that will utilize internal compression emergency generators to provide emergency backup power. The proposed data center will have one-hundred and forty-six (146) internal compression emergency generators rated at 3000 ekW and three (3) administrative internal compression emergency generators rated at 500 ekW. The campus will also have two (2) emergency firewater pumps rated at 236 ekW.

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 MKE Area 2 Data Center Project will be located on approximately 792 acres north of Braun Road, east of Wisconn Valley Way, west of County Road H, and south of Durand Avenue in Mount Pleasant, Wisconsin. The Data Center will be located in Racine County, which is classified as a "nonattainment" area for Ozone. MKE Area 2 will be located northwest and adjacent to the MKE3A and MKE3B campuses, which will form a single source.

State of Wisconsin
Department of Natural Resources
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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
P85-P114, S85-S114	Emergency Generator	3000 ekW	C85-C114	SCR		New Facility	☐		☐
P115, S115	Emergency Fire Water Pump	236 ekW	N/A	N/A		New Facility	☐		☐
P116-P135, S116-S135	Emergency Generator	3000 ekW	C116-C135	SCR		New Facility	☐		☐
P136, S136	Emergency Generator	500 ekW	N/A	N/A		New Facility	☐		☐
P137-P142, S137-S142	Emergency Generator	3000 ekW	C137-C142	SCR		New Facility	☐		☐
P143-P172, S143-S172	Emergency Generator	3000 ekW	C143-C172	SCR		New Facility	☐		☐
P173-P202,	Emergency Generator	3000 ekW	C173-C202	SCR		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
S173-S202									
P203, S203	Emergency Generator	500 ekW	N/A	N/A		New Facility	☐		☐
P204-P233, S204-S233	Emergency Generator	3000 ekW	C204-C233	SCR		New Facility	☐		☐
P234, S234	Emergency Generator	500 ekW	N/A	N/A		New Facility	☐		☐
P235, S235	Emergency Fire Water Pump	236 ekW	N/A	N/A		New Facility	☐		☐
							☐		☐
							☐		☐
							☐		☐

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 - Area 2 Data Center	252302490	S85-S114, S116-S135, S137-S202, S204-233

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

4530-104 P85-P114, P116- P135, P137-P202, P204-P233 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: 33 (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 - Area 2 Data Center	252302490	S136, S203, S234

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

4530-104	4530-106	4530-107	4530-108	4530-109
P136, P203, P234				

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 - Area 2 Data Center	252302490	S115, S235

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

4530-104 P115, P235 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: 15 (feet)

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

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

9. Exhaust flow rate:

Normal 1513 (ACFM) Maximum 1513 (ACFM)

10. Exhaust gas temperature (normal): 848 (°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 - Area 2 Data Center	252302490
3. Stack identification number:	4. RICE number:
S85-S114, S116-S135, S137-S202, S204-S233	

4a. Unit description:
P85-P114, P116-P135, P137-P202, P204-P233 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 ATTACHED

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
- [x] Diesel
- [ ] Landfill gas
- [ ] Digester gas
- [ ] Gasoline
- [ ] Propane
- [x] Other(s): Renewable Diesel

19. Stationary RICE use:

- [x] 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
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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 - Area 2 Data Center	252302490
3. Stack identification number:	4. RICE number:
S136, S203, S234	

4a. Unit description:
P136, P203, P234 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	500DFEK
8. Site rating (brake horsepower (HP)):	9. Electrical output rating (kW):
755	500 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
- [x] Diesel
- [ ] Landfill gas
- [ ] Digester gas
- [ ] Gasoline
- [ ] Propane
- [x] Other(s): Renewable Diesel

19. Stationary RICE use:

- [x] 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
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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 - Area 2 Data Center	252302490
3. Stack identification number:	4. RICE number:
S115, S236	

4a. Unit description:
P115, P236 Emergency Fire Water Pumps

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:
John Deere	TBD
8. Site rating (brake horsepower (HP)):	9. Electrical output rating (kW):
316	236 ekW
10. Heat input rating (mmBtu/hr):	11. Displacement (in liters/cylinder for CI engines or cc for SI engines):
2.56	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
- [x] Diesel
- [ ] Landfill gas
- [ ] Digester gas
- [ ] Gasoline
- [ ] Propane
- [x] Other(s): Renewable Diesel

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)
- [x] 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 (y/n)

SEE INSTRUCTIONS ON REVERSE SIDE

Section A

1. Facility name: Microsoft Corporation - Area 2 Data Center
2. Facility identification number: 252302490
3. Stack identification number: P85-P114, P116-P135, P137-P202, P204-P233
4. Unit identification number:
5. Control device number: C85-C114, C116-C135, C137-C202, C204-C233
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): 23,220	b. Maximum gas velocity through the device (ft./min):
16a. Type of fuel used: Renewable diesel	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):

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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 - Area 2 Data Center	252302490
3. Stack identification number:	4. Unit identification number:
S85-S235	P85-P235

5. Description of materials used:
Diesel Fuel, Renewable diesel

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 - Area 2 Data Center	252302490

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 - Area 2 Data Center	252302490
3. Stack identification number:	4. Unit identification number:
S85-S235	P85-S235

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 - Area 2 Data Center	252302490

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 - Area 2 Data Center	252302490
3. Stack identification number:	4. Unit identification number:
S85-S235	P85-P235

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	NR419.0		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

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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 - Area 2 Data Center	252302490
3. Stack identification number:	**4.** Unit identification number:
S85-S235	P85-P235

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
MKE Area 2, MKE3A, and MKE3B Data Centers
Load Comparison

Emission Factors: Engine Model 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			159			117			67		
Operating Hours (PTE) per engine (hr/yr)	104			104			104			104		
Estimated Startup Time (hr/year)	8.3			8.3			8.3			8.3		
Number of Engines	224			224			224			224		
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	0.04	0.38	1.83E-03	0.06	0.43	2.68E-03	0.10	0.48	4.12E-03	0.21	0.53	7.91E-03
PM10	0.04	0.38	1.83E-03	0.06	0.43	2.68E-03	0.10	0.48	4.12E-03	0.21	0.53	7.91E-03
SO2	5.43E-03	0.05	2.48E-04	5.43E-03	3.86E-02	2.43E-04	5.43E-03	2.62E-02	2.24E-04	5.43E-03	1.37E-02	2.05E-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	54.13	0.43	96.97
3/4 Standby	4.2	29.86	0.5	3.55	33.42	0.29	65.96
1/2 Standby	3.3	15.90	0.5	2.41	18.30	0.18	40.64
1/4 Standby	3.4	8.58	0.5	1.26	9.84	0.10	21.53

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)*	104			104			104			104		
Estimated Startup Time (hr/year)	8.3			8.3			8.3			8.3		
Number of Engines	1			1			1			1		
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	0.1	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	0.11	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	0.11	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 engine will include SCR after treatment to meet Tier 4 emission standards for NOx. 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)

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	3.95	12.91	0.5	1.63	14.54	0.13	0.13
3/4 Standby	3.87	9.49	0.5	1.23	10.71	0.10	0.10
1/2 Standby	5.20	8.49	0.5	0.82	9.31	0.07	0.07
1/4 Standby	4.17	3.41	0.5	0.41	3.82	0.03	0.03

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/yr)*	104			104			104			104		
Number of Engines	4			4			4			4		
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	0.4	0.49	1.90E-02	0.34	0.28	1.52E-02	0.57	0.25	2.25E-02
PM	0.02	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	0.02	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

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 (Cummins C3000 D6e and 500DFEK)
2. Emission factors for VOC, NOx, CO, PM, PM10 for different loads was obtained from Exhaust Emission Data Sheet (Cummins 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 %
4. PTE for the pollutants in the table above are not greater than the major source threshold

Microsoft Corporation
MKE Area 2, MKE3A, and MKE3B Data Centers
Load Comparison Continued

Emission Factors: John Deere Fire Pump 236 kW			
Engine operation	Full Standby		
Power *(bhp)*	316		
Fuel consumption *(gal/hr)*	18.7		
Operating Hours (PTE) per engine *(hr/yr)*	104		
Number of Engines	2		
Pollutant	***(g/bhp-hr)***	***(lb/hr)***	***(lb/gal)***
VOC	0.07	0.05	2.61E-03
NO_x	2.56	1.78	9.54E-02
CO	0.60	0.42	2.24E-02
PM	0.08	0.06	2.98E-03
PM10	0.08	0.06	2.98E-03
SO2	0.93	0.65	3.46E-02

Emission Factors: John Deere Fire Pump 97 kW			
Engine operation	Full Standby		
Power *(bhp)*	130		
Fuel consumption *(gal/hr)*	6.1		
Operating Hours (PTE) per engine *(hr/yr)*	104		
Number of Engines	4		
Pollutant	***(g/bhp-hr)***	***(lb/hr)***	***(lb/gal)***
VOC	0.35	0.24	1.30E-02
NO_x	3.00	2.09	1.12E-01
CO	0.95	0.66	3.54E-02
PM	0.22	0.15	8.20E-03
PM10	0.22	0.15	8.20E-03
SO2	0.93	0.65	3.46E-02

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	0.019	4,845,568	1.90	45.64
PM	0.008		0.53	19.17
PM10	0.008		0.53	19.17
SO2	0.0002		0.05	0.60
VOC	0.011		0.87	27.38
NOx	---		54.13	96.97

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	0.032	7,509	1.10	0.12
PM	0.007		0.18	0.03
PM10	0.007		0.18	0.03
SO2	0.0003		0.01	0.00
VOC	0.005		0.12	0.02
NOx	---		0.59	0.13

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	0.022	14,435	0.65	0.16
PM	0.004		0.06	0.03
PM10	0.004		0.06	0.03
SO2	0.0003		0.01	0.00
VOC	0.009		0.23	0.07
NOx	0.220		7.37	1.59

Emissions:	**John Deere Fire Pump 236 kW**			
Pollutant	***Maximum Emission Factor***	***Requested Combined Annual Fuel Throughput***	***Maximum Emissions***	
	(lb/gal)	***(gal/yr)***	***(lbs/hr)***	***(tons/yr)***
CO	0.022	2,142	0.42	0.02
PM	0.003		0.06	0.00
PM10	0.003		0.06	0.00
SO2	0.035		0.65	0.04
VOC	0.003		0.05	0.00
NOx	0.095		1.78	0.10

Emissions:	**John Deere Fire Pump 236 kW**			
Pollutant	***Maximum Emission Factor***	***Requested Combined Annual Fuel Throughput***	***Maximum Emissions***	
	(lb/gal)	***(gal/yr)***	***(lbs/hr)***	***(tons/yr)***
CO	0.035	2,538	0.66	0.04
PM	0.008		0.15	0.01
PM10	0.008		0.15	0.01
SO2	0.035		0.65	0.04
VOC	0.013		0.24	0.02
NOx	0.112		2.09	0.14

Total Emissions (Using Worst Case Emission Factors)	
Criteria Pollutants	**Project PTE**
	TPY
CO	46.0
NO_x	98.9
PM_{10}	19.2
$PM_{2.5}$	19.2
SO_2	0.7
VOC	27.5

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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	435.1	108.78	435.1	22.6
NO_x	11,112.0	2,778.00	1,101.9	99.0
PM_{10}	86.0	21.44	86.0	4.5
$PM_{2.5}$	86.0	21.46	86.0	4.5
SO_2	11.8	2.95	11.6	0.6
VOC	151.4	37.86	151.4	7.9
Methane	1,061.2	265.30	1,061.2	55.2
CO_2	1,046,498	261,567	1,046,498	54,418
N_2O	2,530	632	2,530	132
CO_{2e}	1,050,089	262,522	1,050,089	54,605

Project Design	**3MW**	**1MW**	**0.5MW**	**316 HP Fire Pumps**	**130 HP Fire Pumps**
MKE 3B	39	0	1	0	2
MKE 16/17	39	1	0	0	2
MKE Area 2	146	0	3	2	0

Project Design	**3MW**	**1MW**	**0.5MW**	**316 HP Fire Pumps**	**130 HP Fire Pumps**
Diesel Tier 4 Equivalent	224	1	---	---	---
Diesel Tier 2	0	---	4	2	4

Available Operating Hours	104

	Form 4530-127								
	Project PTE			Project Limited PTE			NR 445 Compliant? (Yes/No)	Thresholds	
Hazardous Air Pollutants (HAP)	lbs/hr	TPY	lb/yr	lbs/hr	TPY	lb/yr		lb/hr	lb/yr
Benzene	4.980	1.245	2490.2	4.980	0.259	518.0	Yes	---	936
Toluene	1.804	0.451	901.9	1.804	0.094	187.6	Yes	39.3	292,000
Xylenes	1.239	0.310	619.5	1.239	0.064	128.9	Yes	90.6	---
Formaldehyde	0.512	0.128	255.9	0.512	0.027	53.2	Yes	---	562
Acetaldehyde	0.165	0.041	82.7	0.165	0.009	17.2	Yes	10.7	3,318
Acrolein	0.051	0.013	25.5	0.051	0.0027	5.3	Yes	0.0545	---
1,3 Butadiene	0.00020	0.00005	0.098	0.0002	0.00001	0.020	N/A	---	---
Naphthalene	0.834	0.208	417.0	0.834	0.043	86.7	Yes	10.9	---
POM/PAH (w/Naphthalene)	1.360	0.340	680.1	1.360	0.071	141.5			
SHAP - Benzene	4.980	1.245	2490.2	4.980	0.259	518.0			
Total HAPs	9.586	2.396	4792.8	9.586	0.498	996.9			

Microsoft Corporation
MKE Area 2, MKE3A, and MKE3B Data Centers
Form 4530-128, Units P01-P39, P43-P81, P85-P114, P116-P135, P137-P202, P204-P233

Diesel-Fired Emergency Generator Emissions - Aggregated
Cummins C3000 D6e (3,000 ekW)

Project Design	**224**	engines	
	3,212.5	kW per engine	
	719,600	kW 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 C3000 D6e (3,000 ekW)
Maximum Operating Hours[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:	**4,845,568**	**gallon/yr**	**403,797 gallons per month on a 12-month rolling average basis**
Operating Hours (PTE) per engine	104	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 (PTE)							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 Controlled Emissions	10 minutes Uncontrolled Emissions	Total	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	(lb/hr)	(lb/hr)	(lb/hr)	tons/year	tons/year
CO	0.20	g/hp-hr	1	1.90	0.47	425.48	106.37	0.20	g/hp-hr	1	1.90	0.09	425.48	20.35	354.6	70.91	425.5	1.77	22.13
NO_x	5.20	g/hp-hr	1	49.39	12.35	11,063	2,766	0.50	g/hp-hr	3	4.75	0.23	1063.7	50.9	886.4	1,844	2,730	46.09	96.97
PM_{10}	0.04	g/hp-hr	1	0.38	0.09	85.10	21.27	0.04	g/hp-hr	1	0.38	0.02	85.10	4.07	70.91	14.18	85.10	0.35	4.43
$PM_{2.5}$	0.04	g/hp-hr	1	0.38	0.09	85.10	21.27	0.04	g/hp-hr	1	0.38	0.02	85.10	4.07	70.91	14.18	85.10	0.35	4.43
SO_2	0.006	g/hp-hr	4	0.05	0.01	11.71	2.93	0.01	g/hp-hr	4	0.05	0.00	11.55	0.55	9.62	1.95	11.58	0.05	0.60
VOC	0.07	g/hp-hr	1	0.66	0.17	148.92	37.23	0.07	g/hp-hr	1	0.66	0.03	148.92	7.12	124.1	24.82	148.9	0.62	7.74
Methane	0.165	lb/MMBtu	2	4.71	1.18	1,055	264	0.17	lb/MMBtu	2	4.71	0.23	1,055	50	879.5	175.9	1,055	4.40	54.88
CO_2	163.05	lb/MMBtu	2	4,646	1,162	1,040,779	260,195	163.05	lb/MMBtu	2	4,646	222.2	1,040,779	49,784	867,316	173,463	1,040,779	4,337	54,121
N_2O	0.39	lb/MMBtu	2	11.23	2.81	2516	629	0.39	lb/MMBtu	2	11.23	0.54	2,516	120	2,097	419.4	2,516	10.48	130.8
CO_{2e}				4,662	1,166	1,044,351	261,088				4,662	223.0	1,044,351	49,955	870,292	174,058	1,044,351	4,351	54,306

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:
3) Tier 4 emission standards - Engines above 560 kW, 40 CFR Part 1039 (post SCR treatment expected exhaust emissions)
4) SOx 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

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

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
MKE Area 2, MKE3A, and MKE3B Data Centers
Form 4530-126, Units P01-P39, P43-P81, P85-P114, P116-P135, P137-P202, P204-P233

Diesel-Fired Emergency Generator Emissions - Aggregated
Cummins C3000 D6e (3,000 ekW)

Project Design

224	engines	
3,212.5	kW per engine	
719,600	kW design capacity for project	

Maximum Power	4,308	bhp ea.	28.50 MMBtu/hr ea.
Maximum Fuel Input	0.208	1000 gal/hr	Cummins C3000 D6e (3,000 ekW)
Maximum Operating Hours[3]	500	hours/year	

Requested Permit Fuel Usage Limit:	**4,845,568**	**gallons/yr**	**403,797**	**gallons per month on a 12-month rolling average basis**
Operating Hours (PTE) per engine	104	hours/year		

Hazardous Air Pollutant Operating Emissions

				Form 4530-126 Maximum Theoretical Emissions					Form 4530-126 Limited Operation Emissions (PTE)				
				PTE Single Engine		PTE All Engines			PTE Single Engine		PTE All Engines		
Pollutant	Emission Factor		Reference	lbs/hour	tons/year	lbs/hour	tons/year	lb/yr	lbs/hour	tons/year	lbs/hour	tons/year	lb/yr
Benzene	7.76E-04	lb/MMBtu	1	0.022	0.006	4.95	1.24	2,476.6	0.022	0.001	4.95	0.26	515.1
Toluene	2.81E-04	lb/MMBtu	1	0.008	0.002	1.79	0.45	896.8	0.008	0.000	1.79	0.09	186.5
Xylenes	1.93E-04	lb/MMBtu	1	0.005	0.001	1.23	0.31	616.0	0.005	0.000	1.23	0.06	128.1
Formaldehyde	7.89E-05	lb/MMBtu	1	0.002	0.001	0.50	0.13	251.8	0.002	0.000	0.50	0.03	52.4
Acetaldehyde	2.52E-05	lb/MMBtu	1	0.001	0.000	0.16	0.04	80.4	0.001	0.000	0.16	0.01	16.7
Acrolein	7.88E-06	lb/MMBtu	1	0.000	0.000	0.05	0.01	25.1	0.000	0.000	0.05	0.00	5.2
Naphthalene	1.30E-04	lb/MMBtu	1	0.004	0.001	0.83	0.21	414.9	0.004	0.000	0.83	0.04	86.3
POM/PAH (w/Naphthalene)	2.12E-04	lb/MMBtu	1	0.006	0.002	1.35	0.34	676.6	0.006	0.000	1.35	0.07	140.7
Total Federal HAPs				0.04	0.01	10.05	2.51	5,023.4	0.04	0.002	10.05	0.52	1,044.9
Maximum Single Federal HAP (Benzene)				0.02	0.01	4.95	1.24	2,476.6	0.05	0.003	10.88	0.57	1,131.2

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 renewable diesel. A statement from the vendor states that emissions from engines running on renewable diesel 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 renewable diesel 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.

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)

Microsoft Corporation
MKE Area 2, MKE3A, and MKE3B Data Centers
Form 4530-128, Units P82

Diesel-Fired Emergency Generator Emissions - Aggregated
Cummins 1000DQFAD

Project Design

1	engines	Total number of engines for MKE Area 2, MKE3B and MKE 16-17
1,105	kW per engine	
1,105	kW 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
Maximum Operating Hours[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:	**7,509 gallon/yr**	**626 gallons per month on a 12-month rolling average basis**
Operating Hours (PTE) per engine	104 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 (PTE)							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 Controlled Emissions	10 minutes Uncontrolled Emissions	Total	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	(lb/hr)	(lb/hr)	(lb/hr)	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	0.10	2.16	0.10	1.80	0.36	2.16	0.01	0.11
NO_x	3.95	g/hp-hr	1	12.91	3.23	12.91	3.23	0.50	g/hp-hr	3	1.63	0.08	1.63	0.08	1.36	2.15	3.51	0.05	0.13
PM_{10}	0.11	g/hp-hr	1	0.36	0.09	0.36	0.09	0.11	g/hp-hr	1	0.36	0.02	0.36	0.02	0.30	0.06	0.36	0.00	0.02
$PM_{2.5}$	0.11	g/hp-hr	1	0.36	0.09	0.36	0.09	0.11	g/hp-hr	1	0.36	0.02	0.36	0.02	0.30	0.06	0.36	0.00	0.02
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	0.01	0.23	0.01	0.19	0.04	0.23	0.00	0.01
GHGs:																			
CH_4	0.165	lb/MMBtu	2	1.64	0.41	1.64	0.41	0.165	lb/MMBtu	2	1.64	0.08	1.64	0.08	1.36	0.27	1.64	0.01	0.09
CO_2	163.05	lb/MMBtu	2	1,613	403.20	1,613	403.20	163.05	lb/MMBtu	2	1,613	77.15	1,613	77.15	1,344	268.80	1,613	6.72	83.87
N_2O	0.39	lb/MMBtu	2	3.90	0.97	3.90	0.97	0.39	lb/MMBtu	2	3.90	0.19	3.90	0.19	3.25	0.65	3.90	0.02	0.20
CO_{2e}				1,618	405	1,618	405				1,618	77	1,618	77	1,348.62	269.72	1,618.35	6.74	84.15

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
MKE Area 2, MKE3A, and MKE3B Data Centers
Form 4530-126, Units P82

Diesel-Fired Emergency Generator Emissions - Aggregated
Cummins 1000DQFAD

Project Design

1	engine	
1,105	kW per engine	
1,105	kW design capacity for project	

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

Requested Permit Fuel Usage Limit:	**7,509**	**gallons/yr**	**626**	**gallons per month on a 12-month rolling average basis**
Operating Hours (PTE)	104	hours/year		

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		
Pollutant	Emission Factor		Reference	lbs/hour	tons/year	lbs/hour	tons/year	lb/yr	lbs/hour	tons/year	lbs/hour	tons/year	lb/yr
Benzene	7.76E-04	lb/MMBtu	1	0.008	0.002	0.008	0.002	3.84	0.008	0.000	0.008	0.000	0.80
Toluene	2.81E-04	lb/MMBtu	1	0.003	0.001	0.003	0.001	1.39	0.003	0.000	0.003	0.000	0.29
Xylenes	1.93E-04	lb/MMBtu	1	0.002	0.000	0.002	0.000	0.95	0.002	0.000	0.002	0.000	0.20
Formaldehyde	7.89E-05	lb/MMBtu	1	0.001	0.000	0.001	0.000	0.39	0.001	0.000	0.001	0.000	0.08
Acetaldehyde	2.52E-05	lb/MMBtu	1	0.000	0.000	0.000	0.000	0.12	0.000	0.000	0.000	0.000	0.03
Acrolein	7.88E-06	lb/MMBtu	1	0.000	0.000	0.000	0.000	0.04	0.000	0.000	0.000	0.000	0.01
Naphthalene	1.30E-04	lb/MMBtu	1	0.001	0.000	0.001	0.000	0.64	0.001	0.000	0.001	0.000	0.13
POM/PAH (w/Naphthalene)	2.12E-04	lb/MMBtu	1	0.002	0.001	0.002	0.001	1.05	0.002	0.000	0.002	0.000	0.22
Total Federal HAPs				0.016	0.004	0.016	0.004	7.78	0.016	0.001	0.016	0.0008	1.62
Maximum Single Federal HAP (Benzene)				0.008	0.002	0.008	0.002	3.84	0.008	0.000	0.008	0.0004	0.80

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 renewable diesel. A statement from the vendor states that emissions from engines running on renewable diesel 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 renewable diesel 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
MKE Area 2, MKE3A, and MKE3B Data Centers
Form 4530-128, Units P40, P136, P203, and P234

Diesel-Fired Emergency Generator Emissions - Aggregated
Cummins 500DFEK 500ekW Emergency Diesel Generator

Project Design	**4**	engine	
	563	kW per engine (500 ekW)	
	2252	kW 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 500DFEK
Maximum Operating Hours for an Emergency Engine[6]	500	hours/year	
Requested Permit Fuel Usage Limit:	**14,435**	**gallons/yr**	**1,203 gallons per month on a 12-month rolling average basis**
Limited Operating Hours (PTE)	104	hours/year	

Criteria Pollutant Operating Emissions for Engine

	Form 4530-128 Maximum Theoretical Emissions (MTE)							Form 4530-128 Limited Operation Emissions (PTE)						
				Potential to Emit Single Engine		Potential to Emit All Engines					Limited Emissions Single Engine		Limited Emissions 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	2.60	0.65	0.39	g/hp-hr	1	0.65	0.03	2.60	0.14
NO_x	4.43	g/hp-hr	1	7.37	1.84	29.49	7.37	4.43	g/hp-hr	1	7.37	0.38	29.49	1.53
PM_{10}	0.02	g/hp-hr	1	0.03	0.01	0.13	0.03	0.02	g/hp-hr	1	0.03	0.00	0.13	0.007
$PM_{2.5}$	0.02	g/hp-hr	1	0.03	0.01	0.13	0.03	0.02	g/hp-hr	1	0.03	0.00	0.13	0.007
SO_2	0.006	g/hp-hr	3	0.01	0.00	0.04	0.01	0.01	g/hp-hr	3	0.01	0.00	0.04	0.002
VOC	0.14	g/hp-hr	1	0.23	0.06	0.93	0.23	0.14	g/hp-hr	1	0.23	0.01	0.93	0.05
GHGs:														
Methane	0.165	lb/MMBtu	2	0.79	0.20	3.14	0.79	0.165	lb/MMBtu	2	0.79	0.04	3.14	0.16
CO_2	163.052	lb/MMBtu	2	775	194	3101	775	163.052	lb/MMBtu	2	775	40.31	3101	161
N_2O	3.94E-01	lb/MMBtu	2	1.87	0.47	7.50	1.87	3.94E-01	lb/MMBtu	3	1.87	0.10	7	0.39
CO_2e				778	194	3,111	778				778	40.45	3,111	162

Notes:
1) Cummins Exhaust Emission Data, EPA Tier 2. (Full Standby) for 500DFEK. For NOx fraction in the NOx + NMHC, used 0.95 factor (TCEQ)
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 factor: 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 potential emissions are based on 500 hours per year.

Microsoft Corporation
MKE Area 2, MKE3A, and MKE3B Data Centers
Form 4530-126, Units P40, P136, P203, and P234

Diesel-Fired Emergency Generator Emissions - Aggregated
Cummins 500DFEK 500ekW Emergency Diesel Generator

Project Design

4	engine	
563	kW per engine (500 ekW)	
2252	kW design capacity for project	

Maximum Power	755	bhp ea.	4.75 MMBtu/hr ea.
Maximum Fuel Input	0.035	1000 gal/hr	Cummins 500DFEK
Maximum Operating Hours for an Emergency Engine[3]	500	hours/year	

Requested Permit Fuel Usage Limit:	**14,435**	**gallons/yr**	**1,203 gallons per month on a 12-month rolling average basis**
Limited Operating Hours (PTE)	104	hours/year	

Hazardous Air Pollutant Operating Emissions

				Form 4530-126 Maximum Theoretical Emissions (PTE)					Form 4530-126 Limited Operation Emissions (PTE)				
				Potential to Emit Single Engine		Potential to Emit All Engines			Potential to Emit Single Engine		Potential to Emit All Engines		
Pollutant	Emission Factor		Reference	lbs/hour	tons/year	lbs/hour	tons/year	lb/yr	lbs/hour	tons/year	lbs/hour	tons/year	lb/yr
Benzene	7.76E-04	lb/MMBtu	1	0.004	0.001	0.015	0.004	7.38	0.004	0.000	0.015	0.001	1.53
Toluene	2.81E-04	lb/MMBtu	1	0.001	0.000	0.005	0.001	2.67	0.001	0.000	0.005	0.000	0.56
Xylenes	1.93E-04	lb/MMBtu	1	0.001	0.000	0.004	0.001	1.84	0.001	0.000	0.004	0.000	0.38
Formaldehyde	7.89E-05	lb/MMBtu	1	0.000	0.000	0.002	0.000	0.75	0.000	0.000	0.002	0.000	0.16
Acetaldehyde	2.52E-05	lb/MMBtu	1	0.000	0.000	0.000	0.000	0.24	0.000	0.000	0.000	0.000	0.05
Acrolein	7.88E-06	lb/MMBtu	1	0.000	0.000	0.000	0.000	0.07	0.000	0.000	0.000	0.000	0.02
Naphthalene	1.30E-04	lb/MMBtu	1	0.001	0.000	0.002	0.001	1.24	0.001	0.000	0.002	0.000	0.26
POM/PAH (w/Naphthalene)	2.12E-04	lb/MMBtu	1	0.001	0.000	0.004	0.001	2.01	0.001	0.000	0.004	0.000	0.42
Total Federal HAPs				0.007	0.002	0.030	0.007	14.96	0.007	0.000	0.030	0.002	3.11
Maximum Single Federal HAP (Benzene)				0.004	0.001	0.015	0.004	7.38	0.004	0.000	0.015	0.001	1.53

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 renewable diesel. A statement from the vendor states that emissions from engines running on renewable diesel 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 renewable diesel 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 (Bosch)	0.52	0.44	0.42	0.21	0.20

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

Microsoft Corporation
MKE Area 2, MKE3A, and MKE3B Data Centers
Form 4530-128, Units P115 and P235

Diesel-Fired Fire Pump Emissions - Aggregated
John Deere [JU6H-UFADP0]

Project Design

2	engines (MKE09 and MKE14)	
236	kw per engine	
472	kw design capacity for project	

Maximum Power	316	bhp per engine	1.41 MMBtu/hr
Maximum Fuel Input	0.010	1000 gal/hr per engine	
Operating Hours (MTE)[5]	500	hours/year	

Requested Permit Fuel Usage Limit:	**2,142**	**gallons/yr**	**179**	**gallons per month on a 12-month rolling average basis**
Operating Hours (PTE) per engine	104	hours/year		

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	0.60	g/hp-hr	1	0.85	0.21	1.7	0.42	0.85	0.04	1.7	0.09
NO_x	2.56	g/hp-hr	1	1.79	0.45	3.6	0.89	1.79	0.09	3.6	0.19
PM_{10}	0.08	g/hp-hr	1	0.06	0.01	0.11	0.03	0.06	0.00	0.1	0.01
$PM_{2.5}$	0.08	g/hp-hr	1	0.06	0.01	0.11	0.03	0.06	0.00	0.1	0.01
SO_2	0.006	lb/MMBtu	3	0.01	0.00	0.02	0.00	0.01	0.00	0.0	0.00
VOC	0.07	lb/MMBtu	1	0.10	0.02	0.20	0.05	0.10	0.01	0.2	0.01
GHGs:											
CH_4	0.165	lb/MMBtu	4	0.23	0.06	0.47	0.12	0.23	0.01	0.5	0.02
CO_2	163.05	lb/MMBtu	4	230	58	460	115.04	230	11.96	460.2	23.93
N_2O	0.39	lb/MMBtu	4	0.56	0.14	1.11	0.28	0.56	0.03	1.1	0.06
CO_{2e}				231	58	462	115	231	12.01	461.7	24.01

Notes:

1) John Deere Exhaust Emission Data, OEM (Clarke Fire Pump-Emergency)

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
MKE Area 2, MKE3A, and MKE3B Data Centers
Form 4530-126, Units P115 and P235

Diesel-Fired Fire Pump Emissions - Aggregated
John Deere [JU6H-UFADP0]

Project Design

2	engines (MKE09 and MKE14)	
236	kw per engine	
472	kw design capacity for project	

Maximum Power	316	bhp ea.	0.84	MMBtu/hr ea.
Maximum Heat Input	0.010	1000 gal/hr		
Operating Hours (MTE)[2]	500	hours/year		

Requested Permit Fuel Usage Limit:	**2,142**	**gallons/yr**	**179**	**gallons per month on a 12-month rolling average basis**
Operating Hours (PTE)	104	hours/year		

Hazardous Air Pollutant Operating Emissions

				Form 4530-126					Form 4530-126				
				Maximum Theoretical Emissions (MTE)					Limited Operation Emissions (PTE)				
				Single Engine		All Engines			Single Engine		All Engines		
Pollutant	Emission Factor		Reference	lbs/hour	tons/year	lbs/hour	tons/year	lb/yr	lbs/hour	tons/year	lbs/hour	tons/year	lb/yr
Benzene	9.33E-04	lb/MMBtu	1	0.001	0.000	0.002	0.000	0.78	0.001	0.000	0.002	0.000	0.16
Toluene	4.09E-04	lb/MMBtu	1	0.000	0.000	0.001	0.000	0.34	0.000	0.000	0.001	0.000	0.07
Xylenes	2.85E-04	lb/MMBtu	1	0.000	0.000	0.000	0.000	0.24	0.000	0.000	0.000	0.000	0.05
Formaldehyde	1.18E-03	lb/MMBtu	1	0.001	0.000	0.002	0.000	0.99	0.001	0.000	0.002	0.000	0.21
Acetaldehyde	7.67E-04	lb/MMBtu	1	0.001	0.000	0.001	0.000	0.64	0.001	0.000	0.001	0.000	0.13
Acrolein	9.25E-05	lb/MMBtu	1	0.000	0.000	0.000	0.000	0.08	0.000	0.000	0.000	0.000	0.02
1,3-Butadiene	3.91E-05	lb/MMBtu	1	0.000	0.000	0.000	0.000	0.03	0.000	0.000	0.000	0.000	0.01
Naphthalene	8.48E-05	lb/MMBtu	1	0.000	0.000	0.000	0.000	0.07	0.000	0.000	0.000	0.000	0.01
POM/PAH (w/Naphthalene)	1.68E-04	lb/MMBtu	1	0.000	0.000	0.000	0.000	0.14	0.000	0.000	0.000	0.000	0.03
Total Federal HAPs				0.003	0.001	0.006	0.002	3.24	0.003	0.000	0.006	0.000	0.67
Maximum Single Federal HAP (Formaldehyde)				0.001	0.000	0.002	0.000	0.99	0.001	0.000	0.002	0.000	0.21

Notes:
1) Emission Factors from US EPA AP-42 Table 3.3-2 (Oct 1996). The fuel intended to be used in the engines will be renewable diesel. A statement from the vendor states that emissions from engines running on renewable diesel 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 renewable diesel 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.

Rating Specific Emissions Data - John Deere Power Systems

JOHN DEERE

Rating Data

Rating	6068HFC48B	
Certified Power(kW)	236	
Rated Speed	2400	
Vehicle Model Number	OEM (Clarke Fire Pump-Emergency)	
Units	g/kW-hr	g/hp-hr
NOx	3.43	2.56
HC	0.09	0.07
NOx + HC	N/A	N/A
Pm	0.11	0.08
CO	0.8	0.6

Certificate Data

Engine Model Year	2024
EPA Family Name	RJDXL13.5103
EPA JD Name	650HAA
EPA Certificate Number	RJDXL13.5103-008
CARB Executive Order	
Parent of Family	6135HF485A
Units	g/kW-hr
NOx	3.31
HC	0.11
NOx + HC	N/A
Pm	0.10
CO	0.6

* The emission data listed is measured from a laboratory test engine according to the test procedures of 40 CFR 89 or 40 CFR 1039, as applicable. The test engine is intended to represent nominal production hardware, and we do not guarantee that every production engine will have identical test results. The family parent data represents multiple ratings and this data may have been collected at a different engine speed and load. Emission results may vary due to engine manufacturing tolerances, engine operating conditions, fuels used, or other conditions beyond our control.

Microsoft Corporation
MKE Area 2, MKE3A, and MKE3B Data Centers
Form 4530-128, Units P41, P42, P83, P84

Diesel-Fired Fire Pump Emissions - Aggregated
TBD

Project Design

4 engines (1 engine per building at MKE03, MKE04, MKE16, and MKE17)
97 kw per engine
388 kw 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:	**2,538**	**gallons/yr**	**211 gallons per month on a 12-month rolling average basis**
Operating Hours (PTE) per engine	104	hours/year	

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	0.04	3.2	0.17
NO_x	3.00	g/hp-hr	1	0.86	0.22	3.4	0.86	0.86	0.04	3.4	0.18
PM_{10}	0.22	g/hp-hr	1	0.06	0.02	0.25	0.06	0.06	0.00	0.3	0.01
$PM_{2.5}$	0.22	g/hp-hr	1	0.06	0.02	0.25	0.06	0.06	0.00	0.3	0.01
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	0.02	1.2	0.06
GHGs:											
CH_4	0.165	lb/MMBtu	4	0.14	0.03	0.55	0.14	0.14	0.01	0.6	0.03
CO_2	163.05	lb/MMBtu	4	136	34	545	136.26	136	7.09	545.0	28.34
N_2O	0.39	lb/MMBtu	4	0.33	0.08	1.32	0.33	0.33	0.02	1.3	0.07
CO_{2e}				137	34	547	137	137	7.11	546.9	28.44

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
MKE Area 2, MKE3A, and MKE3B Data Centers
Form 4530-126, Units P41, P42, P83, P84

Diesel-Fired Fire Pump Emissions - Aggregated
TBD

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:	**2,538**	**gallons/yr**	**211**	**gallons per month on a 12-month rolling average basis**
Operating Hours (PTE)	104	hours/year		

Hazardous Air Pollutant Operating Emissions

				Form 4530-126					Form 4530-126				
				Maximum Theoretical Emissions (MTE)					Limited Operation Emissions (PTE)				
				Single Engine		All Engines			Single Engine		All Engines		
Pollutant	Emission Factor		Reference	lbs/hour	tons/year	lbs/hour	tons/year	lb/yr	lbs/hour	tons/year	lbs/hour	tons/year	lb/yr
Benzene	9.33E-04	lb/MMBtu	1	0.001	0.000	0.003	0.001	1.56	0.001	0.000	0.003	0.000	0.32
Toluene	4.09E-04	lb/MMBtu	1	0.000	0.000	0.001	0.000	0.68	0.000	0.000	0.001	0.000	0.14
Xylenes	2.85E-04	lb/MMBtu	1	0.000	0.000	0.001	0.000	0.48	0.000	0.000	0.001	0.000	0.10
Formaldehyde	1.18E-03	lb/MMBtu	1	0.001	0.000	0.004	0.001	1.97	0.001	0.000	0.004	0.000	0.41
Acetaldehyde	7.67E-04	lb/MMBtu	1	0.001	0.000	0.003	0.001	1.28	0.001	0.000	0.003	0.000	0.27
Acrolein	9.25E-05	lb/MMBtu	1	0.000	0.000	0.000	0.000	0.15	0.000	0.000	0.000	0.000	0.03
1,3-Butadiene	3.91E-05	lb/MMBtu	1	0.000	0.000	0.000	0.000	0.07	0.000	0.000	0.000	0.000	0.01
Naphthalene	8.48E-05	lb/MMBtu	1	0.000	0.000	0.000	0.000	0.14	0.000	0.000	0.000	0.000	0.03
POM/PAH (w/Naphthalene)	1.68E-04	lb/MMBtu	1	0.000	0.000	0.001	0.000	0.28	0.000	0.000	0.001	0.000	0.06
Total Federal HAPs				0.003	0.001	0.013	0.003	6.4743	0.003	0.000	0.013	0.001	1.35
Maximum Single Federal HAP (Formaldehyde)				0.001	0.000	0.004	0.001	1.9723	0.001	0.000	0.004	0.0002	0.41

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 renewable diesel. A statement from the vendor states that emissions from engines running on renewable diesel 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 renewable diesel 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.

Appendix C

HIGHLIGHTED NESHAP ZZZZ AND NSPS IIII

This content is from the eCFR and is authoritative but unofficial.

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 Part 60, Subpart IIII
Applicable to 3MW and 500 kW Emergency Generators at MKE Area 2

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

What This Subpart Covers
§ 60.4200 Am I subject to this subpart?
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?
§ 60.4202 What emission standards must I meet for emergency engines if I am a stationary CI internal combustion engine manufacturer?
§ 60.4203 How long must my engines meet the emission standards if I am a manufacturer of stationary CI internal combustion engines?
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?
§ 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?
§ 60.4206 How long must I meet the emission standards if I am an owner or operator of a stationary CI internal combustion engine?
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?
Other Requirements for Owners and Operators
§ 60.4208 What is the deadline for importing or installing stationary CI ICE produced in previous model years?
§ 60.4209 What are the monitoring requirements if I am an owner or operator of a stationary CI internal combustion engine?
Compliance Requirements
§ 60.4210 What are my compliance requirements if I am a stationary CI internal combustion engine manufacturer?
§ 60.4211 What are my compliance requirements if I am an owner or operator of a stationary CI internal combustion engine?
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?
§ 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?
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?

Special Requirements

§ 60.4215 What requirements must I meet for engines used in Guam, American Samoa, or the Commonwealth of the Northern Mariana Islands?

§ 60.4216 What requirements must I meet for engines used in Alaska?

§ 60.4217 What emission standards must I meet if I am an owner or operator of a stationary internal combustion engine using special fuels?

General Provisions

§ 60.4218 What General Provisions and confidential information provisions apply to me?

Definitions

§ 60.4219 What definitions apply to this subpart?

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

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

Table 3 to Subpart IIII of Part 60

Certification Requirements for Stationary Fire Pump Engines

Table 4 to Subpart IIII of Part 60

Emission Standards for Stationary Fire Pump Engines

Table 5 to Subpart IIII of Part 60

Labeling and Recordkeeping Requirements for New Stationary Emergency Engines

Table 6 to Subpart IIII of Part 60

Optional 3-Mode Test Cycle for Stationary Fire Pump Engines

Table 7 to Subpart IIII of Part 60

Requirements for Performance Tests for Stationary CI ICE With a Displacement of ≥30 Liters per Cylinder

Table 8 to Subpart IIII of Part 60

Applicability of General Provisions to Subpart IIII

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:

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

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:

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

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)
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	2009

[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.*

Engine power	Starting model year engine manufacturers must certify new stationary fire pump engines according to § 60.4202(d)[1]
(175≤HP≤750)	
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)
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)

[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.

Maximum engine power	Model year(s)	NMHC + NO_X	CO	PM
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';

Each	Complying with the requirement to	You must	Using	According to the following requirements
				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.
		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	i. Select the sampling port location and number/ location of		(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

Each	Complying with the requirement to	You must	Using	According to the following requirements
	combustion engine exhaust.	traverse points at the exhaust of the stationary internal combustion engine;		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 concentration of the stationary internal combustion engine exhaust at the sampling port location;	(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 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	(3) Method 7E of 40 CFR	(d) NO_X concentration must be at 15 percent O_2, dry basis. Results of this

Each	Complying with the requirement to	You must	Using	According to the following requirements
		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.	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)	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 points;	(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.
		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.

Each	Complying with the requirement to	You must	Using	According to the following requirements
	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 content of the stationary internal combustion engine exhaust at the sampling port location; and	(3) Method 4 of 40 CFR part 60, appendix A-3	(c) Measurements to determine moisture content must be made at the same time as the measurements for PM concentration.
		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	
§ 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	Yes	

General Provisions citation	Subject of citation	Applies to subpart	Explanation
	and reporting requirements		

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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 Part 60, Subpart IIII
Applicable to Emergency Fire Pumps at MKE Area 2

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

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Fuel Requirements for Owners and Operators
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§ 60.4208 What is the deadline for importing or installing stationary CI ICE produced in previous model years?
§ 60.4209 What are the monitoring requirements if I am an owner or operator of a stationary CI internal combustion engine?
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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?
§ 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?
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?

Special Requirements

§ 60.4215 What requirements must I meet for engines used in Guam, American Samoa, or the Commonwealth of the Northern Mariana Islands?

§ 60.4216 What requirements must I meet for engines used in Alaska?

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General Provisions

§ 60.4218 What General Provisions and confidential information provisions apply to me?

Definitions

§ 60.4219 What definitions apply to this subpart?

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

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

Table 3 to Subpart IIII of Part 60

Certification Requirements for Stationary Fire Pump Engines

Table 4 to Subpart IIII of Part 60

Emission Standards for Stationary Fire Pump Engines

Table 5 to Subpart IIII of Part 60

Labeling and Recordkeeping Requirements for New Stationary Emergency Engines

Table 6 to Subpart IIII of Part 60

Optional 3-Mode Test Cycle for Stationary Fire Pump Engines

Table 7 to Subpart IIII of Part 60

Requirements for Performance Tests for Stationary CI ICE With a Displacement of ≥30 Liters per Cylinder

Table 8 to Subpart IIII of Part 60

Applicability of General Provisions to Subpart IIII

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:

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

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:

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

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)
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	2009

[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.*

Engine power	Starting model year engine manufacturers must certify new stationary fire pump engines according to § 60.4202(d)[1]
(175≤HP≤750)	
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)
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)

[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.*

Maximum engine power	Model year(s)	NMHC + NO_X	CO	PM
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';

Each	Complying with the requirement to	You must	Using	According to the following requirements
				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.
		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	i. Select the sampling port location and number/ location of		(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

Each	Complying with the requirement to	You must	Using	According to the following requirements
	combustion engine exhaust.	traverse points at the exhaust of the stationary internal combustion engine;		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 concentration of the stationary internal combustion engine exhaust at the sampling port location;	(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 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	(3) Method 7E of 40 CFR	(d) NO_X concentration must be at 15 percent O_2, dry basis. Results of this

Each	Complying with the requirement to	You must	Using	According to the following requirements
		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.	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)	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 points;	(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.
		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.

Each	Complying with the requirement to	You must	Using	According to the following requirements
	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 content of the stationary internal combustion engine exhaust at the sampling port location; and	(3) Method 4 of 40 CFR part 60, appendix A-3	(c) Measurements to determine moisture content must be made at the same time as the measurements for PM concentration.
		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	
§ 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	Yes	

General Provisions citation	Subject of citation	Applies to subpart	Explanation
	and reporting requirements		

This content is from the eCFR and is authoritative but unofficial.

Title 40 —Protection of Environment
Chapter I —Environmental Protection Agency
Subchapter C —Air Programs
Part 63 —National Emission Standards for Hazardous Air Pollutants for Source Categories

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

Source: 57 FR 61992, Dec. 29, 1992, unless otherwise noted.

Subpart ZZZZ National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

What This Subpart Covers

§ 63.6580 What is the purpose of subpart ZZZZ?

§ 63.6585 Am I subject to this subpart?

§ 63.6590 What parts of my plant does this subpart cover?

§ 63.6595 When do I have to comply with this subpart?

Emission and Operating Limitations

§ 63.6600 What emission limitations and operating limitations must I meet if I own or operate a stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions?

§ 63.6601 What emission limitations must I meet if I own or operate a new or reconstructed 4SLB stationary RICE with a site rating of greater than or equal to 250 brake HP and less than or equal to 500 brake HP located at a major source of HAP emissions?

§ 63.6602 What emission limitations and other requirements must I meet if I own or operate an existing stationary RICE with a site rating of equal to or less than 500 brake HP located at a major source of HAP emissions?

§ 63.6603 What emission limitations, operating limitations, and other requirements must I meet if I own or operate an existing stationary RICE located at an area source of HAP emissions?

§ 63.6604 What fuel requirements must I meet if I own or operate a stationary CI RICE?

General Compliance Requirements

§ 63.6605 What are my general requirements for complying with this subpart?

Testing and Initial Compliance Requirements

§ 63.6610 By what date must I conduct the initial performance tests or other initial compliance demonstrations if I own or operate a stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions?

§ 63.6611 By what date must I conduct the initial performance tests or other initial compliance demonstrations if I own or operate a new or reconstructed 4SLB SI stationary RICE with a site rating of greater than or equal to 250 and less than or equal to 500 brake HP located at a major source of HAP emissions?

§ 63.6612 By what date must I conduct the initial performance tests or other initial compliance demonstrations if I own or operate an existing stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions or an existing stationary RICE located at an area source of HAP emissions?
§ 63.6615 When must I conduct subsequent performance tests?
§ 63.6620 What performance tests and other procedures must I use?
§ 63.6625 What are my monitoring, installation, collection, operation, and maintenance requirements?
§ 63.6630 How do I demonstrate initial compliance with the emission limitations, operating limitations, and other requirements?

Continuous Compliance Requirements

§ 63.6635 How do I monitor and collect data to demonstrate continuous compliance?
§ 63.6640 How do I demonstrate continuous compliance with the emission limitations, operating limitations, and other requirements?

Notifications, Reports, and Records

§ 63.6645 What notifications must I submit and when?
§ 63.6650 What reports must I submit and when?
§ 63.6655 What records must I keep?
§ 63.6660 In what form and how long must I keep my records?

Other Requirements and Information

§ 63.6665 What parts of the General Provisions apply to me?
§ 63.6670 Who implements and enforces this subpart?
§ 63.6675 What definitions apply to this subpart?

Table 1a to Subpart ZZZZ of Part 63
Emission Limitations for Existing, New, and Reconstructed Spark Ignition, 4SRB Stationary RICE >500 HP Located at a Major Source of HAP Emissions

Table 1b to Subpart ZZZZ of Part 63
Operating Limitations for Existing, New, and Reconstructed SI 4SRB Stationary RICE >500 HP Located at a Major Source of HAP Emissions

Table 2a to Subpart ZZZZ of Part 63
Emission Limitations for New and Reconstructed 2SLB and Compression Ignition Stationary RICE >500 HP and New and Reconstructed 4SLB Stationary RICE ≥250 HP Located at a Major Source of HAP Emissions

Table 2b to Subpart ZZZZ of Part 63
Operating Limitations for New and Reconstructed 2SLB and CI

Stationary RICE >500 HP Located at a Major Source of HAP Emissions, New and Reconstructed 4SLB Stationary RICE ≥250 HP Located at a Major Source of HAP Emissions, Existing CI Stationary RICE >500 HP

Table 2c to Subpart ZZZZ of Part 63
Requirements for Existing Compression Ignition Stationary RICE Located at a Major Source of HAP Emissions and Existing Spark Ignition Stationary RICE ≤500 HP Located at a Major Source of HAP Emissions

Table 2d to Subpart ZZZZ of Part 63
Requirements for Existing Stationary RICE Located at Area Sources of HAP Emissions

Table 3 to Subpart ZZZZ of Part 63
Subsequent Performance Tests

Table 4 to Subpart ZZZZ of Part 63
Requirements for Performance Tests

Table 5 to Subpart ZZZZ of Part 63
Initial Compliance With Emission Limitations, Operating Limitations, and Other Requirements

Table 6 to Subpart ZZZZ of Part 63
Continuous Compliance With Emission Limitations, and Other Requirements

Table 7 to Subpart ZZZZ of Part 63
Requirements for Reports

Table 8 to Subpart ZZZZ of Part 63
Applicability of General Provisions to Subpart ZZZZ.

Appendix A to Subpart ZZZZ of Part 63
Protocol for Using an Electrochemical Analyzer to Determine Oxygen and Carbon Monoxide Concentrations From Certain Engines

Subpart ZZZZ—National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

Source: 69 FR 33506, June 15, 2004, unless otherwise noted.

What This Subpart Covers

§ 63.6580 What is the purpose of subpart ZZZZ?

Subpart ZZZZ establishes national emission limitations and operating limitations for hazardous air pollutants (HAP) emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations.

[73 FR 3603, Jan. 18, 2008]

§ 63.6585 Am I subject to this subpart?

You are subject to this subpart if you own or operate a stationary RICE at a major or area source of HAP emissions, except if the stationary RICE is being tested at a stationary RICE test cell/stand.

(a) A stationary RICE is any internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work and which is not mobile. Stationary RICE differ from mobile RICE in that a stationary RICE is not a non-road engine as defined at 40 CFR 1068.30, and is not used to propel a motor vehicle or a vehicle used solely for competition.

(b) A major source of HAP emissions is a plant site that emits or has the potential to emit any single HAP at a rate of 10 tons (9.07 megagrams) or more per year or any combination of HAP at a rate of 25 tons (22.68 megagrams) or more per year, except that for oil and gas production facilities, a major source of HAP emissions is determined for each surface site.

(c) An area source of HAP emissions is a source that is not a major source.

(d) If you are an owner or operator of an area source subject to this subpart, your status as an entity subject to a standard or other requirements under this subpart does not subject you to the obligation to obtain a permit under 40 CFR part 70 or 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 as applicable.

(e) If you are an owner or operator of a stationary RICE used for national security purposes, you may be eligible to request an exemption from the requirements of this subpart as described in 40 CFR part 1068, subpart C.

(f) The emergency stationary RICE listed in paragraphs (f)(1) through (3) of this section are not subject to this subpart. The stationary RICE must meet the definition of an emergency stationary RICE in § 63.6675, which includes operating according to the provisions specified in § 63.6640(f).

(1) Existing residential emergency stationary RICE located at an area source of HAP emissions that do not operate for the purpose specified in § 63.6640(f)(4)(ii).

(2) Existing commercial emergency stationary RICE located at an area source of HAP emissions that do not operate for the purpose specified in § 63.6640(f)(4)(ii).

(3) Existing institutional emergency stationary RICE located at an area source of HAP emissions that do not operate for the purpose specified in § 63.6640(f)(4)(ii).

[69 FR 33506, June 15, 2004, as amended at 73 FR 3603, Jan. 18, 2008; 78 FR 6700, Jan. 30, 2013; 87 FR 48607, Aug. 10, 2022]

§ 63.6590 What parts of my plant does this subpart cover?

This subpart applies to each affected source.

(a) ***Affected source.*** An affected source is any existing, new, or reconstructed stationary RICE located at a major or area source of HAP emissions, excluding stationary RICE being tested at a stationary RICE test cell/stand.

(1) ***Existing stationary RICE.***

(i) For stationary RICE with a site rating of more than 500 brake horsepower (HP) located at a major source of HAP emissions, a stationary RICE is existing if you commenced construction or reconstruction of the stationary RICE before December 19, 2002.

(ii) For stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions, a stationary RICE is existing if you commenced construction or reconstruction of the stationary RICE before June 12, 2006.

(iii) For stationary RICE located at an area source of HAP emissions, a stationary RICE is existing if you commenced construction or reconstruction of the stationary RICE before June 12, 2006.

(iv) A change in ownership of an existing stationary RICE does not make that stationary RICE a new or reconstructed stationary RICE.

(2) ***New stationary RICE.***

(i) A stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions is new if you commenced construction of the stationary RICE on or after December 19, 2002.

(ii) A stationary RICE with a site rating of equal to or less than 500 brake HP located at a major source of HAP emissions is new if you commenced construction of the stationary RICE on or after June 12, 2006.

(iii) A stationary RICE located at an area source of HAP emissions is new if you commenced construction of the stationary RICE on or after June 12, 2006.

(3) ***Reconstructed stationary RICE.***

(i) A stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions is reconstructed if you meet the definition of reconstruction in § 63.2 and reconstruction is commenced on or after December 19, 2002.

(ii) A stationary RICE with a site rating of equal to or less than 500 brake HP located at a major source of HAP emissions is reconstructed if you meet the definition of reconstruction in § 63.2 and reconstruction is commenced on or after June 12, 2006.

(iii) A stationary RICE located at an area source of HAP emissions is reconstructed if you meet the definition of reconstruction in § 63.2 and reconstruction is commenced on or after June 12, 2006.

(b) ***Stationary RICE subject to limited requirements.***

(1) An affected source which meets either of the criteria in paragraphs (b)(1)(i) through (ii) of this section does not have to meet the requirements of this subpart and of subpart A of this part except for the initial notification requirements of § 63.6645(f).

(i) The stationary RICE is a new or reconstructed emergency stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions.

(ii) The stationary RICE is a new or reconstructed limited use stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions.

(2) A new or reconstructed stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis must meet the initial notification requirements of § 63.6645(f) and the requirements of §§ 63.6625(c), 63.6650(g), and 63.6655(c). These stationary RICE do not have to meet the emission limitations and operating limitations of this subpart.

(3) The following stationary RICE do not have to meet the requirements of this subpart and of subpart A of this part, including initial notification requirements:

(i) Existing spark ignition 2 stroke lean burn (2SLB) stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions;

(ii) Existing spark ignition 4 stroke lean burn (4SLB) stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions;

(iii) Existing emergency stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions.

(iv) Existing limited use stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions;

(v) Existing stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions that combusts landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis;

(c) ***Stationary RICE subject to Regulations under 40 CFR Part 60.*** An affected source that meets any of the criteria in paragraphs (c)(1) through (7) of this section must meet the requirements of this part by meeting the requirements of 40 CFR part 60 subpart IIII, for compression ignition engines or 40 CFR part 60 subpart JJJJ, for spark ignition engines. No further requirements apply for such engines under this part.

(1) A new or reconstructed stationary RICE located at an area source;

(2) A new or reconstructed 2SLB stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions;

(3) A new or reconstructed 4SLB stationary RICE with a site rating of less than 250 brake HP located at a major source of HAP emissions;

(4) A new or reconstructed spark ignition 4 stroke rich burn (4SRB) stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions;

(5) A new or reconstructed stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis;

(6) A new or reconstructed emergency or limited use stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions;

(7) A new or reconstructed compression ignition (CI) stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions.

[69 FR 33506, June 15, 2004, as amended at 73 FR 3604, Jan. 18, 2008; 75 FR 9674, Mar. 3, 2010; 75 FR 37733, June 30, 2010; 75 FR 51588, Aug. 20, 2010; 78 FR 6700, Jan. 30, 2013; 87 FR 48607, Aug. 10, 2022]

§ 63.6595 When do I have to comply with this subpart?

(a) ***Affected sources.***

(1) If you have an existing stationary RICE, excluding existing non-emergency CI stationary RICE, with a site rating of more than 500 brake HP located at a major source of HAP emissions, you must comply with the applicable emission limitations, operating limitations and other requirements no later than June 15, 2007. If you have an existing non-emergency CI stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, an existing stationary CI RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions, or an existing stationary CI RICE located at an area source of HAP emissions, you must comply with the applicable emission limitations, operating limitations, and other requirements no later than May 3, 2013. If you have an existing stationary SI RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions, or an existing stationary SI RICE located at an area source of HAP emissions, you must comply with the applicable emission limitations, operating limitations, and other requirements no later than October 19, 2013.

(2) If you start up your new or reconstructed stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions before August 16, 2004, you must comply with the applicable emission limitations and operating limitations in this subpart no later than August 16, 2004.

(3) If you start up your new or reconstructed stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions after August 16, 2004, you must comply with the applicable emission limitations and operating limitations in this subpart upon startup of your affected source.

(4) If you start up your new or reconstructed stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions before January 18, 2008, you must comply with the applicable emission limitations and operating limitations in this subpart no later than January 18, 2008.

(5) If you start up your new or reconstructed stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions after January 18, 2008, you must comply with the applicable emission limitations and operating limitations in this subpart upon startup of your affected source.

(6) If you start up your new or reconstructed stationary RICE located at an area source of HAP emissions before January 18, 2008, you must comply with the applicable emission limitations and operating limitations in this subpart no later than January 18, 2008.

(7) If you start up your new or reconstructed stationary RICE located at an area source of HAP emissions after January 18, 2008, you must comply with the applicable emission limitations and operating limitations in this subpart upon startup of your affected source.

(b) ***Area sources that become major sources.*** If you have an area source that increases its emissions or its potential to emit such that it becomes a major source of HAP, the compliance dates in paragraphs (b)(1) and (2) of this section apply to you.

(1) Any stationary RICE for which construction or reconstruction is commenced after the date when your area source becomes a major source of HAP must be in compliance with this subpart upon startup of your affected source.

(2) Any stationary RICE for which construction or reconstruction is commenced before your area source becomes a major source of HAP must be in compliance with the provisions of this subpart that are applicable to RICE located at major sources within 3 years after your area source becomes a major source of HAP.

(c) If you own or operate an affected source, you must meet the applicable notification requirements in § 63.6645 and in 40 CFR part 63, subpart A.

[69 FR 33506, June 15, 2004, as amended at 73 FR 3604, Jan. 18, 2008; 75 FR 9675, Mar. 3, 2010; 75 FR 51589, Aug. 20, 2010; 78 FR 6701, Jan. 30, 2013]

EMISSION AND OPERATING LIMITATIONS

§ 63.6600 What emission limitations and operating limitations must I meet if I own or operate a stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions?

Compliance with the numerical emission limitations established in this subpart is based on the results of testing the average of three 1-hour runs using the testing requirements and procedures in § 63.6620 and Table 4 to this subpart.

(a) If you own or operate an existing, new, or reconstructed spark ignition 4SRB stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, you must comply with the emission limitations in Table 1a to this subpart and the operating limitations in Table 1b to this subpart which apply to you.

(b) If you own or operate a new or reconstructed 2SLB stationary RICE with a site rating of more than 500 brake HP located at major source of HAP emissions, a new or reconstructed 4SLB stationary RICE with a site rating of more than 500 brake HP located at major source of HAP emissions, or a new or reconstructed CI stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, you must comply with the emission limitations in Table 2a to this subpart and the operating limitations in Table 2b to this subpart which apply to you.

(c) If you own or operate any of the following stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, you do not need to comply with the emission limitations in Tables 1a, 2a, 2c, and 2d to this subpart or operating limitations in Tables 1b and 2b to this subpart: an

existing 2SLB stationary RICE; an existing 4SLB stationary RICE; a stationary RICE that combusts landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis; an emergency stationary RICE; or a limited use stationary RICE.

(d) If you own or operate an existing non-emergency stationary CI RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, you must comply with the emission limitations in Table 2c to this subpart and the operating limitations in Table 2b to this subpart which apply to you.

[73 FR 3605, Jan. 18, 2008, as amended at 75 FR 9675, Mar. 3, 2010]

§ 63.6601 What emission limitations must I meet if I own or operate a new or reconstructed 4SLB stationary RICE with a site rating of greater than or equal to 250 brake HP and less than or equal to 500 brake HP located at a major source of HAP emissions?

Compliance with the numerical emission limitations established in this subpart is based on the results of testing the average of three 1-hour runs using the testing requirements and procedures in § 63.6620 and Table 4 to this subpart. If you own or operate a new or reconstructed 4SLB stationary RICE with a site rating of greater than or equal to 250 and less than or equal to 500 brake HP located at major source of HAP emissions manufactured on or after January 1, 2008, you must comply with the emission limitations in Table 2a to this subpart and the operating limitations in Table 2b to this subpart which apply to you.

[73 FR 3605, Jan. 18, 2008, as amended at 75 FR 9675, Mar. 3, 2010; 75 FR 51589, Aug. 20, 2010]

§ 63.6602 What emission limitations and other requirements must I meet if I own or operate an existing stationary RICE with a site rating of equal to or less than 500 brake HP located at a major source of HAP emissions?

If you own or operate an existing stationary RICE with a site rating of equal to or less than 500 brake HP located at a major source of HAP emissions, you must comply with the emission limitations and other requirements in Table 2c to this subpart which apply to you. Compliance with the numerical emission limitations established in this subpart is based on the results of testing the average of three 1-hour runs using the testing requirements and procedures in § 63.6620 and Table 4 to this subpart.

[78 FR 6701, Jan. 30, 2013]

§ 63.6603 What emission limitations, operating limitations, and other requirements must I meet if I own or operate an existing stationary RICE located at an area source of HAP emissions?

Compliance with the numerical emission limitations established in this subpart is based on the results of testing the average of three 1-hour runs using the testing requirements and procedures in § 63.6620 and Table 4 to this subpart.

(a) If you own or operate an existing stationary RICE located at an area source of HAP emissions, you must comply with the requirements in Table 2d to this subpart and the operating limitations in Table 2b to this subpart that apply to you.

(b) If you own or operate an existing stationary non-emergency CI RICE with a site rating of more than 300 HP located at an area source of HAP that meets either paragraph (b)(1) or (2) of this section, you do not have to meet the numerical CO emission limitations specified in Table 2d of this subpart. Existing stationary

non-emergency CI RICE with a site rating of more than 300 HP located at an area source of HAP that meet either paragraph (b)(1) or (2) of this section must meet the management practices that are shown for stationary non-emergency CI RICE with a site rating of less than or equal to 300 HP in Table 2d of this subpart.

(1) The area source is located in an area of Alaska that is not accessible by the Federal Aid Highway System (FAHS).

(2) The stationary RICE is located at an area source that meets paragraphs (b)(2)(i), (ii), and (iii) of this section.

(i) The only connection to the FAHS is through the Alaska Marine Highway System (AMHS), or the stationary RICE 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 RICE on an annual basis is used for residential purposes.

(iii) The generating capacity of the area source is less than 12 megawatts, or the stationary RICE is used exclusively for backup power for renewable energy.

(c) If you own or operate an existing stationary non-emergency CI RICE with a site rating of more than 300 HP located on an offshore vessel that is an area source of HAP and is a nonroad vehicle that is an Outer Continental Shelf (OCS) source as defined in 40 CFR 55.2, you do not have to meet the numerical CO emission limitations specified in Table 2d of this subpart. You must meet all of the following management practices:

(1) Change oil every 1,000 hours of operation or annually, whichever comes first. Sources have the option to utilize an oil analysis program as described in § 63.6625(i) in order to extend the specified oil change requirement.

(2) Inspect and clean air filters every 750 hours of operation or annually, whichever comes first, and replace as necessary.

(3) Inspect fuel filters and belts, if installed, every 750 hours of operation or annually, whichever comes first, and replace as necessary.

(4) Inspect all flexible hoses every 1,000 hours of operation or annually, whichever comes first, and replace as necessary.

(d) If you own or operate an existing non-emergency CI RICE with a site rating of more than 300 HP located at an area source of HAP emissions that is certified to the Tier 1 or Tier 2 emission standards in Table 1 of 40 CFR 89.112 and that is subject to an enforceable state or local standard that requires the engine to be replaced no later than June 1, 2018, you may until January 1, 2015, or 12 years after the installation date of the engine (whichever is later), but not later than June 1, 2018, choose to comply with the management practices that are shown for stationary non-emergency CI RICE with a site rating of less than or equal to 300 HP in Table 2d of this subpart instead of the applicable emission limitations in Table 2d, operating limitations in Table 2b, and crankcase ventilation system requirements in § 63.6625(g). You must comply with the emission limitations in Table 2d and operating limitations in Table 2b that apply for non-emergency CI RICE with a site rating of more than 300 HP located at an area source of HAP emissions by January 1, 2015, or 12 years after the installation date of the engine (whichever is later), but not later than

June 1, 2018. You must also comply with the crankcase ventilation system requirements in § 63.6625(g) by January 1, 2015, or 12 years after the installation date of the engine (whichever is later), but not later than June 1, 2018.

(e) If you own or operate an existing non-emergency CI RICE with a site rating of more than 300 HP located at an area source of HAP emissions that is certified to the Tier 3 (Tier 2 for engines above 560 kilowatt (kW)) emission standards in Table 1 of 40 CFR 89.112, you may comply with the requirements under this part by meeting the requirements for Tier 3 engines (Tier 2 for engines above 560 kW) in 40 CFR part 60 subpart IIII instead of the emission limitations and other requirements that would otherwise apply under this part for existing non-emergency CI RICE with a site rating of more than 300 HP located at an area source of HAP emissions.

(f) An existing non-emergency SI 4SLB and 4SRB stationary RICE with a site rating of more than 500 HP located at area sources of HAP must meet the definition of remote stationary RICE in § 63.6675 on the initial compliance date for the engine, October 19, 2013, in order to be considered a remote stationary RICE under this subpart. Owners and operators of existing non-emergency SI 4SLB and 4SRB stationary RICE with a site rating of more than 500 HP located at area sources of HAP that meet the definition of remote stationary RICE in § 63.6675 of this subpart as of October 19, 2013 must evaluate the status of their stationary RICE every 12 months. Owners and operators must keep records of the initial and annual evaluation of the status of the engine. If the evaluation indicates that the stationary RICE no longer meets the definition of remote stationary RICE in § 63.6675 of this subpart, the owner or operator must comply with all of the requirements for existing non-emergency SI 4SLB and 4SRB stationary RICE with a site rating of more than 500 HP located at area sources of HAP that are not remote stationary RICE within 1 year of the evaluation.

[75 FR 9675, Mar. 3, 2010, as amended at 75 FR 51589, Aug. 20, 2010; 76 FR 12866, Mar. 9, 2011; 78 FR 6701, Jan. 30, 2013]

§ 63.6604 What fuel requirements must I meet if I own or operate a stationary CI RICE?

(a) If you own or operate an existing non-emergency, non-black start CI stationary RICE with a site rating of more than 300 brake HP with a displacement of less than 30 liters per cylinder that uses diesel fuel, you must use diesel fuel that meets the requirements in 40 CFR 1090.305 for nonroad diesel fuel.

(b) Beginning January 1, 2015, if you own or operate an existing emergency CI stationary RICE with a site rating of more than 100 brake HP and a displacement of less than 30 liters per cylinder that uses diesel fuel and operates for the purpose specified in § 63.6640(f)(4)(ii), you must use diesel fuel that meets the requirements in 40 CFR 1090.305 for nonroad diesel fuel, except that any existing diesel fuel purchased (or otherwise obtained) prior to January 1, 2015, may be used until depleted.

(c) [Reserved]

(d) Existing CI stationary RICE located in Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, at area sources in areas of Alaska that meet either § 63.6603(b)(1) or § 63.6603(b)(2), or are on offshore vessels that meet § 63.6603(c) are exempt from the requirements of this section.

[78 FR 6702, Jan. 30, 2013, as amended at 85 FR 78463, Dec. 4, 2020; 87 FR 48607, Aug. 10, 2022]

GENERAL COMPLIANCE REQUIREMENTS

§ 63.6605 What are my general requirements for complying with this subpart?

(a) You must be in compliance with the emission limitations, operating limitations, and other requirements in this subpart that apply to you at all times.

(b) At all times you must operate and maintain any affected source, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions. The general duty to minimize emissions does not require you to make any further efforts to reduce emissions if levels required by this standard have been achieved. Determination of whether such operation and maintenance procedures are being used will be based on information available to the Administrator which may include, but is not limited to, monitoring results, review of operation and maintenance procedures, review of operation and maintenance records, and inspection of the source.

[75 FR 9675, Mar. 3, 2010, as amended at 78 FR 6702, Jan. 30, 2013]

Testing and Initial Compliance Requirements

§ 63.6610 By what date must I conduct the initial performance tests or other initial compliance demonstrations if I own or operate a stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions?

If you own or operate a stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions you are subject to the requirements of this section.

(a) You must conduct the initial performance test or other initial compliance demonstrations in Table 4 to this subpart that apply to you within 180 days after the compliance date that is specified for your stationary RICE in § 63.6595 and according to the provisions in § 63.7(a)(2).

(b) If you commenced construction or reconstruction between December 19, 2002 and June 15, 2004 and own or operate stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, you must demonstrate initial compliance with either the proposed emission limitations or the promulgated emission limitations no later than February 10, 2005 or no later than 180 days after startup of the source, whichever is later, according to § 63.7(a)(2)(ix).

(c) If you commenced construction or reconstruction between December 19, 2002 and June 15, 2004 and own or operate stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, and you chose to comply with the proposed emission limitations when demonstrating initial compliance, you must conduct a second performance test to demonstrate compliance with the promulgated emission limitations by December 13, 2007 or after startup of the source, whichever is later, according to § 63.7(a)(2)(ix).

(d) An owner or operator is not required to conduct an initial performance test on units for which a performance test has been previously conducted, but the test must meet all of the conditions described in paragraphs (d)(1) through (5) of this section.

(1) The test must have been conducted using the same methods specified in this subpart, and these methods must have been followed correctly.

(2) The test must not be older than 2 years.

(3) The test must be reviewed and accepted by the Administrator.

(4) Either no process or equipment changes must have been made since the test was performed, or the owner or operator must be able to demonstrate that the results of the performance test, with or without adjustments, reliably demonstrate compliance despite process or equipment changes.

(5) The test must be conducted at any load condition within plus or minus 10 percent of 100 percent load.

[69 FR 33506, June 15, 2004, as amended at 73 FR 3605, Jan. 18, 2008]

§ 63.6611 By what date must I conduct the initial performance tests or other initial compliance demonstrations if I own or operate a new or reconstructed 4SLB SI stationary RICE with a site rating of greater than or equal to 250 and less than or equal to 500 brake HP located at a major source of HAP emissions?

If you own or operate a new or reconstructed 4SLB stationary RICE with a site rating of greater than or equal to 250 and less than or equal to 500 brake HP located at a major source of HAP emissions, you must conduct an initial performance test within 240 days after the compliance date that is specified for your stationary RICE in § 63.6595 and according to the provisions specified in Table 4 to this subpart, as appropriate.

[73 FR 3605, Jan. 18, 2008, as amended at 75 FR 51589, Aug. 20, 2010]

§ 63.6612 By what date must I conduct the initial performance tests or other initial compliance demonstrations if I own or operate an existing stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions or an existing stationary RICE located at an area source of HAP emissions?

If you own or operate an existing stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions or an existing stationary RICE located at an area source of HAP emissions you are subject to the requirements of this section.

(a) You must conduct any initial performance test or other initial compliance demonstration according to Tables 4 and 5 to this subpart that apply to you within 180 days after the compliance date that is specified for your stationary RICE in § 63.6595 and according to the provisions in § 63.7(a)(2).

(b) An owner or operator is not required to conduct an initial performance test on a unit for which a performance test has been previously conducted, but the test must meet all of the conditions described in paragraphs (b)(1) through (4) of this section.

(1) The test must have been conducted using the same methods specified in this subpart, and these methods must have been followed correctly.

(2) The test must not be older than 2 years.

(3) The test must be reviewed and accepted by the Administrator.

(4) Either no process or equipment changes must have been made since the test was performed, or the owner or operator must be able to demonstrate that the results of the performance test, with or without adjustments, reliably demonstrate compliance despite process or equipment changes.

[75 FR 9676, Mar. 3, 2010, as amended at 75 FR 51589, Aug. 20, 2010]

§ 63.6615 When must I conduct subsequent performance tests?

If you must comply with the emission limitations and operating limitations, you must conduct subsequent performance tests as specified in Table 3 of this subpart.

§ 63.6620 What performance tests and other procedures must I use?

(a) You must conduct each performance test in Tables 3 and 4 of this subpart that applies to you.

(b) Each performance test must be conducted according to the requirements that this subpart specifies in Table 4 to this subpart. If you own or operate a non-operational stationary RICE that is subject to performance testing, you do not need to start up the engine solely to conduct the performance test. Owners and operators of a non-operational engine can conduct the performance test when the engine is started up again. The test must be conducted at any load condition within plus or minus 10 percent of 100 percent load for the stationary RICE listed in paragraphs (b)(1) through (4) of this section.

(1) Non-emergency 4SRB stationary RICE with a site rating of greater than 500 brake HP located at a major source of HAP emissions.

(2) New non-emergency 4SLB stationary RICE with a site rating of greater than or equal to 250 brake HP located at a major source of HAP emissions.

(3) New non-emergency 2SLB stationary RICE with a site rating of greater than 500 brake HP located at a major source of HAP emissions.

(4) New non-emergency CI stationary RICE with a site rating of greater than 500 brake HP located at a major source of HAP emissions.

(c) [Reserved]

(d) You must conduct three separate test runs for each performance test required in this section, as specified in § 63.7(e)(3). Each test run must last at least 1 hour, unless otherwise specified in this subpart.

(e)

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

$$\frac{C_i - C_o}{C_i} \times 100 = R \quad (Eq.\ 1)$$

Where:

C_i = concentration of carbon monoxide (CO), total hydrocarbons (THC), or formaldehyde at the control device inlet,

C_o = concentration of CO, THC, or formaldehyde at the control device outlet, and

R = percent reduction of CO, THC, or formaldehyde emissions.

(2) You must normalize the CO, THC, or formaldehyde concentrations at the inlet and outlet of the control device to a dry basis and to 15 percent oxygen, or an equivalent percent carbon dioxide (CO_2). If pollutant concentrations are to be corrected to 15 percent oxygen and CO_2 concentration is measured in lieu of oxygen concentration measurement, a CO_2 correction factor is needed. Calculate the CO_2 correction factor as described in paragraphs (e)(2)(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:

$$F_o = \frac{0.209\ F_d}{F_c} \quad (Eq.\ 2)$$

Where:

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

0.209 = Fraction of air that is oxygen, 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:

$$X_{CO2} = \frac{5.9}{F_o} \quad (Eq.\ 3)$$

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 CO, THC, and formaldehyde gas concentrations adjusted to 15 percent O_2 using CO_2 as follows:

$$C_{adj} = C_d \frac{X_{CO2}}{\%CO_2} \quad (Eq.\ 4)$$

Where:

C_{adj} = Calculated concentration of CO, THC, or formaldehyde adjusted to 15 percent O_2.

C_d = Measured concentration of CO, THC, or formaldehyde, uncorrected.

X_{CO2} = CO_2 correction factor, percent.

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

(f) If you comply with the emission limitation to reduce CO and you are not using an oxidation catalyst, if you comply with the emission limitation to reduce formaldehyde and you are not using NSCR, or if you comply with the emission limitation to limit the concentration of formaldehyde in the stationary RICE exhaust and you are not using an oxidation catalyst or NSCR, you must petition the Administrator for operating limitations to be established during the initial performance test and continuously monitored thereafter; or for approval of no operating limitations. You must not conduct the initial performance test until after the petition has been approved by the Administrator.

(g) If you petition the Administrator for approval of operating limitations, your petition must include the information described in paragraphs (g)(1) through (5) of this section.

(1) Identification of the specific parameters you propose to use as operating limitations;

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

(3) 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;

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

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

(h) If you petition the Administrator for approval of no operating limitations, your petition must include the information described in paragraphs (h)(1) through (7) of this section.

(1) Identification of the parameters associated with operation of the stationary RICE and any emission control device which could change intentionally (*e.g.,* operator adjustment, automatic controller adjustment, etc.) or unintentionally (*e.g.,* wear and tear, error, etc.) on a routine basis or over time;

(2) A discussion of the relationship, if any, between changes in the parameters and changes in HAP emissions;

(3) For the parameters which could change in such a way as to increase HAP emissions, a discussion of whether establishing limitations on the parameters would serve to limit HAP emissions;

(4) For the parameters which could change in such a way as to increase HAP emissions, a discussion of how you could establish upper and/or lower values for the parameters which would establish limits on the parameters in operating limitations;

(5) For the parameters, a discussion identifying the methods you could use to measure them and the instruments you could use to monitor them, as well as the relative accuracy and precision of the methods and instruments;

(6) For the parameters, a discussion identifying the frequency and methods for recalibrating the instruments you could use to monitor them; and

(7) A discussion of why, from your point of view, it is infeasible or unreasonable to adopt the parameters as operating limitations.

(i) The engine percent load during a performance test must be determined by documenting the calculations, assumptions, and measurement devices used to measure or estimate the percent load in a specific application. A written report of the average percent load determination must be included in the notification of compliance status. The following information must be included in the written report: the engine model number, the engine manufacturer, the year of purchase, the manufacturer's site-rated brake horsepower, the ambient temperature, pressure, and humidity during the performance test, and all assumptions that were made to estimate or calculate percent load during the performance test must be clearly explained. If measurement devices such as flow meters, kilowatt meters, beta analyzers, stain gauges, etc. are used, the model number of the measurement device, and an estimate of its accurate in percentage of true value must be provided.

[69 FR 33506, June 15, 2004, as amended at 75 FR 9676, Mar. 3, 2010; 78 FR 6702, Jan. 30, 2013]

§ 63.6625 What are my monitoring, installation, collection, operation, and maintenance requirements?

(a) If you elect to install a CEMS as specified in Table 5 of this subpart, you must install, operate, and maintain a CEMS to monitor CO and either O_2 or CO_2 according to the requirements in paragraphs (a)(1) through (4) of this section. If you are meeting a requirement to reduce CO emissions, the CEMS must be installed at both the inlet and outlet of the control device. If you are meeting a requirement to limit the concentration of CO, the CEMS must be installed at the outlet of the control device.

(1) Each CEMS must be installed, operated, and maintained according to the applicable performance specifications of 40 CFR part 60, appendix B.

(2) You must conduct an initial performance evaluation and an annual relative accuracy test audit (RATA) of each CEMS according to the requirements in § 63.8 and according to the applicable performance specifications of 40 CFR part 60, appendix B as well as daily and periodic data quality checks in accordance with 40 CFR part 60, appendix F, procedure 1.

(3) As specified in § 63.8(c)(4)(ii), each CEMS must complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period. You must have at least two data points, with each representing a different 15-minute period, to have a valid hour of data.

(4) The CEMS data must be reduced as specified in § 63.8(g)(2) and recorded in parts per million or parts per billion (as appropriate for the applicable limitation) at 15 percent oxygen or the equivalent CO_2 concentration.

(b) If you are required to install a continuous parameter monitoring system (CPMS) as specified in Table 5 of this subpart, you must install, operate, and maintain each CPMS according to the requirements in paragraphs (b)(1) through (6) of this section. For an affected source that is complying with the emission limitations and operating limitations on March 9, 2011, the requirements in paragraph (b) of this section are applicable September 6, 2011.

(1) You must prepare a site-specific monitoring plan that addresses the monitoring system design, data collection, and the quality assurance and quality control elements outlined in paragraphs (b)(1)(i) through (v) of this section and in § 63.8(d). As specified in § 63.8(f)(4), you may request approval of monitoring system quality assurance and quality control procedures alternative to those specified in paragraphs (b)(1) through (5) of this section in your site-specific monitoring plan.

(i) The performance criteria and design specifications for the monitoring system equipment, including the sample interface, detector signal analyzer, and data acquisition and calculations;

(ii) Sampling interface (*e.g.,* thermocouple) location such that the monitoring system will provide representative measurements;

(iii) Equipment performance evaluations, system accuracy audits, or other audit procedures;

(iv) Ongoing operation and maintenance procedures in accordance with provisions in § 63.8(c)(1)(ii) and (c)(3); and

(v) Ongoing reporting and recordkeeping procedures in accordance with provisions in § 63.10(c), (e)(1), and (e)(2)(i).

(2) You must install, operate, and maintain each CPMS in continuous operation according to the procedures in your site-specific monitoring plan.

(3) The CPMS must collect data at least once every 15 minutes (see also § 63.6635).

(4) For a CPMS for measuring temperature range, the temperature sensor must have a minimum tolerance of 2.8 degrees Celsius (5 degrees Fahrenheit) or 1 percent of the measurement range, whichever is larger.

(5) You must conduct the CPMS equipment performance evaluation, system accuracy audits, or other audit procedures specified in your site-specific monitoring plan at least annually.

(6) You must conduct a performance evaluation of each CPMS in accordance with your site-specific monitoring plan.

(c) If you are operating a new or reconstructed stationary RICE which fires landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis, you must monitor and record your fuel usage daily with separate fuel meters to measure the volumetric flow rate of each fuel. In addition, you must operate your stationary RICE in a manner which reasonably minimizes HAP emissions.

(d) If you are operating a new or reconstructed emergency 4SLB stationary RICE with a site rating of greater than or equal to 250 and less than or equal to 500 brake HP located at a major source of HAP emissions, you must install a non-resettable hour meter prior to the startup of the engine.

(e) If you own or operate any of the following stationary RICE, you must operate and maintain the stationary RICE and after-treatment control device (if any) according to the manufacturer's emission-related written instructions or develop your own maintenance plan which must provide to the extent practicable for the maintenance and operation of the engine in a manner consistent with good air pollution control practice for minimizing emissions:

(1) An existing stationary RICE with a site rating of less than 100 HP located at a major source of HAP emissions;

(2) An existing emergency or black start stationary RICE with a site rating of less than or equal to 500 HP located at a major source of HAP emissions;

(3) An existing emergency or black start stationary RICE located at an area source of HAP emissions;

(4) An existing non-emergency, non-black start stationary CI RICE with a site rating less than or equal to 300 HP located at an area source of HAP emissions;

(5) An existing non-emergency, non-black start 2SLB stationary RICE located at an area source of HAP emissions;

(6) An existing non-emergency, non-black start stationary RICE located at an area source of HAP emissions which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis.

(7) An existing non-emergency, non-black start 4SLB stationary RICE with a site rating less than or equal to 500 HP located at an area source of HAP emissions;

(8) An existing non-emergency, non-black start 4SRB stationary RICE with a site rating less than or equal to 500 HP located at an area source of HAP emissions;

(9) An existing, non-emergency, non-black start 4SLB stationary RICE with a site rating greater than 500 HP located at an area source of HAP emissions that is operated 24 hours or less per calendar year; and

(10) An existing, non-emergency, non-black start 4SRB stationary RICE with a site rating greater than 500 HP located at an area source of HAP emissions that is operated 24 hours or less per calendar year.

(f) If you own or operate an existing emergency stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions or an existing emergency stationary RICE located at an area source of HAP emissions, you must install a non-resettable hour meter if one is not already installed.

(g) If you own or operate an existing non-emergency, non-black start CI engine greater than or equal to 300 HP that is not equipped with a closed crankcase ventilation system, you must comply with either paragraph (g)(1) or paragraph (2) of this section. Owners and operators must follow the manufacturer's specified maintenance requirements for operating and maintaining the open or closed crankcase ventilation systems and replacing the crankcase filters, or can request the Administrator to approve different maintenance requirements that are as protective as manufacturer requirements. Existing CI engines located at area sources in areas of Alaska that meet either § 63.6603(b)(1) or § 63.6603(b)(2) do not have to meet the requirements of this paragraph (g). Existing CI engines located on offshore vessels that meet § 63.6603(c) do not have to meet the requirements of this paragraph (g).

(1) Install a closed crankcase ventilation system that prevents crankcase emissions from being emitted to the atmosphere, or

(2) Install an open crankcase filtration emission control system that reduces emissions from the crankcase by filtering the exhaust stream to remove oil mist, particulates and metals.

(h) If you operate a new, reconstructed, or existing stationary engine, you must minimize the engine's time spent at idle during startup and minimize the engine's startup time to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the emission standards applicable to all times other than startup in Tables 1a, 2a, 2c, and 2d to this subpart apply.

(i) If you own or operate a stationary CI engine that is subject to the work, operation or management practices in items 1 or 2 of Table 2c to this subpart or in items 1 or 4 of Table 2d to this subpart, you have the option of utilizing an oil analysis program in order to extend the specified oil change requirement in

Tables 2c and 2d to this subpart. The oil analysis must be performed at the same frequency specified for changing the oil in Table 2c or 2d to this subpart. The analysis program must at a minimum analyze the following three parameters: Total Base Number, viscosity, and percent water content. The condemning limits for these parameters are as follows: Total Base Number is less than 30 percent of the Total Base Number of the oil when new; viscosity of the oil has changed by more than 20 percent from the viscosity of the oil when new; or percent water content (by volume) is greater than 0.5. If all of these condemning limits are not exceeded, the engine owner or operator is not required to change the oil. If any of the limits are exceeded, the engine owner or operator must change the oil within 2 business days of receiving the results of the analysis; if the engine is not in operation when the results of the analysis are received, the engine owner or operator must change the oil within 2 business days or before commencing operation, whichever is later. The owner or operator must keep records of the parameters that are analyzed as part of the program, the results of the analysis, and the oil changes for the engine. The analysis program must be part of the maintenance plan for the engine.

(j) If you own or operate a stationary SI engine that is subject to the work, operation or management practices in items 6, 7, or 8 of Table 2c to this subpart or in items 5, 6, 7, 9, or 11 of Table 2d to this subpart, you have the option of utilizing an oil analysis program in order to extend the specified oil change requirement in Tables 2c and 2d to this subpart. The oil analysis must be performed at the same frequency specified for changing the oil in Table 2c or 2d to this subpart. The analysis program must at a minimum analyze the following three parameters: Total Acid Number, viscosity, and percent water content. The condemning limits for these parameters are as follows: Total Acid Number increases by more than 3.0 milligrams of potassium hydroxide (KOH) per gram from Total Acid Number of the oil when new; viscosity of the oil has changed by more than 20 percent from the viscosity of the oil when new; or percent water content (by volume) is greater than 0.5. If all of these condemning limits are not exceeded, the engine owner or operator is not required to change the oil. If any of the limits are exceeded, the engine owner or operator must change the oil within 2 business days of receiving the results of the analysis; if the engine is not in operation when the results of the analysis are received, the engine owner or operator must change the oil within 2 business days or before commencing operation, whichever is later. The owner or operator must keep records of the parameters that are analyzed as part of the program, the results of the analysis, and the oil changes for the engine. The analysis program must be part of the maintenance plan for the engine.

[69 FR 33506, June 15, 2004, as amended at 73 FR 3606, Jan. 18, 2008; 75 FR 9676, Mar. 3, 2010; 75 FR 51589, Aug. 20, 2010; 76 FR 12866, Mar. 9, 2011; 78 FR 6703, Jan. 30, 2013]

§ 63.6630 How do I demonstrate initial compliance with the emission limitations, operating limitations, and other requirements?

(a) You must demonstrate initial compliance with each emission limitation, operating limitation, and other requirement that applies to you according to Table 5 of this subpart.

(b) During the initial performance test, you must establish each operating limitation in Tables 1b and 2b of this subpart that applies to you.

(c) You must submit the Notification of Compliance Status containing the results of the initial compliance demonstration according to the requirements in § 63.6645.

(d) Non-emergency 4SRB stationary RICE complying with the requirement to reduce formaldehyde emissions by 76 percent or more can demonstrate initial compliance with the formaldehyde emission limit by testing for THC instead of formaldehyde. The testing must be conducted according to the requirements in Table 4 of this subpart. The average reduction of emissions of THC determined from the performance test must be equal to or greater than 30 percent.

(e) The initial compliance demonstration required for existing non-emergency 4SLB and 4SRB stationary RICE with a site rating of more than 500 HP located at an area source of HAP that are not remote stationary RICE and that are operated more than 24 hours per calendar year must be conducted according to the following requirements:

(1) The compliance demonstration must consist of at least three test runs.

(2) Each test run must be of at least 15 minute duration, except that each test conducted using the method in appendix A to this subpart must consist of at least one measurement cycle and include at least 2 minutes of test data phase measurement.

(3) If you are demonstrating compliance with the CO concentration or CO percent reduction requirement, you must measure CO emissions using one of the CO measurement methods specified in Table 4 of this subpart, or using appendix A to this subpart.

(4) If you are demonstrating compliance with the THC percent reduction requirement, you must measure THC emissions using Method 25A, reported as propane, of 40 CFR part 60, appendix A.

(5) You must measure O_2 using one of the O_2 measurement methods specified in Table 4 of this subpart. Measurements to determine O_2 concentration must be made at the same time as the measurements for CO or THC concentration.

(6) If you are demonstrating compliance with the CO or THC percent reduction requirement, you must measure CO or THC emissions and O_2 emissions simultaneously at the inlet and outlet of the control device.

[69 FR 33506, June 15, 2004, as amended at 78 FR 6704, Jan. 30, 2013]

CONTINUOUS COMPLIANCE REQUIREMENTS

§ 63.6635 How do I monitor and collect data to demonstrate continuous compliance?

(a) If you must comply with emission and operating limitations, you must monitor and collect data according to this section.

(b) Except for monitor malfunctions, associated repairs, required performance evaluations, and required quality assurance or control activities, you must monitor continuously at all times that the stationary RICE is operating. A monitoring malfunction is any sudden, infrequent, not reasonably preventable failure of the monitoring to provide valid data. Monitoring failures that are caused in part by poor maintenance or careless operation are not malfunctions.

(c) You may not use data recorded during monitoring malfunctions, associated repairs, and required quality assurance or control activities in data averages and calculations used to report emission or operating levels. You must, however, use all the valid data collected during all other periods.

[69 FR 33506, June 15, 2004, as amended at 76 FR 12867, Mar. 9, 2011]

§ 63.6640 How do I demonstrate continuous compliance with the emission limitations, operating limitations, and other requirements?

(a) You must demonstrate continuous compliance with each emission limitation, operating limitation, and other requirements in Tables 1a and 1b, Tables 2a and 2b, Table 2c, and Table 2d to this subpart that apply to you according to methods specified in Table 6 to this subpart.

(b) You must report each instance in which you did not meet each emission limitation or operating limitation in Tables 1a and 1b, Tables 2a and 2b, Table 2c, and Table 2d to this subpart that apply to you. These instances are deviations from the emission and operating limitations in this subpart. These deviations must be reported according to the requirements in § 63.6650. If you change your catalyst, you must reestablish the values of the operating parameters measured during the initial performance test. When you reestablish the values of your operating parameters, you must also conduct a performance test to demonstrate that you are meeting the required emission limitation applicable to your stationary RICE.

(c) The annual compliance demonstration required for existing non-emergency 4SLB and 4SRB stationary RICE with a site rating of more than 500 HP located at an area source of HAP that are not remote stationary RICE and that are operated more than 24 hours per calendar year must be conducted according to the following requirements:

(1) The compliance demonstration must consist of at least one test run.

(2) Each test run must be of at least 15 minute duration, except that each test conducted using the method in appendix A to this subpart must consist of at least one measurement cycle and include at least 2 minutes of test data phase measurement.

(3) If you are demonstrating compliance with the CO concentration or CO percent reduction requirement, you must measure CO emissions using one of the CO measurement methods specified in Table 4 of this subpart, or using appendix A to this subpart.

(4) If you are demonstrating compliance with the THC percent reduction requirement, you must measure THC emissions using Method 25A, reported as propane, of 40 CFR part 60, appendix A.

(5) You must measure O_2 using one of the O_2 measurement methods specified in Table 4 of this subpart. Measurements to determine O_2 concentration must be made at the same time as the measurements for CO or THC concentration.

(6) If you are demonstrating compliance with the CO or THC percent reduction requirement, you must measure CO or THC emissions and O_2 emissions simultaneously at the inlet and outlet of the control device.

(7) If the results of the annual compliance demonstration show that the emissions exceed the levels specified in Table 6 of this subpart, the stationary RICE must be shut down as soon as safely possible, and appropriate corrective action must be taken (e.g., repairs, catalyst cleaning, catalyst replacement). The stationary RICE must be retested within 7 days of being restarted and the emissions must meet the levels specified in Table 6 of this subpart. If the retest shows that the emissions continue to exceed the specified levels, the stationary RICE must again be shut down as soon as safely possible, and the stationary RICE may not operate, except for purposes of startup and testing, until the owner/operator demonstrates through testing that the emissions do not exceed the levels specified in Table 6 of this subpart.

(d) For new, reconstructed, and rebuilt stationary RICE, deviations from the emission or operating limitations that occur during the first 200 hours of operation from engine startup (engine burn-in period) are not violations. Rebuilt stationary RICE means a stationary RICE that has been rebuilt as that term is defined in 40 CFR 94.11(a).

(e) You must also report each instance in which you did not meet the requirements in Table 8 to this subpart that apply to you. If you own or operate a new or reconstructed stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions (except new or reconstructed 4SLB engines greater than or equal to 250 and less than or equal to 500 brake HP), a new or reconstructed stationary RICE located at an area source of HAP emissions, or any of the following RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, you do not need to comply with the requirements in Table 8 to this subpart: An existing 2SLB stationary RICE, an existing 4SLB stationary RICE, an existing emergency stationary RICE, an existing limited use stationary RICE, or an existing stationary RICE which fires landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis. If you own or operate any of the following RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, you do not need to comply with the requirements in Table 8 to this subpart, except for the initial notification requirements: a new or reconstructed stationary RICE that combusts landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis, a new or reconstructed emergency stationary RICE, or a new or reconstructed limited use stationary RICE.

(f) If you own or operate an emergency stationary RICE, you must operate the emergency stationary RICE according to the requirements in paragraphs (f)(1) through (4) of this section. In order for the engine to be considered an emergency stationary RICE 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 (4), is prohibited. If you do not operate the engine according to the requirements in paragraphs (f)(1) through (4), 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 RICE in emergency situations.

(2) You may operate your emergency stationary RICE 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 paragraphs (f)(3) and (4) of this section counts as part of the 100 hours per calendar year allowed by this paragraph (f)(2).

(i) Emergency stationary RICE 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 RICE beyond 100 hours per calendar year.

(ii)-(iii) [Reserved]

(3) Emergency stationary RICE located at major sources of HAP 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. The 50 hours per year for non-emergency situations cannot be used for peak shaving or non-emergency demand response, or to generate income for a facility to supply power to an electric grid or otherwise supply power as part of a financial arrangement with another entity.

(4) Emergency stationary RICE located at area sources of HAP 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 paragraphs (f)(4)(i) and (ii) of this section, the 50 hours per 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) Prior to May 3, 2014, the 50 hours per year for non-emergency situations can be used for peak shaving or non-emergency demand response to generate income for a facility, or to otherwise supply power as part of a financial arrangement with another entity if the engine is operated as part of a peak shaving (load management program) with the local distribution system operator and the power is provided only to the facility itself or to support the local distribution system.

(ii) 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.

[69 FR 33506, June 15, 2004, as amended at 71 FR 20467, Apr. 20, 2006; 73 FR 3606, Jan. 18, 2008; 75 FR 9676, Mar. 3, 2010; 75 FR 51591, Aug. 20, 2010; 78 FR 6704, Jan. 30, 2013; 87 FR 48607, Aug. 10, 2022]

Notifications, Reports, and Records

§ 63.6645 What notifications must I submit and when?

(a) You must submit all of the notifications in §§ 63.7(b) and (c), 63.8(e), (f)(4) and (f)(6), 63.9(b) through (e), and (g) and (h) that apply to you by the dates specified if you own or operate any of the following;

(1) An existing stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions.

(2) An existing stationary RICE located at an area source of HAP emissions.

(3) A stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions.

(4) A new or reconstructed 4SLB stationary RICE with a site rating of greater than or equal to 250 HP located at a major source of HAP emissions.

(5) This requirement does not apply if you own or operate an existing stationary RICE less than 100 HP, an existing stationary emergency RICE, or an existing stationary RICE that is not subject to any numerical emission standards.

(b) As specified in § 63.9(b)(2), if you start up your stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions before the effective date of this subpart, you must submit an Initial Notification not later than December 13, 2004, or no later than 120 days after the source becomes subject to this subpart, whichever is later.

(c) If you start up your new or reconstructed stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions on or after August 16, 2004, you must submit an Initial Notification not later than 120 days after you become subject to this subpart.

(d) As specified in § 63.9(b)(2), if you start up your stationary RICE with a site rating of equal to or less than 500 brake HP located at a major source of HAP emissions before the effective date of this subpart and you are required to submit an initial notification, you must submit an Initial Notification not later than July 16, 2008, or no later than 120 days after the source becomes subject to this subpart, whichever is later.

(e) If you start up your new or reconstructed stationary RICE with a site rating of equal to or less than 500 brake HP located at a major source of HAP emissions on or after March 18, 2008 and you are required to submit an initial notification, you must submit an Initial Notification not later than 120 days after you become subject to this subpart.

(f) If you are required to submit an Initial Notification but are otherwise not affected by the requirements of this subpart, in accordance with § 63.6590(b), your notification should include the information in § 63.9(b)(2)(i) through (v), and a statement that your stationary RICE has no additional requirements and explain the basis of the exclusion (for example, that it operates exclusively as an emergency stationary RICE if it has a site rating of more than 500 brake HP located at a major source of HAP emissions).

(g) If you are required to conduct a performance test, you must submit a Notification of Intent to conduct a performance test at least 60 days before the performance test is scheduled to begin as required in § 63.7(b)(1).

(h) If you are required to conduct a performance test or other initial compliance demonstration as specified in Tables 4 and 5 to this subpart, you must submit a Notification of Compliance Status according to § 63.9(h)(2)(ii).

(1) For each initial compliance demonstration required in Table 5 to this subpart that does not include a performance test, you must submit the Notification of Compliance Status before the close of business on the 30th day following the completion of the initial compliance demonstration.

(2) For each initial compliance demonstration required in Table 5 to this subpart that includes a performance test conducted according to the requirements in Table 3 to this subpart, you must submit the Notification of Compliance Status, including the performance test results, before the close of business on the 60th day following the completion of the performance test according to § 63.10(d)(2).

(i) If you own or operate an existing non-emergency CI RICE with a site rating of more than 300 HP located at an area source of HAP emissions that is certified to the Tier 1 or Tier 2 emission standards in Table 1 of 40 CFR 89.112 and subject to an enforceable state or local standard requiring engine replacement and you intend to meet management practices rather than emission limits, as specified in § 63.6603(d), you must submit a notification by March 3, 2013, stating that you intend to use the provision in § 63.6603(d) and identifying the state or local regulation that the engine is subject to.

[73 FR 3606, Jan. 18, 2008, as amended at 75 FR 9677, Mar. 3, 2010; 75 FR 51591, Aug. 20, 2010; 78 FR 6705, Jan. 30, 2013; 85 FR 73912, Nov. 19, 2020]

§ 63.6650 What reports must I submit and when?

(a) You must submit each report in Table 7 of this subpart that applies to you.

(b) Unless the Administrator has approved a different schedule for submission of reports under § 63.10(a), you must submit each report by the date in Table 7 of this subpart and according to the requirements in paragraphs (b)(1) through (b)(9) of this section.

(1) For semiannual Compliance reports, the first Compliance report must cover the period beginning on the compliance date that is specified for your affected source in § 63.6595 and ending on June 30 or December 31, whichever date is the first date following the end of the first calendar half after the compliance date that is specified for your source in § 63.6595.

(2) For semiannual Compliance reports, the first Compliance report must be postmarked or delivered no later than July 31 or January 31, whichever date follows the end of the first calendar half after the compliance date that is specified for your affected source in § 63.6595.

(3) For semiannual Compliance reports, each subsequent Compliance report must cover the semiannual reporting period from January 1 through June 30 or the semiannual reporting period from July 1 through December 31.

(4) For semiannual Compliance reports, each subsequent Compliance report must be postmarked or delivered no later than July 31 or January 31, whichever date is the first date following the end of the semiannual reporting period.

(5) For each stationary RICE that is subject to permitting regulations pursuant to 40 CFR part 70 or 71, and if the permitting authority has established dates for submitting semiannual reports pursuant to 40 CFR 70.6(a)(3)(iii)(A) or 40 CFR 71.6 (a)(3)(iii)(A), you may submit the first and subsequent Compliance reports according to the dates the permitting authority has established instead of according to the dates in paragraphs (b)(1) through (b)(4) of this section.

(6) For annual Compliance reports, the first Compliance report must cover the period beginning on the compliance date that is specified for your affected source in § 63.6595 and ending on December 31.

(7) For annual Compliance reports, the first Compliance report must be postmarked or delivered no later than January 31 following the end of the first calendar year after the compliance date that is specified for your affected source in § 63.6595.

(8) For annual Compliance reports, each subsequent Compliance report must cover the annual reporting period from January 1 through December 31.

(9) For annual Compliance reports, each subsequent Compliance report must be postmarked or delivered no later than January 31.

(c) The Compliance report must contain the information in paragraphs (c)(1) through (6) of this section.

(1) Company name and address.

(2) Statement by a responsible official, with that official's name, title, and signature, certifying the accuracy of the content of the report.

(3) Date of report and beginning and ending dates of the reporting period.

(4) If you had a malfunction during the reporting period, the compliance report must include the number, duration, and a brief description for each type of malfunction which occurred during the reporting period and which caused or may have caused any applicable emission limitation to be exceeded. The report must also include a description of actions taken by an owner or operator during a malfunction of an affected source to minimize emissions in accordance with § 63.6605(b), including actions taken to correct a malfunction.

(5) If there are no deviations from any emission or operating limitations that apply to you, a statement that there were no deviations from the emission or operating limitations during the reporting period.

(6) If there were no periods during which the continuous monitoring system (CMS), including CEMS and CPMS, was out-of-control, as specified in § 63.8(c)(7), a statement that there were no periods during which the CMS was out-of-control during the reporting period.

(d) For each deviation from an emission or operating limitation that occurs for a stationary RICE where you are not using a CMS to comply with the emission or operating limitations in this subpart, the Compliance report must contain the information in paragraphs (c)(1) through (4) of this section and the information in paragraphs (d)(1) and (2) of this section.

(1) The total operating time of the stationary RICE at which the deviation occurred during the reporting period.

(2) Information on the number, duration, and cause of deviations (including unknown cause, if applicable), as applicable, and the corrective action taken.

(e) For each deviation from an emission or operating limitation occurring for a stationary RICE where you are using a CMS to comply with the emission and operating limitations in this subpart, you must include information in paragraphs (c)(1) through (4) and (e)(1) through (12) of this section.

(1) The date and time that each malfunction started and stopped.

(2) The date, time, and duration that each CMS was inoperative, except for zero (low-level) and high-level checks.

(3) The date, time, and duration that each CMS was out-of-control, including the information in § 63.8(c)(8).

(4) The date and time that each deviation started and stopped, and whether each deviation occurred during a period of malfunction or during another period.

(5) A summary of the total duration of the deviation during the reporting period, and the total duration as a percent of the total source operating time during that reporting period.

(6) A breakdown of the total duration of the deviations during the reporting period into those that are due to control equipment problems, process problems, other known causes, and other unknown causes.

(7) A summary of the total duration of CMS downtime during the reporting period, and the total duration of CMS downtime as a percent of the total operating time of the stationary RICE at which the CMS downtime occurred during that reporting period.

(8) An identification of each parameter and pollutant (CO or formaldehyde) that was monitored at the stationary RICE.

(9) A brief description of the stationary RICE.

(10) A brief description of the CMS.

(11) The date of the latest CMS certification or audit.

(12) A description of any changes in CMS, processes, or controls since the last reporting period.

(f) Each affected source that has obtained a title V operating permit pursuant to 40 CFR part 70 or 71 must report all deviations as defined in this subpart in the semiannual monitoring report required by 40 CFR 70.6 (a)(3)(iii)(A) or 40 CFR 71.6(a)(3)(iii)(A). If an affected source submits a Compliance report pursuant to Table 7 of this subpart along with, or as part of, the semiannual monitoring report required by 40 CFR 70.6(a)(3)(iii)(A) or 40 CFR 71.6(a)(3)(iii)(A), and the Compliance report includes all required information concerning deviations from any emission or operating limitation in this subpart, submission of the Compliance report shall be deemed to satisfy any obligation to report the same deviations in the semiannual monitoring report. However, submission of a Compliance report shall not otherwise affect any obligation the affected source may have to report deviations from permit requirements to the permit authority.

(g) If you are operating as a new or reconstructed stationary RICE which fires landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis, you must submit an annual report according to Table 7 of this subpart by the date specified unless the Administrator has approved a different schedule, according to the information described in paragraphs (b)(1) through (b)(5) of this section. You must report the data specified in (g)(1) through (g)(3) of this section.

(1) Fuel flow rate of each fuel and the heating values that were used in your calculations. You must also demonstrate that the percentage of heat input provided by landfill gas or digester gas is equivalent to 10 percent or more of the total fuel consumption on an annual basis.

(2) The operating limits provided in your federally enforceable permit, and any deviations from these limits.

(3) Any problems or errors suspected with the meters.

(h) If you own or operate an emergency stationary RICE with a site rating of more than 100 brake HP that operates for the purpose specified in § 63.6640(f)(4)(ii), you must submit an annual report according to the requirements in paragraphs (h)(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 purpose specified in § 63.6640(f)(4)(ii), including the date, start time, and end time for engine operation for the purposes specified in § 63.6640(f)(4)(ii). The report must also identify the entity that dispatched the engine and the situation that necessitated the dispatch of the engine.

(viii) If there were no deviations from the fuel requirements in § 63.6604 that apply to the engine (if any), a statement that there were no deviations from the fuel requirements during the reporting period.

(ix) If there were deviations from the fuel requirements in § 63.6604 that apply to the engine (if any), information on the number, duration, and cause of deviations, and the corrective action taken.

(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 § 63.13.

[69 FR 33506, June 15, 2004, as amended at 75 FR 9677, Mar. 3, 2010; 78 FR 6705, Jan. 30, 2013; 87 FR 48607, Aug. 10, 2022]

§ 63.6655 What records must I keep?

(a) If you must comply with the emission and operating limitations, you must keep the records described in paragraphs (a)(1) through (a)(5), (b)(1) through (b)(3) and (c) of this section.

(1) A copy of each notification and report that you submitted to comply with this subpart, including all documentation supporting any Initial Notification or Notification of Compliance Status that you submitted, according to the requirement in § 63.10(b)(2)(xiv).

(2) Records of the occurrence and duration of each malfunction of operation (*i.e.,* process equipment) or the air pollution control and monitoring equipment.

(3) Records of performance tests and performance evaluations as required in § 63.10(b)(2)(viii).

(4) Records of all required maintenance performed on the air pollution control and monitoring equipment.

(5) Records of actions taken during periods of malfunction to minimize emissions in accordance with § 63.6605(b), including corrective actions to restore malfunctioning process and air pollution control and monitoring equipment to its normal or usual manner of operation.

(b) For each CEMS or CPMS, you must keep the records listed in paragraphs (b)(1) through (3) of this section.

(1) Records described in § 63.10(b)(2)(vi) through (xi).

(2) Previous (*i.e.,* superseded) versions of the performance evaluation plan as required in § 63.8(d)(3).

(3) Requests for alternatives to the relative accuracy test for CEMS or CPMS as required in § 63.8(f)(6)(i), if applicable.

(c) If you are operating a new or reconstructed stationary RICE which fires landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis, you must keep the records of your daily fuel usage monitors.

(d) You must keep the records required in Table 6 of this subpart to show continuous compliance with each emission or operating limitation that applies to you.

(e) You must keep records of the maintenance conducted on the stationary RICE in order to demonstrate that you operated and maintained the stationary RICE and after-treatment control device (if any) according to your own maintenance plan if you own or operate any of the following stationary RICE;

(1) An existing stationary RICE with a site rating of less than 100 brake HP located at a major source of HAP emissions.

(2) An existing stationary emergency RICE.

(3) An existing stationary RICE located at an area source of HAP emissions subject to management practices as shown in Table 2d to this subpart.

(f) If you own or operate any of the stationary RICE in paragraphs (f)(1) through (2) of this section, you must keep records of the hours of operation of the engine that is recorded through the non-resettable hour meter. The owner or operator must document how many hours are spent for emergency operation, including what classified the operation as emergency and how many hours are spent for non-emergency operation. If the engine is used for the purpose specified in § 63.6640(f)(4)(ii), the owner or operator must keep records of the notification of the emergency situation, and the date, start time, and end time of engine operation for these purposes.

(1) An existing emergency stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions that does not meet the standards applicable to non-emergency engines.

(2) An existing emergency stationary RICE located at an area source of HAP emissions that does not meet the standards applicable to non-emergency engines.

[69 FR 33506, June 15, 2004, as amended at 75 FR 9678, Mar. 3, 2010; 75 FR 51592, Aug. 20, 2010; 78 FR 6706, Jan. 30, 2013; 87 FR 48607, Aug. 10, 2022]

§ 63.6660 In what form and how long must I keep my records?

(a) Your records must be in a form suitable and readily available for expeditious review according to § 63.10(b)(1).

(b) As specified in § 63.10(b)(1), you must keep each record for 5 years following the date of each occurrence, measurement, maintenance, corrective action, report, or record.

(c) You must keep each record readily accessible in hard copy or electronic form for at least 5 years after the date of each occurrence, measurement, maintenance, corrective action, report, or record, according to § 63.10(b)(1).

[69 FR 33506, June 15, 2004, as amended at 75 FR 9678, Mar. 3, 2010]

OTHER REQUIREMENTS AND INFORMATION

§ 63.6665 What parts of the General Provisions apply to me?

Table 8 to this subpart shows which parts of the General Provisions in §§ 63.1 through 63.15 apply to you. If you own or operate a new or reconstructed stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions (except new or reconstructed 4SLB engines greater than or equal to 250 and less than or equal to 500 brake HP), a new or reconstructed stationary RICE located at an area source of HAP emissions, or any of the following RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, you do not need to comply with any of the requirements of the General Provisions specified in Table 8: An existing 2SLB stationary RICE, an existing 4SLB stationary RICE, an existing stationary RICE that combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis, an existing emergency stationary RICE, or an existing limited use stationary RICE. If you own or operate any of the following RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, you do not need to comply with the requirements in the General Provisions specified in Table 8 except for the initial notification requirements: A new stationary RICE that combusts landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis, a new emergency stationary RICE, or a new limited use stationary RICE.

[75 FR 9678, Mar. 3, 2010]

§ 63.6670 Who implements and enforces this subpart?

(a) This subpart is implemented and enforced by the U.S. EPA, or a delegated authority such as your State, local, or tribal agency. If the U.S. EPA Administrator has delegated authority to your State, local, or tribal agency, then that agency (as well as the U.S. EPA) has the authority to implement and enforce this subpart. You should contact your U.S. EPA Regional Office to find out whether this subpart is delegated to your State, local, or tribal agency.

(b) In delegating implementation and enforcement authority of this subpart to a State, local, or tribal agency under 40 CFR part 63, subpart E, the authorities contained in paragraph (c) of this section are retained by the Administrator of the U.S. EPA and are not transferred to the State, local, or tribal agency.

(c) The authorities that will not be delegated to State, local, or tribal agencies are:

(1) Approval of alternatives to the non-opacity emission limitations and operating limitations in § 63.6600 under § 63.6(g).

(2) Approval of major alternatives to test methods under § 63.7(e)(2)(ii) and (f) and as defined in § 63.90.

(3) Approval of major alternatives to monitoring under § 63.8(f) and as defined in § 63.90.

(4) Approval of major alternatives to recordkeeping and reporting under § 63.10(f) and as defined in § 63.90.

(5) Approval of a performance test which was conducted prior to the effective date of the rule, as specified in § 63.6610(b).

§ 63.6675 What definitions apply to this subpart?

Terms used in this subpart are defined in the Clean Air Act (CAA); in 40 CFR 63.2, the General Provisions of this part; and in this section as follows:

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.

Area source means any stationary source of HAP that is not a major source as defined in part 63.

Associated equipment as used in this subpart and as referred to in section 112(n)(4) of the CAA, means equipment associated with an oil or natural gas exploration or production well, and includes all equipment from the well bore to the point of custody transfer, except glycol dehydration units, storage vessels with potential for flash emissions, combustion turbines, and stationary RICE.

Backup power for renewable energy means an engine that provides backup power to a facility that generates electricity from renewable energy resources, as that term is defined in Alaska Statute 42.45.045(l)(5) (incorporated by reference, see § 63.14).

Black start engine means an engine whose only purpose is to start up a combustion turbine.

CAA means the Clean Air Act (42 U.S.C. 7401 *et seq.,* as amended by Public Law 101-549, 104 Stat. 2399).

Commercial emergency stationary RICE means an emergency stationary RICE used in commercial establishments such as office buildings, hotels, stores, telecommunications facilities, restaurants, financial institutions such as banks, doctor's offices, and sports and performing arts facilities.

Compression ignition means relating to a type of stationary internal combustion engine that is not a spark ignition engine.

Custody transfer means the transfer of hydrocarbon liquids or natural gas: After processing and/or treatment in the producing operations, or from storage vessels or automatic transfer facilities or other such equipment, including product loading racks, to pipelines or any other forms of transportation. For the purposes of this subpart, the point at which such liquids or natural gas enters a natural gas processing plant is a point of custody transfer.

Deviation means any instance in which an affected source subject to this subpart, or an owner or operator of such a source:

(1) Fails to meet any requirement or obligation established by this subpart, including but not limited to any emission limitation or operating limitation;

(2) Fails to meet any term or condition that is adopted to implement an applicable requirement in this subpart and that is included in the operating permit for any affected source required to obtain such a permit; or

(3) Fails to meet any emission limitation or operating limitation in this subpart during malfunction, regardless or whether or not such failure is permitted by this subpart.

(4) Fails to satisfy the general duty to minimize emissions established by § 63.6(e)(1)(i).

Diesel engine means any stationary RICE in which a high boiling point liquid fuel injected into the combustion chamber ignites when the air charge has been compressed to a temperature sufficiently high for auto-ignition. This process is also known as compression ignition.

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 fuel oil number 2. Diesel fuel also includes any non-distillate fuel with comparable physical and chemical properties (*e.g.* biodiesel) that is suitable for use in compression ignition engines.

Digester gas means any gaseous by-product of wastewater treatment typically formed through the anaerobic decomposition of organic waste materials and composed principally of methane and CO_2.

Dual-fuel engine means any stationary RICE in which a liquid fuel (typically diesel fuel) is used for compression ignition and gaseous fuel (typically natural gas) is used as the primary fuel.

Emergency stationary RICE means any stationary reciprocating internal combustion engine that meets all of the criteria in paragraphs (1) through (3) of this definition. All emergency stationary RICE must comply with the requirements specified in § 63.6640(f) in order to be considered emergency stationary RICE. If the engine does not comply with the requirements specified in § 63.6640(f), then it is not considered to be an emergency stationary RICE under this subpart.

(1) The stationary RICE is operated to provide electrical power or mechanical work during an emergency situation. Examples include stationary RICE 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 RICE used to pump water in the case of fire or flood, etc.

(2) The stationary RICE is operated under limited circumstances for situations not included in paragraph (1) of this definition, as specified in § 63.6640(f).

(3) The stationary RICE operates as part of a financial arrangement with another entity in situations not included in paragraph (1) of this definition only as allowed in § 63.6640(f)(4)(i) or (ii).

Engine startup means the time from initial start until applied load and engine and associated equipment reaches steady state or normal operation. For stationary engine with catalytic controls, engine startup means the time from initial start until applied load and engine and associated equipment, including the catalyst, reaches steady state or normal operation.

Four-stroke engine means any type of engine which completes the power cycle in two crankshaft revolutions, with intake and compression strokes in the first revolution and power and exhaust strokes in the second revolution.

Gaseous fuel means a material used for combustion which is in the gaseous state at standard atmospheric temperature and pressure conditions.

Gasoline means any fuel sold in any State for use in motor vehicles and motor vehicle engines, or nonroad or stationary engines, and commonly or commercially known or sold as gasoline.

Glycol dehydration unit means a device in which a liquid glycol (including, but not limited to, ethylene glycol, diethylene glycol, or triethylene glycol) absorbent directly contacts a natural gas stream and absorbs water in a contact tower or absorption column (absorber). The glycol contacts and absorbs water vapor and other gas stream constituents from the natural gas and becomes "rich" glycol. This glycol is then regenerated in the glycol dehydration unit reboiler. The "lean" glycol is then recycled.

Hazardous air pollutants (HAP) means any air pollutants listed in or pursuant to section 112(b) of the CAA.

Institutional emergency stationary RICE means an emergency stationary RICE used in institutional establishments such as medical centers, nursing homes, research centers, institutions of higher education, correctional facilities, elementary and secondary schools, libraries, religious establishments, police stations, and fire stations.

ISO standard day conditions means 288 degrees Kelvin (15 degrees Celsius), 60 percent relative humidity and 101.3 kilopascals pressure.

Landfill gas means a gaseous by-product of the land application of municipal refuse typically formed through the anaerobic decomposition of waste materials and composed principally of methane and CO_2.

Lean burn engine means any two-stroke or four-stroke spark ignited engine that does not meet the definition of a rich burn engine.

Limited use stationary RICE means any stationary RICE that operates less than 100 hours per year.

Liquefied petroleum gas means any liquefied hydrocarbon gas obtained as a by-product in petroleum refining of natural gas production.

Liquid fuel means any fuel in liquid form at standard temperature and pressure, including but not limited to diesel, residual/crude oil, kerosene/naphtha (jet fuel), and gasoline.

Major Source, as used in this subpart, shall have the same meaning as in § 63.2, except that:

(1) Emissions from any oil or gas exploration or production well (with its associated equipment (as defined in this section)) and emissions from any pipeline compressor station or pump station shall not be aggregated with emissions from other similar units, to determine whether such emission points or stations are major sources, even when emission points are in a contiguous area or under common control;

(2) For oil and gas production facilities, emissions from processes, operations, or equipment that are not part of the same oil and gas production facility, as defined in § 63.1271 of subpart HHH of this part, shall not be aggregated;

(3) For production field facilities, only HAP emissions from glycol dehydration units, storage vessel with the potential for flash emissions, combustion turbines and reciprocating internal combustion engines shall be aggregated for a major source determination; and

(4) Emissions from processes, operations, and equipment that are not part of the same natural gas transmission and storage facility, as defined in § 63.1271 of subpart HHH of this part, shall not be aggregated.

Malfunction means any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner which causes, or has the potential to cause, the emission limitations in an applicable standard to be exceeded. Failures that are caused in part by poor maintenance or careless operation are not malfunctions.

Natural gas means a naturally occurring mixture of hydrocarbon and non-hydrocarbon gases found in geologic formations beneath the Earth's surface, of which the principal constituent is methane. Natural gas may be field or pipeline quality.

Non-selective catalytic reduction (NSCR) means an add-on catalytic nitrogen oxides (NO_X) control device for rich burn engines that, in a two-step reaction, promotes the conversion of excess oxygen, NO_X, CO, and volatile organic compounds (VOC) into CO_2, nitrogen, and water.

Oil and gas production facility as used in this subpart means any grouping of equipment where hydrocarbon liquids are processed, upgraded (*i.e.,* remove impurities or other constituents to meet contract specifications), or stored prior to the point of custody transfer; or where natural gas is processed, upgraded, or stored prior to entering the natural gas transmission and storage source category. For purposes of a major source determination, facility (including a building, structure, or installation) means oil and natural gas production and processing equipment that is located within the boundaries of an individual surface site as defined in this section. Equipment that is part of a facility will typically be located within close proximity to other equipment located at the same facility. Pieces of production equipment or groupings of equipment located on different oil and gas leases, mineral fee tracts, lease tracts, subsurface or surface unit areas, surface fee tracts, surface lease tracts, or separate surface sites, whether or not connected by a road, waterway, power line or pipeline, shall not be considered part of the same facility. Examples of facilities in the oil and natural gas production source category include, but are not limited to, well sites, satellite tank batteries, central tank batteries, a compressor station that transports natural gas to a natural gas processing plant, and natural gas processing plants.

Oxidation catalyst means an add-on catalytic control device that controls CO and VOC by oxidation.

Peaking unit or engine means any standby engine intended for use during periods of high demand that are not emergencies.

Percent load means the fractional power of an engine compared to its maximum manufacturer's design capacity at engine site conditions. Percent load may range between 0 percent to above 100 percent.

Potential to emit means the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the stationary source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable. For oil and natural gas production facilities subject to subpart HH of this part, the potential to emit provisions in § 63.760(a) may be used. For natural gas transmission and storage facilities subject to subpart HHH of this part, the maximum annual facility gas throughput for storage facilities may be determined according to § 63.1270(a)(1) and the maximum annual throughput for transmission facilities may be determined according to § 63.1270(a)(2).

Production field facility means those oil and gas production facilities located prior to the point of custody transfer.

Production well means any hole drilled in the earth from which crude oil, condensate, or field natural gas is extracted.

Propane means a colorless gas derived from petroleum and natural gas, with the molecular structure C_3H_8.

Remote stationary RICE means stationary RICE meeting any of the following criteria:

(1) Stationary RICE located in an offshore area that is beyond the line of ordinary low water along that portion of the coast of the United States that is in direct contact with the open seas and beyond the line marking the seaward limit of inland waters.

(2) Stationary RICE located on a pipeline segment that meets both of the criteria in paragraphs (2)(i) and (ii) of this definition.

(i) A pipeline segment with 10 or fewer buildings intended for human occupancy and no buildings with four or more stories within 220 yards (200 meters) on either side of the centerline of any continuous 1-mile (1.6 kilometers) length of pipeline. Each separate dwelling unit in a multiple dwelling unit building is counted as a separate building intended for human occupancy.

(ii) The pipeline segment does not lie within 100 yards (91 meters) of either a building or a small, well-defined outside area (such as a playground, recreation area, outdoor theater, or other place of public assembly) that is occupied by 20 or more persons on at least 5 days a week for 10 weeks in any 12-month period. The days and weeks need not be consecutive. The building or area is considered occupied for a full day if it is occupied for any portion of the day.

(iii) For purposes of this paragraph (2), the term pipeline segment means all parts of those physical facilities through which gas moves in transportation, including but not limited to pipe, valves, and other appurtenance attached to pipe, compressor units, metering stations, regulator stations, delivery stations, holders, and fabricated assemblies. Stationary RICE located within 50 yards (46 meters) of the pipeline segment providing power for equipment on a pipeline segment are part of the pipeline segment. Transportation of gas means the gathering, transmission, or distribution of gas by pipeline, or the storage of gas. A building is intended for human occupancy if its primary use is for a purpose involving the presence of humans.

(3) Stationary RICE that are not located on gas pipelines and that have 5 or fewer buildings intended for human occupancy and no buildings with four or more stories within a 0.25 mile radius around the engine. A building is intended for human occupancy if its primary use is for a purpose involving the presence of humans.

Residential emergency stationary RICE means an emergency stationary RICE used in residential establishments such as homes or apartment buildings.

Responsible official means responsible official as defined in 40 CFR 70.2.

Rich burn engine means any four-stroke spark ignited engine where the manufacturer's recommended operating air/fuel ratio divided by the stoichiometric air/fuel ratio at full load conditions is less than or equal to 1.1. Engines originally manufactured as rich burn engines, but modified prior to December 19, 2002 with passive emission control technology for NO_X (such as pre-combustion chambers) will be considered lean burn engines. Also, existing engines where there are no manufacturer's recommendations regarding air/fuel ratio will be considered a rich burn engine if the excess oxygen content of the exhaust at full load conditions is less than or equal to 2 percent.

Site-rated HP means the maximum manufacturer's design capacity at engine site conditions.

Spark ignition means relating to either: A gasoline-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 reciprocating internal combustion engine (RICE) means any reciprocating internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work and which is not mobile. Stationary RICE differ from mobile RICE in that a stationary RICE is not a non-road engine as defined at 40 CFR 1068.30, and is not used to propel a motor vehicle or a vehicle used solely for competition.

Stationary RICE test cell/stand means an engine test cell/stand, as defined in subpart PPPPP of this part, that tests stationary RICE.

Stoichiometric means the theoretical air-to-fuel ratio required for complete combustion.

Storage vessel with the potential for flash emissions means any storage vessel that contains a hydrocarbon liquid with a stock tank gas-to-oil ratio equal to or greater than 0.31 cubic meters per liter and an American Petroleum Institute gravity equal to or greater than 40 degrees and an actual annual average hydrocarbon liquid throughput equal to or greater than 79,500 liters per day. Flash emissions occur when dissolved hydrocarbons in the fluid evolve from solution when the fluid pressure is reduced.

Subpart means 40 CFR part 63, subpart ZZZZ.

Surface site means any combination of one or more graded pad sites, gravel pad sites, foundations, platforms, or the immediate physical location upon which equipment is physically affixed.

Two-stroke engine means a type of engine which completes the power cycle in single crankshaft revolution by combining the intake and compression operations into one stroke and the power and exhaust operations into a second stroke. This system requires auxiliary scavenging and inherently runs lean of stoichiometric.

[69 FR 33506, June 15, 2004, as amended at 71 FR 20467, Apr. 20, 2006; 73 FR 3607, Jan. 18, 2008; 75 FR 9679, Mar. 3, 2010; 75 FR 51592, Aug. 20, 2010; 76 FR 12867, Mar. 9, 2011; 78 FR 6706, Jan. 30, 2013; 87 FR 48608, Aug. 10, 2022]

Table 1a to Subpart ZZZZ of Part 63—Emission Limitations for Existing, New, and Reconstructed Spark Ignition, 4SRB Stationary RICE >500 HP Located at a Major Source of HAP Emissions

As stated in §§ 63.6600 and 63.6640, you must comply with the following emission limitations at 100 percent load plus or minus 10 percent for existing, new and reconstructed 4SRB stationary RICE >500 HP located at a major source of HAP emissions:

For each . . .	You must meet the following emission limitation, except during periods of startup . . .	During periods of startup you must . . .
1. 4SRB stationary RICE	a. Reduce formaldehyde emissions by 76 percent or more. If you commenced construction or reconstruction between December 19, 2002 and June 15, 2004, you may reduce formaldehyde emissions by 75 percent or more until June 15, 2007 or	Minimize the engine's time spent at idle and minimize the engine's startup time at startup to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations apply.[1]

[1] *Sources can petition the Administrator pursuant to the requirements of 40 CFR 63.6(g) for alternative work practices.*

For each . . .	You must meet the following emission limitation, except during periods of startup . . .	During periods of startup you must . . .
	b. Limit the concentration of formaldehyde in the stationary RICE exhaust to 350 ppbvd or less at 15 percent O_2	

[1] Sources can petition the Administrator pursuant to the requirements of 40 CFR 63.6(g) for alternative work practices.

[75 FR 9679, Mar. 3, 2010, as amended at 75 FR 51592, Aug. 20, 2010]

Table 1b to Subpart ZZZZ of Part 63—Operating Limitations for Existing, New, and Reconstructed SI 4SRB Stationary RICE >500 HP Located at a Major Source of HAP Emissions

As stated in §§ 63.6600, 63.6603, 63.6630 and 63.6640, you must comply with the following operating limitations for existing, new and reconstructed 4SRB stationary RICE >500 HP located at a major source of HAP emissions:

For each . . .	You must meet the following operating limitation, except during periods of startup . . .
1. existing, new and reconstructed 4SRB stationary RICE >500 HP located at a major source of HAP emissions complying with the requirement to reduce formaldehyde emissions by 76 percent or more (or by 75 percent or more, if applicable) and using NSCR; or existing, new and reconstructed 4SRB stationary RICE >500 HP located at a major source of HAP emissions complying with the requirement to limit the concentration of formaldehyde in the stationary RICE exhaust to 350 ppbvd or less at 15 percent O_2 and using NSCR;	a. maintain your catalyst so that the pressure drop across the catalyst does not change by more than 2 inches of water at 100 percent load plus or minus 10 percent from the pressure drop across the catalyst measured during the initial performance test; and b. maintain the temperature of your stationary RICE exhaust so that the catalyst inlet temperature is greater than or equal to 750 °F and less than or equal to 1250 °F.[1]
2. existing, new and reconstructed 4SRB stationary RICE >500 HP located at a major source of HAP emissions complying with the requirement to reduce formaldehyde emissions by 76 percent or more (or by 75 percent or more, if applicable) and not using NSCR; or	Comply with any operating limitations approved by the Administrator.
existing, new and reconstructed 4SRB stationary RICE >500 HP located at a major source of HAP	

[1] Sources can petition the Administrator pursuant to the requirements of 40 CFR 63.8(f) for a different temperature range.

For each . . .	You must meet the following operating limitation, except during periods of startup . . .
emissions complying with the requirement to limit the concentration of formaldehyde in the stationary RICE exhaust to 350 ppbvd or less at 15 percent O_2 and not using NSCR.	

[1] *Sources can petition the Administrator pursuant to the requirements of 40 CFR 63.8(f) for a different temperature range.*

[78 FR 6706, Jan. 30, 2013]

Table 2a to Subpart ZZZZ of Part 63—Emission Limitations for New and Reconstructed 2SLB and Compression Ignition Stationary RICE >500 HP and New and Reconstructed 4SLB Stationary RICE ≥250 HP Located at a Major Source of HAP Emissions

As stated in §§ 63.6600 and 63.6640, you must comply with the following emission limitations for new and reconstructed lean burn and new and reconstructed compression ignition stationary RICE at 100 percent load plus or minus 10 percent:

For each . . .	You must meet the following emission limitation, except during periods of startup . . .	During periods of startup you must . . .
1. 2SLB stationary RICE	a. Reduce CO emissions by 58 percent or more; or b. Limit concentration of formaldehyde in the stationary RICE exhaust to 12 ppmvd or less at 15 percent O_2. If you commenced construction or reconstruction between December 19, 2002 and June 15, 2004, you may limit concentration of formaldehyde to 17 ppmvd or less at 15 percent O_2 until June 15, 2007	Minimize the engine's time spent at idle and minimize the engine's startup time at startup to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations apply.[1]
2. 4SLB stationary RICE	a. Reduce CO emissions by 93 percent or more; or	
	b. Limit concentration of formaldehyde in the stationary RICE exhaust to 14 ppmvd or less at 15 percent O_2	
3. CI stationary	a. Reduce CO emissions by 70 percent or more; or	

[1] *Sources can petition the Administrator pursuant to the requirements of 40 CFR 63.6(g) for alternative work practices.*

For each . . .	You must meet the following emission limitation, except during periods of startup . . .	During periods of startup you must . . .
RICE		
	b. Limit concentration of formaldehyde in the stationary RICE exhaust to 580 ppbvd or less at 15 percent O_2	

[1] *Sources can petition the Administrator pursuant to the requirements of 40 CFR 63.6(g) for alternative work practices.*

[75 FR 9680, Mar. 3, 2010]

Table 2b to Subpart ZZZZ of Part 63—Operating Limitations for New and Reconstructed 2SLB and CI Stationary RICE >500 HP Located at a Major Source of HAP Emissions, New and Reconstructed 4SLB Stationary RICE ≥250 HP Located at a Major Source of HAP Emissions, Existing CI Stationary RICE >500 HP

As stated in §§ 63.6600, 63.6601, 63.6603, 63.6630, and 63.6640, you must comply with the following operating limitations for new and reconstructed 2SLB and CI stationary RICE >500 HP located at a major source of HAP emissions; new and reconstructed 4SLB stationary RICE ≥250 HP located at a major source of HAP emissions; and existing CI stationary RICE >500 HP:

For each . . .	You must meet the following operating limitation, except during periods of startup . . .
1. New and reconstructed 2SLB and CI stationary RICE >500 HP located at a major source of HAP emissions and new and reconstructed 4SLB stationary RICE ≥250 HP located at a major source of HAP emissions complying with the requirement to reduce CO emissions and using an oxidation catalyst; and New and reconstructed 2SLB and CI stationary RICE >500 HP located at a major source of HAP emissions and new and reconstructed 4SLB stationary RICE ≥250 HP located at a major source of HAP emissions complying with the requirement to limit the concentration of formaldehyde in the stationary RICE exhaust and using an oxidation catalyst.	a. maintain your catalyst so that the pressure drop across the catalyst does not change by more than 2 inches of water at 100 percent load plus or minus 10 percent from the pressure drop across the catalyst that was measured during the initial performance test; and b. maintain the temperature of your stationary RICE exhaust so that the catalyst inlet temperature is greater than or equal to 450 °F and less than or equal to 1350 °F.[1]
2. Existing CI stationary RICE >500 HP complying with	a. maintain your catalyst so that the

[1] *Sources can petition the Administrator pursuant to the requirements of 40 CFR 63.8(f) for a different temperature range.*

For each . . .	You must meet the following operating limitation, except during periods of startup . . .
the requirement to limit or reduce the concentration of CO in the stationary RICE exhaust and using an oxidation catalyst	pressure drop across the catalyst does not change by more than 2 inches of water from the pressure drop across the catalyst that was measured during the initial performance test; and
	b. maintain the temperature of your stationary RICE exhaust so that the catalyst inlet temperature is greater than or equal to 450 °F and less than or equal to 1350 °F.[1]
3. New and reconstructed 2SLB and CI stationary RICE >500 HP located at a major source of HAP emissions and new and reconstructed 4SLB stationary RICE ≥250 HP located at a major source of HAP emissions complying with the requirement to reduce CO emissions and not using an oxidation catalyst; and	Comply with any operating limitations approved by the Administrator.
New and reconstructed 2SLB and CI stationary RICE >500 HP located at a major source of HAP emissions and new and reconstructed 4SLB stationary RICE ≥250 HP located at a major source of HAP emissions complying with the requirement to limit the concentration of formaldehyde in the stationary RICE exhaust and not using an oxidation catalyst; and	
existing CI stationary RICE >500 HP complying with the requirement to limit or reduce the concentration of CO in the stationary RICE exhaust and not using an oxidation catalyst.	

[1] *Sources can petition the Administrator pursuant to the requirements of 40 CFR 63.8(f) for a different temperature range.*

[78 FR 6707, Jan. 30, 2013]

Table 2c to Subpart ZZZZ of Part 63—Requirements for Existing Compression Ignition Stationary RICE Located at a Major Source of HAP Emissions and Existing Spark Ignition Stationary RICE ≤500 HP Located at a Major Source of HAP Emissions

As stated in §§ 63.6600, 63.6602, and 63.6640, you must comply with the following requirements for existing compression ignition stationary RICE located at a major source of HAP emissions and existing spark ignition stationary RICE ≤500 HP located at a major source of HAP emissions:

For each . . .	You must meet the following requirement, except during periods of startup . . .	During periods of startup you must . . .
1. Emergency stationary CI RICE and black start stationary CI RICE[1]	a. Change oil and filter every 500 hours of operation or annually, whichever comes first.[2] b. Inspect air cleaner every 1,000 hours of operation or annually, whichever comes first, and replace as necessary; c. Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as	Minimize the engine's time spent at idle and minimize the engine's startup time at startup to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations apply.[3]

[1] *If an emergency engine is operating during an emergency and it is not possible to shut down the engine in order to perform the work practice requirements on the schedule required in Table 2c of this subpart, or if performing the work practice on the required schedule would otherwise pose an unacceptable risk under federal, state, or local law, the work practice can be delayed until the emergency is over or the unacceptable risk under federal, state, or local law has abated. The work practice should be performed as soon as practicable after the emergency has ended or the unacceptable risk under federal, state, or local law has abated. Sources must report any failure to perform the work practice on the schedule required and the federal, state or local law under which the risk was deemed unacceptable.*

[2] *Sources have the option to utilize an oil analysis program as described in § 63.6625(i) or (j) in order to extend the specified oil change requirement in Table 2c of this subpart.*

[3] *Sources can petition the Administrator pursuant to the requirements of 40 CFR 63.6(g) for alternative work practices.*

For each . . .	You must meet the following requirement, except during periods of startup . . .	During periods of startup you must . . .
	necessary.[3]	
2. Non-Emergency, non-black start stationary CI RICE <100 HP	a. Change oil and filter every 1,000 hours of operation or annually, whichever comes first.[2] b. Inspect air cleaner every 1,000 hours of operation or annually, whichever comes first, and replace as necessary; c. Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary.[3]	
3. Non-Emergency, non-black start CI stationary RICE 100≤HP≤300 HP	Limit concentration of CO in the stationary RICE exhaust to 230 ppmvd or less at 15 percent O_2.	

[1] If an emergency engine is operating during an emergency and it is not possible to shut down the engine in order to perform the work practice requirements on the schedule required in Table 2c of this subpart, or if performing the work practice on the required schedule would otherwise pose an unacceptable risk under federal, state, or local law, the work practice can be delayed until the emergency is over or the unacceptable risk under federal, state, or local law has abated. The work practice should be performed as soon as practicable after the emergency has ended or the unacceptable risk under federal, state, or local law has abated. Sources must report any failure to perform the work practice on the schedule required and the federal, state or local law under which the risk was deemed unacceptable.

[2] Sources have the option to utilize an oil analysis program as described in § 63.6625(i) or (j) in order to extend the specified oil change requirement in Table 2c of this subpart.

[3] Sources can petition the Administrator pursuant to the requirements of 40 CFR 63.6(g) for alternative work practices.

For each . . .	You must meet the following requirement, except during periods of startup . . .	During periods of startup you must . . .
4. Non-Emergency, non-black start CI stationary RICE 300<HP≤500	a. Limit concentration of CO in the stationary RICE exhaust to 49 ppmvd or less at 15 percent O_2; or b. Reduce CO emissions by 70 percent or more.	
5. Non-Emergency, non-black start stationary CI RICE >500 HP	a. Limit concentration of CO in the stationary RICE exhaust to 23 ppmvd or less at 15 percent O_2; or b. Reduce CO emissions by 70 percent or more.	
6. Emergency stationary SI RICE and black start stationary SI RICE.[1]	a. Change oil and filter every 500 hours of operation or annually, whichever comes first;[2] b. Inspect spark plugs every 1,000 hours of operation	

[1] If an emergency engine is operating during an emergency and it is not possible to shut down the engine in order to perform the work practice requirements on the schedule required in Table 2c of this subpart, or if performing the work practice on the required schedule would otherwise pose an unacceptable risk under federal, state, or local law, the work practice can be delayed until the emergency is over or the unacceptable risk under federal, state, or local law has abated. The work practice should be performed as soon as practicable after the emergency has ended or the unacceptable risk under federal, state, or local law has abated. Sources must report any failure to perform the work practice on the schedule required and the federal, state or local law under which the risk was deemed unacceptable.

[2] Sources have the option to utilize an oil analysis program as described in § 63.6625(i) or (j) in order to extend the specified oil change requirement in Table 2c of this subpart.

[3] Sources can petition the Administrator pursuant to the requirements of 40 CFR 63.6(g) for alternative work practices.

For each . . .	You must meet the following requirement, except during periods of startup . . .	During periods of startup you must . . .
	or annually, whichever comes first, and replace as necessary; c. Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary.[3]	
7. Non-Emergency, non-black start stationary SI RICE <100 HP that are not 2SLB stationary RICE	a. Change oil and filter every 1,440 hours of operation or annually, whichever comes first;[2] b. Inspect spark plugs every 1,440 hours of operation or annually, whichever comes first, and replace as necessary;	
	c. Inspect all hoses and belts every 1,440 hours of	

[1] If an emergency engine is operating during an emergency and it is not possible to shut down the engine in order to perform the work practice requirements on the schedule required in Table 2c of this subpart, or if performing the work practice on the required schedule would otherwise pose an unacceptable risk under federal, state, or local law, the work practice can be delayed until the emergency is over or the unacceptable risk under federal, state, or local law has abated. The work practice should be performed as soon as practicable after the emergency has ended or the unacceptable risk under federal, state, or local law has abated. Sources must report any failure to perform the work practice on the schedule required and the federal, state or local law under which the risk was deemed unacceptable.

[2] Sources have the option to utilize an oil analysis program as described in § 63.6625(i) or (j) in order to extend the specified oil change requirement in Table 2c of this subpart.

[3] Sources can petition the Administrator pursuant to the requirements of 40 CFR 63.6(g) for alternative work practices.

For each . . .	You must meet the following requirement, except during periods of startup . . .	During periods of startup you must . . .
	operation or annually, whichever comes first, and replace as necessary.[3]	
8. Non-Emergency, non-black start 2SLB stationary SI RICE <100 HP	a. Change oil and filter every 4,320 hours of operation or annually, whichever comes first;[2] b. Inspect spark plugs every 4,320 hours of operation or annually, whichever comes first, and replace as necessary;	
	c. Inspect all hoses and belts every 4,320 hours of operation or annually, whichever comes first, and replace as necessary.[3]	

[1] If an emergency engine is operating during an emergency and it is not possible to shut down the engine in order to perform the work practice requirements on the schedule required in Table 2c of this subpart, or if performing the work practice on the required schedule would otherwise pose an unacceptable risk under federal, state, or local law, the work practice can be delayed until the emergency is over or the unacceptable risk under federal, state, or local law has abated. The work practice should be performed as soon as practicable after the emergency has ended or the unacceptable risk under federal, state, or local law has abated. Sources must report any failure to perform the work practice on the schedule required and the federal, state or local law under which the risk was deemed unacceptable.

[2] Sources have the option to utilize an oil analysis program as described in § 63.6625(i) or (j) in order to extend the specified oil change requirement in Table 2c of this subpart.

[3] Sources can petition the Administrator pursuant to the requirements of 40 CFR 63.6(g) for alternative work practices.

For each . . .	You must meet the following requirement, except during periods of startup . . .	During periods of startup you must . . .
9. Non-emergency, non-black start 2SLB stationary RICE 100≤HP≤500	Limit concentration of CO in the stationary RICE exhaust to 225 ppmvd or less at 15 percent O_2.	
10. Non-emergency, non-black start 4SLB stationary RICE 100≤HP≤500	Limit concentration of CO in the stationary RICE exhaust to 47 ppmvd or less at 15 percent O_2.	
11. Non-emergency, non-black start 4SRB stationary RICE 100≤HP≤500	Limit concentration of formaldehyde in the stationary RICE exhaust to 10.3 ppmvd or less at 15 percent O_2.	
12. Non-emergency, non-black start stationary RICE 100≤HP≤500 which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis	Limit concentration of CO in the stationary RICE exhaust to 177 ppmvd or less at 15 percent O_2.	

[1] If an emergency engine is operating during an emergency and it is not possible to shut down the engine in order to perform the work practice requirements on the schedule required in Table 2c of this subpart, or if performing the work practice on the required schedule would otherwise pose an unacceptable risk under federal, state, or local law, the work practice can be delayed until the emergency is over or the unacceptable risk under federal, state, or local law has abated. The work practice should be performed as soon as practicable after the emergency has ended or the unacceptable risk under federal, state, or local law has abated. Sources must report any failure to perform the work practice on the schedule required and the federal, state or local law under which the risk was deemed unacceptable.

[2] Sources have the option to utilize an oil analysis program as described in § 63.6625(i) or (j) in order to extend the specified oil change requirement in Table 2c of this subpart.

[3] Sources can petition the Administrator pursuant to the requirements of 40 CFR 63.6(g) for alternative work practices.

[78 FR 6708, Jan. 30, 2013, as amended at 78 FR 14457, Mar. 6, 2013]

Table 2d to Subpart ZZZZ of Part 63—Requirements for Existing Stationary RICE Located at Area Sources of HAP Emissions

As stated in §§ 63.6603 and 63.6640, you must comply with the following requirements for existing stationary RICE located at area sources of HAP emissions:

For each . . .	You must meet the following requirement, except during periods of startup . . .	During periods of startup you must . . .
1. Non-Emergency, non-black start CI stationary RICE ≤300 HP	a. Change oil and filter every 1,000 hours of operation or annually, whichever comes first;[1] b. Inspect air cleaner every 1,000 hours of operation or annually, whichever comes first, and replace as necessary; c. Inspect all hoses and belts every 500 hours of operation or	Minimize the engine's time spent at idle and minimize the engine's startup time at startup to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations apply.

[1] Sources have the option to utilize an oil analysis program as described in § 63.6625(i) or (j) in order to extend the specified oil change requirement in Table 2d of this subpart.

[2] If an emergency engine is operating during an emergency and it is not possible to shut down the engine in order to perform the management practice requirements on the schedule required in Table 2d of this subpart, or if performing the management practice on the required schedule would otherwise pose an unacceptable risk under federal, state, or local law, the management practice can be delayed until the emergency is over or the unacceptable risk under federal, state, or local law has abated. The management practice should be performed as soon as practicable after the emergency has ended or the unacceptable risk under federal, state, or local law has abated. Sources must report any failure to perform the management practice on the schedule required and the federal, state or local law under which the risk was deemed unacceptable.

For each . . .	You must meet the following requirement, except during periods of startup . . .	During periods of startup you must . . .
	annually, whichever comes first, and replace as necessary.	
2. Non-Emergency, non-black start CI stationary RICE 300<HP≤500	a. Limit concentration of CO in the stationary RICE exhaust to 49 ppmvd at 15 percent O_2; or	
	b. Reduce CO emissions by 70 percent or more.	
3. Non-Emergency, non-black start CI stationary RICE >500 HP	a. Limit concentration of CO in the stationary RICE exhaust to 23 ppmvd at 15 percent O_2; or	
	b. Reduce CO emissions by 70 percent or more.	
4. Emergency stationary CI RICE and black start stationary CI RICE.[2]	a. Change oil and filter every	

[1] *Sources have the option to utilize an oil analysis program as described in § 63.6625(i) or (j) in order to extend the specified oil change requirement in Table 2d of this subpart.*

[2] *If an emergency engine is operating during an emergency and it is not possible to shut down the engine in order to perform the management practice requirements on the schedule required in Table 2d of this subpart, or if performing the management practice on the required schedule would otherwise pose an unacceptable risk under federal, state, or local law, the management practice can be delayed until the emergency is over or the unacceptable risk under federal, state, or local law has abated. The management practice should be performed as soon as practicable after the emergency has ended or the unacceptable risk under federal, state, or local law has abated. Sources must report any failure to perform the management practice on the schedule required and the federal, state or local law under which the risk was deemed unacceptable.*

For each . . .	You must meet the following requirement, except during periods of startup . . .	During periods of startup you must . . .
	500 hours of operation or annually, whichever comes first;[1]	
	b. Inspect air cleaner every 1,000 hours of operation or annually, whichever comes first, and replace as necessary; and	
	c. Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary.	
5. Emergency stationary SI RICE; black start stationary SI RICE; non-emergency, non-black start 4SLB stationary RICE >500 HP that operate 24 hours or less per calendar year; non-emergency, non-black	a. Change oil and filter every 500 hours of operation or annually,	

[1] Sources have the option to utilize an oil analysis program as described in § 63.6625(i) or (j) in order to extend the specified oil change requirement in Table 2d of this subpart.

[2] If an emergency engine is operating during an emergency and it is not possible to shut down the engine in order to perform the management practice requirements on the schedule required in Table 2d of this subpart, or if performing the management practice on the required schedule would otherwise pose an unacceptable risk under federal, state, or local law, the management practice can be delayed until the emergency is over or the unacceptable risk under federal, state, or local law has abated. The management practice should be performed as soon as practicable after the emergency has ended or the unacceptable risk under federal, state, or local law has abated. Sources must report any failure to perform the management practice on the schedule required and the federal, state or local law under which the risk was deemed unacceptable.

For each . . .	You must meet the following requirement, except during periods of startup . . .	During periods of startup you must . . .
start 4SRB stationary RICE >500 HP that operate 24 hours or less per calendar year.[2]	whichever comes first;[1]; b. Inspect spark plugs every 1,000 hours of operation or annually, whichever comes first, and replace as necessary; and c. Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary.	
6. Non-emergency, non-black start 2SLB stationary RICE	a. Change oil and filter every 4,320 hours of operation or annually, whichever comes first;[1]	
	b. Inspect spark	

[1] *Sources have the option to utilize an oil analysis program as described in § 63.6625(i) or (j) in order to extend the specified oil change requirement in Table 2d of this subpart.*

[2] *If an emergency engine is operating during an emergency and it is not possible to shut down the engine in order to perform the management practice requirements on the schedule required in Table 2d of this subpart, or if performing the management practice on the required schedule would otherwise pose an unacceptable risk under federal, state, or local law, the management practice can be delayed until the emergency is over or the unacceptable risk under federal, state, or local law has abated. The management practice should be performed as soon as practicable after the emergency has ended or the unacceptable risk under federal, state, or local law has abated. Sources must report any failure to perform the management practice on the schedule required and the federal, state or local law under which the risk was deemed unacceptable.*

For each . . .	You must meet the following requirement, except during periods of startup . . .	During periods of startup you must . . .
	plugs every 4,320 hours of operation or annually, whichever comes first, and replace as necessary; and	
	c. Inspect all hoses and belts every 4,320 hours of operation or annually, whichever comes first, and replace as necessary.	
7. Non-emergency, non-black start 4SLB stationary RICE ≤500 HP	a. Change oil and filter every 1,440 hours of operation or annually, whichever comes first;[1]	
	b. Inspect spark plugs every 1,440 hours of	

[1] Sources have the option to utilize an oil analysis program as described in § 63.6625(i) or (j) in order to extend the specified oil change requirement in Table 2d of this subpart.

[2] If an emergency engine is operating during an emergency and it is not possible to shut down the engine in order to perform the management practice requirements on the schedule required in Table 2d of this subpart, or if performing the management practice on the required schedule would otherwise pose an unacceptable risk under federal, state, or local law, the management practice can be delayed until the emergency is over or the unacceptable risk under federal, state, or local law has abated. The management practice should be performed as soon as practicable after the emergency has ended or the unacceptable risk under federal, state, or local law has abated. Sources must report any failure to perform the management practice on the schedule required and the federal, state or local law under which the risk was deemed unacceptable.

For each . . .	You must meet the following requirement, except during periods of startup . . .	During periods of startup you must . . .
	operation or annually, whichever comes first, and replace as necessary; and	
	c. Inspect all hoses and belts every 1,440 hours of operation or annually, whichever comes first, and replace as necessary.	
8. Non-emergency, non-black start 4SLB remote stationary RICE >500 HP	a. Change oil and filter every 2,160 hours of operation or annually, whichever comes first;[1]	
	b. Inspect spark plugs every 2,160 hours of operation or annually,	

[1] Sources have the option to utilize an oil analysis program as described in § 63.6625(i) or (j) in order to extend the specified oil change requirement in Table 2d of this subpart.

[2] If an emergency engine is operating during an emergency and it is not possible to shut down the engine in order to perform the management practice requirements on the schedule required in Table 2d of this subpart, or if performing the management practice on the required schedule would otherwise pose an unacceptable risk under federal, state, or local law, the management practice can be delayed until the emergency is over or the unacceptable risk under federal, state, or local law has abated. The management practice should be performed as soon as practicable after the emergency has ended or the unacceptable risk under federal, state, or local law has abated. Sources must report any failure to perform the management practice on the schedule required and the federal, state or local law under which the risk was deemed unacceptable.

For each . . .	You must meet the following requirement, except during periods of startup . . .	During periods of startup you must . . .
	whichever comes first, and replace as necessary; and	
	c. Inspect all hoses and belts every 2,160 hours of operation or annually, whichever comes first, and replace as necessary.	
9. Non-emergency, non-black start 4SLB stationary RICE >500 HP that are not remote stationary RICE and that operate more than 24 hours per calendar year	Install an oxidation catalyst to reduce HAP emissions from the stationary RICE.	
10. Non-emergency, non-black start 4SRB stationary RICE ≤500 HP	a. Change oil and filter every 1,440 hours of operation or annually, whichever comes first;[1]	

[1] Sources have the option to utilize an oil analysis program as described in § 63.6625(i) or (j) in order to extend the specified oil change requirement in Table 2d of this subpart.

[2] If an emergency engine is operating during an emergency and it is not possible to shut down the engine in order to perform the management practice requirements on the schedule required in Table 2d of this subpart, or if performing the management practice on the required schedule would otherwise pose an unacceptable risk under federal, state, or local law, the management practice can be delayed until the emergency is over or the unacceptable risk under federal, state, or local law has abated. The management practice should be performed as soon as practicable after the emergency has ended or the unacceptable risk under federal, state, or local law has abated. Sources must report any failure to perform the management practice on the schedule required and the federal, state or local law under which the risk was deemed unacceptable.

For each . . .	You must meet the following requirement, except during periods of startup . . .	During periods of startup you must . . .
	b. Inspect spark plugs every 1,440 hours of operation or annually, whichever comes first, and replace as necessary; and	
	c. Inspect all hoses and belts every 1,440 hours of operation or annually, whichever comes first, and replace as necessary.	
11. Non-emergency, non-black start 4SRB remote stationary RICE >500 HP	a. Change oil and filter every 2,160 hours of operation or annually, whichever comes first;[1]	
	b. Inspect spark plugs every	

[1] Sources have the option to utilize an oil analysis program as described in § 63.6625(i) or (j) in order to extend the specified oil change requirement in Table 2d of this subpart.

[2] If an emergency engine is operating during an emergency and it is not possible to shut down the engine in order to perform the management practice requirements on the schedule required in Table 2d of this subpart, or if performing the management practice on the required schedule would otherwise pose an unacceptable risk under federal, state, or local law, the management practice can be delayed until the emergency is over or the unacceptable risk under federal, state, or local law has abated. The management practice should be performed as soon as practicable after the emergency has ended or the unacceptable risk under federal, state, or local law has abated. Sources must report any failure to perform the management practice on the schedule required and the federal, state or local law under which the risk was deemed unacceptable.

For each . . .	You must meet the following requirement, except during periods of startup . . .	During periods of startup you must . . .
	2,160 hours of operation or annually, whichever comes first, and replace as necessary; and	
	c. Inspect all hoses and belts every 2,160 hours of operation or annually, whichever comes first, and replace as necessary.	
12. Non-emergency, non-black start 4SRB stationary RICE >500 HP that are not remote stationary RICE and that operate more than 24 hours per calendar year	Install NSCR to reduce HAP emissions from the stationary RICE.	
13. Non-emergency, non-black start stationary RICE which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis	a. Change oil and filter every 1,440 hours of operation or annually, whichever	

[1] Sources have the option to utilize an oil analysis program as described in § 63.6625(i) or (j) in order to extend the specified oil change requirement in Table 2d of this subpart.

[2] If an emergency engine is operating during an emergency and it is not possible to shut down the engine in order to perform the management practice requirements on the schedule required in Table 2d of this subpart, or if performing the management practice on the required schedule would otherwise pose an unacceptable risk under federal, state, or local law, the management practice can be delayed until the emergency is over or the unacceptable risk under federal, state, or local law has abated. The management practice should be performed as soon as practicable after the emergency has ended or the unacceptable risk under federal, state, or local law has abated. Sources must report any failure to perform the management practice on the schedule required and the federal, state or local law under which the risk was deemed unacceptable.

For each . . .	You must meet the following requirement, except during periods of startup . . .	During periods of startup you must . . .
	comes first;[1] b. Inspect spark plugs every 1,440 hours of operation or annually, whichever comes first, and replace as necessary; and	
	c. Inspect all hoses and belts every 1,440 hours of operation or annually, whichever comes first, and replace as necessary.	

[1] Sources have the option to utilize an oil analysis program as described in § 63.6625(i) or (j) in order to extend the specified oil change requirement in Table 2d of this subpart.

[2] If an emergency engine is operating during an emergency and it is not possible to shut down the engine in order to perform the management practice requirements on the schedule required in Table 2d of this subpart, or if performing the management practice on the required schedule would otherwise pose an unacceptable risk under federal, state, or local law, the management practice can be delayed until the emergency is over or the unacceptable risk under federal, state, or local law has abated. The management practice should be performed as soon as practicable after the emergency has ended or the unacceptable risk under federal, state, or local law has abated. Sources must report any failure to perform the management practice on the schedule required and the federal, state or local law under which the risk was deemed unacceptable.

[78 FR 6709, Jan. 30, 2013]

Table 3 to Subpart ZZZZ of Part 63—Subsequent Performance Tests

As stated in §§ 63.6615 and 63.6620, you must comply with the following subsequent performance test requirements:

For each . . .	Complying with the requirement to . . .	You must . . .
1. New or reconstructed 2SLB stationary RICE >500 HP located at major sources; new or reconstructed 4SLB stationary RICE ≥250 HP located at major sources; and new or reconstructed CI stationary RICE >500 HP located at major sources	Reduce CO emissions and not using a CEMS	Conduct subsequent performance tests semiannually.[1]
2. 4SRB stationary RICE ≥5,000 HP located at major sources	Reduce formaldehyde emissions	Conduct subsequent performance tests semiannually.[1]
3. Stationary RICE >500 HP located at major sources and new or reconstructed 4SLB stationary RICE 250≤HP≤500 located at major sources	Limit the concentration of formaldehyde in the stationary RICE exhaust	Conduct subsequent performance tests semiannually.[1]
4. Existing non-emergency, non-black start CI stationary RICE >500 HP that are not limited use stationary RICE	Limit or reduce CO emissions and not using a CEMS	Conduct subsequent performance tests every 8,760 hours or 3 years, whichever comes first.
5. Existing non-emergency, non-black start CI stationary RICE >500 HP that are limited use stationary RICE	Limit or reduce CO emissions and not using a CEMS	Conduct subsequent performance tests every 8,760 hours or 5 years, whichever comes first.

[1] *After you have demonstrated compliance for two consecutive tests, you may reduce the frequency of subsequent performance tests to annually. If the results of any subsequent annual performance test indicate the stationary RICE is not in compliance with the CO or formaldehyde emission limitation, or you deviate from any of your operating limitations, you must resume semiannual performance tests.*

[78 FR 6711, Jan. 30, 2013]

Table 4 to Subpart ZZZZ of Part 63—Requirements for Performance Tests

As stated in §§ 63.6610, 63.6611, 63.6620, and 63.6640, you must comply with the following requirements for performance tests for stationary RICE:

For each . . .	Complying with the requirement to . . .	You must . . .	Using . . .	According to the following requirements . . .
1. 2SLB, 4SLB, and CI stationary RICE	a. Reduce CO emissions	i. Select the sampling port location and the number/ location of traverse points at the inlet and outlet of the control device; and		(a) For CO, 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 the O_2 at the inlet and outlet of the control device; and	(1) Method 3 or 3A or 3B of 40 CFR part 60, appendix A-2, or ASTM D6522-00 (Reapproved 2005)[13] (heated probe not necessary)	(b) Measurements to determine O_2 must be made at the same time as the measurements for CO concentration.

[1] *You may also use methods 3A and 10 as options to ASTM-D6522-00 (2005).*

[2] *You may obtain a copy of ASTM-D6348-03 from at least one of the following addresses: American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, or University Microfilms International, 300 North Zeeb Road, Ann Arbor, MI 48106.*

[3] *Incorporated by reference, see § 63.14.*

For each . . .	Complying with the requirement to . . .	You must . . .	Using . . .	According to the following requirements . . .
		iii. Measure the CO at the inlet and the outlet of the control device; and	(2) ASTM D6522-00 (Reapproved 2005)[123] (heated probe not necessary) or method 10 of 40 CFR part 60, appendix A-4	(c) The CO concentration must be at 15 percent O_2, dry basis.
		iv. Measure moisture content at the inlet and outlet of the control device as needed to determine CO and O_2 concentrations on a dry basis	(3) Method 4 of 40 CFR part 60, appendix A-3, or method 320 of 40 CFR part 63, appendix A, or ASTM D6348-03[13]	(d) Measurements to determine moisture content must be made at the same time and location as the measurements for CO concentration.
2. 4SRB stationary RICE	a. Reduce formaldehyde or THC emissions	i. Select the sampling port location and the number/ location of traverse points at the inlet and outlet of the control device; and		(a) For formaldehyde, THC, 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

[1] *You may also use methods 3A and 10 as options to ASTM-D6522-00 (2005).*

[2] *You may obtain a copy of ASTM-D6348-03 from at least one of the following addresses: American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, or University Microfilms International, 300 North Zeeb Road, Ann Arbor, MI 48106.*

[3] *Incorporated by reference, see § 63.14.*

For each . . .	Complying with the requirement to . . .	You must . . .	Using . . .	According to the following requirements . . .
				A, 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.
		ii. Measure O_2 at the inlet and outlet of the control device; and	(1) Method 3 or 3A or 3B of 40 CFR part 60, appendix A-2, or ASTM D6522-00 (Reapproved 2005)[13] (heated probe not necessary)	(b) Measurements to determine O_2 concentration must be made at the same time as the measurements for formaldehyde or THC concentration.
		iii. Measure moisture content at the inlet and outlet of the control device as needed to determine formaldehyde or THC and O_2 concentrations on a dry basis; and	(2) Method 4 of 40 CFR part 60, appendix A-3, or method 320 of 40 CFR part 63, appendix A, or ASTM D6348-03[13]	(c) Measurements to determine moisture content must be made at the same time and location as the measurements for formaldehyde or THC concentration.
		iv. If demonstrating compliance	(3) Method 320 or 323 of 40 CFR	(d) Formaldehyde concentration must be at 15 percent O_2, dry basis. Results of this test consist of the average of the

[1] *You may also use methods 3A and 10 as options to ASTM-D6522-00 (2005).*

[2] *You may obtain a copy of ASTM-D6348-03 from at least one of the following addresses: American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, or University Microfilms International, 300 North Zeeb Road, Ann Arbor, MI 48106.*

[3] *Incorporated by reference, see § 63.14.*

For each . . .	Complying with the requirement to . . .	You must . . .	Using . . .	According to the following requirements . . .
		with the formaldehyde percent reduction requirement, measure formaldehyde at the inlet and the outlet of the control device	part 63, appendix A; or ASTM D6348-03,[13] provided in ASTM D6348-03 Annex A5 (Analyte Spiking Technique), the percent R must be greater than or equal to 70 and less than or equal to 130	three 1-hour or longer runs.
		v. If demonstrating compliance with the THC percent reduction requirement, measure THC at the inlet and the outlet of the control device	(4) (1) Method 25A, reported as propane, of 40 CFR part 60, appendix A-7	(e) THC 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.
3. Stationary RICE	a. Limit the concentration of formaldehyde or CO in the stationary	i. Select the sampling port location and the number/ location of traverse points		(a) For formaldehyde, CO, 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

[1] You may also use methods 3A and 10 as options to ASTM-D6522-00 (2005).

[2] You may obtain a copy of ASTM-D6348-03 from at least one of the following addresses: American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, or University Microfilms International, 300 North Zeeb Road, Ann Arbor, MI 48106.

[3] Incorporated by reference, see § 63.14.

For each . . .	Complying with the requirement to . . .	You must . . .	Using . . .	According to the following requirements . . .
	RICE exhaust	at the exhaust of the stationary RICE; and		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, 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. 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 RICE exhaust at the sampling port location; and	(1) Method 3 or 3A or 3B of 40 CFR part 60, appendix A-2, or ASTM D6522-00 (Reapproved 2005)[13] (heated probe not necessary)	(b) Measurements to determine O_2 concentration must be made at the same time and location as the measurements for formaldehyde or CO concentration.
		iii. Measure moisture content of the stationary RICE exhaust at the sampling port location as	(2) Method 4 of 40 CFR part 60, appendix A-3, or method 320 of 40 CFR part 63,	(c) Measurements to determine moisture content must be made at the same time and location as the measurements for formaldehyde or CO concentration.

[1] *You may also use methods 3A and 10 as options to ASTM-D6522-00 (2005).*

[2] *You may obtain a copy of ASTM-D6348-03 from at least one of the following addresses: American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, or University Microfilms International, 300 North Zeeb Road, Ann Arbor, MI 48106.*

[3] *Incorporated by reference, see § 63.14.*

For each . . .	Complying with the requirement to . . .	You must . . .	Using . . .	According to the following requirements . . .
		needed to determine formaldehyde or CO and O_2 concentrations on a dry basis; and	appendix A, or ASTM D6348-03[13]	
		iv. Measure formaldehyde at the exhaust of the stationary RICE; or	(3) Method 320 or 323 of 40 CFR part 63, appendix A; or ASTM D6348-03,[13] provided in ASTM D6348-03 Annex A5 (Analyte Spiking Technique), the percent R must be greater than or equal to 70 and less than or equal to 130	(d) Formaldehyde 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.
		v. Measure CO at the exhaust of the stationary RICE	(4) Method 10 of 40 CFR part 60, appendix A-4, ASTM D6522-00 (2005),[13]	(e) CO 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.

[1] *You may also use methods 3A and 10 as options to ASTM-D6522-00 (2005).*

[2] *You may obtain a copy of ASTM-D6348-03 from at least one of the following addresses: American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, or University Microfilms International, 300 North Zeeb Road, Ann Arbor, MI 48106.*

[3] *Incorporated by reference, see § 63.14.*

For each . . .	Complying with the requirement to . . .	You must . . .	Using . . .	According to the following requirements . . .
			method 320 of 40 CFR part 63, appendix A, or ASTM D6348-03[13]	

[1] *You may also use methods 3A and 10 as options to ASTM-D6522-00 (2005).*

[2] *You may obtain a copy of ASTM-D6348-03 from at least one of the following addresses: American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, or University Microfilms International, 300 North Zeeb Road, Ann Arbor, MI 48106.*

[3] *Incorporated by reference, see § 63.14.*

[88 FR 18413, Mar. 29, 2023]

Table 5 to Subpart ZZZZ of Part 63—Initial Compliance With Emission Limitations, Operating Limitations, and Other Requirements

As stated in §§ 63.6612, 63.6625 and 63.6630, you must initially comply with the emission and operating limitations as required by the following:

For each . . .	Complying with the requirement to . . .	You have demonstrated initial compliance if . . .
1. New or reconstructed non-emergency 2SLB stationary RICE >500 HP located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE ≥250 HP located at a major source of HAP, non-emergency stationary CI RICE >500 HP located at a major source of HAP, and existing non-emergency stationary CI RICE >500 HP located at an area source of HAP	a. Reduce CO emissions and using oxidation catalyst, and using a CPMS	i. The average reduction of emissions of CO determined from the initial performance test achieves the required CO percent reduction; and ii. You have installed a CPMS to continuously monitor catalyst inlet temperature according to the requirements in § 63.6625(b); and iii. You have recorded the catalyst pressure drop and catalyst inlet temperature during the initial performance test.

For each . . .	Complying with the requirement to . . .	You have demonstrated initial compliance if . . .
2. Non-emergency stationary CI RICE >500 HP located at a major source of HAP, and existing non-emergency stationary CI RICE >500 HP located at an area source of HAP	a. Limit the concentration of CO, using oxidation catalyst, and using a CPMS	i. The average CO concentration determined from the initial performance test is less than or equal to the CO emission limitation; and
		ii. You have installed a CPMS to continuously monitor catalyst inlet temperature according to the requirements in § 63.6625(b); and
		iii. You have recorded the catalyst pressure drop and catalyst inlet temperature during the initial performance test.
3. New or reconstructed non-emergency 2SLB stationary RICE >500 HP located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE ≥250 HP located at a major source of HAP, non-emergency stationary CI RICE >500 HP located at a major source of HAP, and existing non-emergency stationary CI RICE >500 HP located at an area source of HAP	a. Reduce CO emissions and not using oxidation catalyst	i. The average reduction of emissions of CO determined from the initial performance test achieves the required CO percent reduction; and ii. You have installed a CPMS to continuously monitor operating parameters approved by the Administrator (if any) according to the requirements in § 63.6625(b); and iii. You have recorded the approved operating parameters (if any) during the initial performance test.
4. Non-emergency stationary CI RICE >500 HP located at a major source of HAP, and existing non-emergency stationary CI RICE >500 HP located at an area source of HAP	a. Limit the concentration of CO, and not using oxidation catalyst	i. The average CO concentration determined from the initial performance test is less than or equal to the CO emission limitation; and ii. You have installed a CPMS to continuously monitor operating parameters approved by the Administrator (if any) according to the requirements in § 63.6625(b); and

For each . . .	Complying with the requirement to . . .	You have demonstrated initial compliance if . . .
		iii. You have recorded the approved operating parameters (if any) during the initial performance test.
5. New or reconstructed non-emergency 2SLB stationary RICE >500 HP located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE ≥250 HP located at a major source of HAP, non-emergency stationary CI RICE >500 HP located at a major source of HAP, and existing non-emergency stationary CI RICE >500 HP located at an area source of HAP	a. Reduce CO emissions, and using a CEMS	i. You have installed a CEMS to continuously monitor CO and either O_2 or CO_2 at both the inlet and outlet of the oxidation catalyst according to the requirements in § 63.6625(a); and ii. You have conducted a performance evaluation of your CEMS using PS 3 and 4A of 40 CFR part 60, appendix B; and
		iii. The average reduction of CO calculated using § 63.6620 equals or exceeds the required percent reduction. The initial test comprises the first 4-hour period after successful validation of the CEMS. Compliance is based on the average percent reduction achieved during the 4-hour period.
6. Non-emergency stationary CI RICE >500 HP located at a major source of HAP, and existing non-emergency stationary CI RICE >500 HP located at an area source of HAP	a. Limit the concentration of CO, and using a CEMS	i. You have installed a CEMS to continuously monitor CO and either O_2 or CO_2 at the outlet of the oxidation catalyst according to the requirements in § 63.6625(a); and
		ii. You have conducted a performance evaluation of your CEMS using PS 3 and 4A of 40 CFR part 60, appendix B; and
		iii. The average concentration of CO calculated using § 63.6620 is less than or equal to the CO emission limitation. The initial test comprises the first 4-hour period after successful validation of the CEMS. Compliance is based on the average concentration measured during the 4-hour period.

For each . . .	Complying with the requirement to . . .	You have demonstrated initial compliance if . . .
7. Non-emergency 4SRB stationary RICE >500 HP located at a major source of HAP	a. Reduce formaldehyde emissions and using NSCR	i. The average reduction of emissions of formaldehyde determined from the initial performance test is equal to or greater than the required formaldehyde percent reduction, or the average reduction of emissions of THC determined from the initial performance test is equal to or greater than 30 percent; and
		ii. You have installed a CPMS to continuously monitor catalyst inlet temperature according to the requirements in § 63.6625(b); and
		iii. You have recorded the catalyst pressure drop and catalyst inlet temperature during the initial performance test.
8. Non-emergency 4SRB stationary RICE >500 HP located at a major source of HAP	a. Reduce formaldehyde emissions and not using NSCR	i. The average reduction of emissions of formaldehyde determined from the initial performance test is equal to or greater than the required formaldehyde percent reduction or the average reduction of emissions of THC determined from the initial performance test is equal to or greater than 30 percent; and
		ii. You have installed a CPMS to continuously monitor operating parameters approved by the Administrator (if any) according to the requirements in § 63.6625(b); and
		iii. You have recorded the approved operating parameters (if any) during the initial performance test.
9. New or reconstructed non-emergency stationary RICE >500 HP located at a major source of HAP, new or reconstructed non-	a. Limit the concentration of	i. The average formaldehyde concentration, corrected to 15 percent O_2, dry basis, from the three

For each . . .	Complying with the requirement to . . .	You have demonstrated initial compliance if . . .
emergency 4SLB stationary RICE 250≤HP≤500 located at a major source of HAP, and existing non-emergency 4SRB stationary RICE >500 HP located at a major source of HAP	formaldehyde in the stationary RICE exhaust and using oxidation catalyst or NSCR	test runs is less than or equal to the formaldehyde emission limitation; and ii. You have installed a CPMS to continuously monitor catalyst inlet temperature according to the requirements in § 63.6625(b); and
		iii. You have recorded the catalyst pressure drop and catalyst inlet temperature during the initial performance test.
10. New or reconstructed non-emergency stationary RICE >500 HP located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE 250≤HP≤500 located at a major source of HAP, and existing non-emergency 4SRB stationary RICE >500 HP located at a major source of HAP	a. Limit the concentration of formaldehyde in the stationary RICE exhaust and not using oxidation catalyst or NSCR	i. The average formaldehyde concentration, corrected to 15 percent O_2, dry basis, from the three test runs is less than or equal to the formaldehyde emission limitation; and ii. You have installed a CPMS to continuously monitor operating parameters approved by the Administrator (if any) according to the requirements in § 63.6625(b); and
		iii. You have recorded the approved operating parameters (if any) during the initial performance test.
11. Existing non-emergency stationary RICE 100≤HP≤500 located at a major source of HAP, and existing non-emergency stationary CI RICE 300<HP≤500 located at an area source of HAP	a. Reduce CO emissions	i. The average reduction of emissions of CO or formaldehyde, as applicable determined from the initial performance test is equal to or greater than the required CO or formaldehyde, as applicable, percent reduction.
12. Existing non-emergency stationary RICE 100≤HP≤500 located at a major source of HAP, and existing non-emergency stationary CI RICE 300<HP≤500 located at an area source of HAP	a. Limit the concentration of formaldehyde or CO in the stationary	i. The average formaldehyde or CO concentration, as applicable, corrected to 15 percent O_2, dry basis, from the three test runs is less than or equal to the formaldehyde or CO emission limitation, as applicable.

For each . . .	Complying with the requirement to . . .	You have demonstrated initial compliance if . . .
	RICE exhaust	
13. Existing non-emergency 4SLB stationary RICE >500 HP located at an area source of HAP that are not remote stationary RICE and that are operated more than 24 hours per calendar year	a. Install an oxidation catalyst	i. You have conducted an initial compliance demonstration as specified in § 63.6630(e) to show that the average reduction of emissions of CO is 93 percent or more, or the average CO concentration is less than or equal to 47 ppmvd at 15 percent O_2;
		ii. You have installed a CPMS to continuously monitor catalyst inlet temperature according to the requirements in § 63.6625(b), or you have installed equipment to automatically shut down the engine if the catalyst inlet temperature exceeds 1350 °F.
14. Existing non-emergency 4SRB stationary RICE >500 HP located at an area source of HAP that are not remote stationary RICE and that are operated more than 24 hours per calendar year	a. Install NSCR	i. You have conducted an initial compliance demonstration as specified in § 63.6630(e) to show that the average reduction of emissions of CO is 75 percent or more, the average CO concentration is less than or equal to 270 ppmvd at 15 percent O_2, or the average reduction of emissions of THC is 30 percent or more;
		ii. You have installed a CPMS to continuously monitor catalyst inlet temperature according to the requirements in § 63.6625(b), or you have installed equipment to automatically shut down the engine if the catalyst inlet temperature exceeds 1250 °F.

[78 FR 6712, Jan. 30, 2013]

Table 6 to Subpart ZZZZ of Part 63—Continuous Compliance With Emission Limitations, and Other Requirements

As stated in § 63.6640, you must continuously comply with the emissions and operating limitations and work or management practices as required by the following:

For each . . .	Complying with the requirement to . . .	You must demonstrate continuous compliance by . . .
1. New or reconstructed non-emergency 2SLB stationary RICE >500 HP located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE ≥250 HP located at a major source of HAP, and new or reconstructed non-emergency CI stationary RICE >500 HP located at a major source of HAP	a. Reduce CO emissions and using an oxidation catalyst, and using a CPMS	i. Conducting semiannual performance tests for CO to demonstrate that the required CO percent reduction is achieved[a]; and ii. Collecting the catalyst inlet temperature data according to § 63.6625(b); and iii. Reducing these data to 4-hour rolling averages; and
		iv. Maintaining the 4-hour rolling averages within the operating limitations for the catalyst inlet temperature; and
		v. Measuring the pressure drop across the catalyst once per month and demonstrating

[a] *After you have demonstrated compliance for two consecutive tests, you may reduce the frequency of subsequent performance tests to annually. If the results of any subsequent annual performance test indicate the stationary RICE is not in compliance with the CO or formaldehyde emission limitation, or you deviate from any of your operating limitations, you must resume semiannual performance tests.*

For each . . .	Complying with the requirement to . . .	You must demonstrate continuous compliance by . . .
		that the pressure drop across the catalyst is within the operating limitation established during the performance test.
2. New or reconstructed non-emergency 2SLB stationary RICE >500 HP located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE ≥250 HP located at a major source of HAP, and new or reconstructed non-emergency CI stationary RICE >500 HP located at a major source of HAP	a. Reduce CO emissions and not using an oxidation catalyst, and using a CPMS	i. Conducting semiannual performance tests for CO to demonstrate that the required CO percent reduction is achieved[a]; and ii. Collecting the approved operating parameter (if any) data according to § 63.6625(b); and iii. Reducing these data to 4-hour rolling averages; and
		iv. Maintaining the 4-hour rolling averages within the operating limitations for the operating parameters established during the performance test.

[a] *After you have demonstrated compliance for two consecutive tests, you may reduce the frequency of subsequent performance tests to annually. If the results of any subsequent annual performance test indicate the stationary RICE is not in compliance with the CO or formaldehyde emission limitation, or you deviate from any of your operating limitations, you must resume semiannual performance tests.*

For each . . .	Complying with the requirement to . . .	You must demonstrate continuous compliance by . . .
3. New or reconstructed non-emergency 2SLB stationary RICE >500 HP located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE ≥250 HP located at a major source of HAP, new or reconstructed non-emergency stationary CI RICE >500 HP located at a major source of HAP, and existing non-emergency stationary CI RICE >500 HP	a. Reduce CO emissions or limit the concentration of CO in the stationary RICE exhaust, and using a CEMS	i. Collecting the monitoring data according to § 63.6625(a), reducing the measurements to 1-hour averages, calculating the percent reduction or concentration of CO emissions according to § 63.6620; and ii. Demonstrating that the catalyst achieves the required percent reduction of CO emissions over the 4-hour averaging period, or that the emission remain at or below the CO concentration limit; and
		iii. Conducting an annual RATA of your CEMS using PS 3 and 4A of 40 CFR part 60, appendix B, as well as daily and periodic data quality checks in accordance with

[a] *After you have demonstrated compliance for two consecutive tests, you may reduce the frequency of subsequent performance tests to annually. If the results of any subsequent annual performance test indicate the stationary RICE is not in compliance with the CO or formaldehyde emission limitation, or you deviate from any of your operating limitations, you must resume semiannual performance tests.*

For each . . .	Complying with the requirement to . . .	You must demonstrate continuous compliance by . . .
		40 CFR part 60, appendix F, procedure 1.
4. Non-emergency 4SRB stationary RICE >500 HP located at a major source of HAP	a. Reduce formaldehyde emissions and using NSCR	i. Collecting the catalyst inlet temperature data according to § 63.6625(b); and
		ii. Reducing these data to 4-hour rolling averages; and
		iii. Maintaining the 4-hour rolling averages within the operating limitations for the catalyst inlet temperature; and
		iv. Measuring the pressure drop across the catalyst once per month and demonstrating that the pressure drop across the catalyst is within the operating limitation established during the performance test.
5. Non-emergency 4SRB stationary RICE >500 HP located at a major source of HAP	a. Reduce formaldehyde	i. Collecting the approved

[a] *After you have demonstrated compliance for two consecutive tests, you may reduce the frequency of subsequent performance tests to annually. If the results of any subsequent annual performance test indicate the stationary RICE is not in compliance with the CO or formaldehyde emission limitation, or you deviate from any of your operating limitations, you must resume semiannual performance tests.*

For each . . .	Complying with the requirement to . . .	You must demonstrate continuous compliance by . . .
	emissions and not using NSCR	operating parameter (if any) data according to § 63.6625(b); and
		ii. Reducing these data to 4-hour rolling averages; and
		iii. Maintaining the 4-hour rolling averages within the operating limitations for the operating parameters established during the performance test.
6. Non-emergency 4SRB stationary RICE with a brake HP ≥5,000 located at a major source of HAP	a. Reduce formaldehyde emissions	Conducting semiannual performance tests for formaldehyde to demonstrate that the required formaldehyde percent reduction is achieved, or to demonstrate that the average reduction of emissions of THC determined from the performance test is equal to or greater than 30 percent.[a]

[a] *After you have demonstrated compliance for two consecutive tests, you may reduce the frequency of subsequent performance tests to annually. If the results of any subsequent annual performance test indicate the stationary RICE is not in compliance with the CO or formaldehyde emission limitation, or you deviate from any of your operating limitations, you must resume semiannual performance tests.*

For each . . .	Complying with the requirement to . . .	You must demonstrate continuous compliance by . . .
7. New or reconstructed non-emergency stationary RICE >500 HP located at a major source of HAP and new or reconstructed non-emergency 4SLB stationary RICE 250≤HP≤500 located at a major source of HAP	a. Limit the concentration of formaldehyde in the stationary RICE exhaust and using oxidation catalyst or NSCR	i. Conducting semiannual performance tests for formaldehyde to demonstrate that your emissions remain at or below the formaldehyde concentration limit[a]; and ii. Collecting the catalyst inlet temperature data according to § 63.6625(b); and
		iii. Reducing these data to 4-hour rolling averages; and
		iv. Maintaining the 4-hour rolling averages within the operating limitations for the catalyst inlet temperature; and
		v. Measuring the pressure drop across the catalyst once per month and demonstrating that the pressure drop across the catalyst is within

[a] *After you have demonstrated compliance for two consecutive tests, you may reduce the frequency of subsequent performance tests to annually. If the results of any subsequent annual performance test indicate the stationary RICE is not in compliance with the CO or formaldehyde emission limitation, or you deviate from any of your operating limitations, you must resume semiannual performance tests.*

For each . . .	Complying with the requirement to . . .	You must demonstrate continuous compliance by . . .
		the operating limitation established during the performance test.
8. New or reconstructed non-emergency stationary RICE >500 HP located at a major source of HAP and new or reconstructed non-emergency 4SLB stationary RICE 250≤HP≤500 located at a major source of HAP	a. Limit the concentration of formaldehyde in the stationary RICE exhaust and not using oxidation catalyst or NSCR	i. Conducting semiannual performance tests for formaldehyde to demonstrate that your emissions remain at or below the formaldehyde concentration limit[a]; and ii. Collecting the approved operating parameter (if any) data according to § 63.6625(b); and
		iii. Reducing these data to 4-hour rolling averages; and
		iv. Maintaining the 4-hour rolling averages within the operating limitations for the operating parameters established during the performance test.

[a] After you have demonstrated compliance for two consecutive tests, you may reduce the frequency of subsequent performance tests to annually. If the results of any subsequent annual performance test indicate the stationary RICE is not in compliance with the CO or formaldehyde emission limitation, or you deviate from any of your operating limitations, you must resume semiannual performance tests.

For each . . .	Complying with the requirement to . . .	You must demonstrate continuous compliance by . . .
9. Existing emergency and black start stationary RICE ≤500 HP located at a major source of HAP, existing non-emergency stationary RICE <100 HP located at a major source of HAP, existing emergency and black start stationary RICE located at an area source of HAP, existing non-emergency stationary CI RICE ≤300 HP located at an area source of HAP, existing non-emergency 2SLB stationary RICE located at an area source of HAP, existing non-emergency stationary SI RICE located at an area source of HAP which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis, existing non-emergency 4SLB and 4SRB stationary RICE ≤500 HP located at an area source of HAP, existing non-emergency 4SLB and 4SRB stationary RICE >500 HP located at an area source of HAP that operate 24 hours or less per calendar year, and existing non-emergency 4SLB and 4SRB stationary RICE >500 HP located at an area source of HAP that are remote stationary RICE	a. Work or Management practices	i. Operating and maintaining the stationary RICE according to the manufacturer's emission-related operation and maintenance instructions; or ii. Develop and follow your own maintenance plan which must provide to the extent practicable for the maintenance and operation of the engine in a manner consistent with good air pollution control practice for minimizing emissions.
10. Existing stationary CI RICE >500 HP that are not limited use stationary RICE	a. Reduce CO emissions, or limit the concentration of CO in the stationary RICE exhaust, and using oxidation catalyst	i. Conducting performance tests every 8,760 hours or 3 years, whichever comes first, for CO or formaldehyde, as appropriate, to demonstrate that the required CO or formaldehyde, as

[a] *After you have demonstrated compliance for two consecutive tests, you may reduce the frequency of subsequent performance tests to annually. If the results of any subsequent annual performance test indicate the stationary RICE is not in compliance with the CO or formaldehyde emission limitation, or you deviate from any of your operating limitations, you must resume semiannual performance tests.*

For each . . .	Complying with the requirement to . . .	You must demonstrate continuous compliance by . . .
		appropriate, percent reduction is achieved or that your emissions remain at or below the CO or formaldehyde concentration limit; and
		ii. Collecting the catalyst inlet temperature data according to § 63.6625(b); and
		iii. Reducing these data to 4-hour rolling averages; and
		iv. Maintaining the 4-hour rolling averages within the operating limitations for the catalyst inlet temperature; and
		v. Measuring the pressure drop across the catalyst once per month and demonstrating that the pressure drop across the catalyst is within the operating limitation

[a] *After you have demonstrated compliance for two consecutive tests, you may reduce the frequency of subsequent performance tests to annually. If the results of any subsequent annual performance test indicate the stationary RICE is not in compliance with the CO or formaldehyde emission limitation, or you deviate from any of your operating limitations, you must resume semiannual performance tests.*

For each . . .	Complying with the requirement to . . .	You must demonstrate continuous compliance by . . .
		established during the performance test.
11. Existing stationary CI RICE >500 HP that are not limited use stationary RICE	a. Reduce CO emissions, or limit the concentration of CO in the stationary RICE exhaust, and not using oxidation catalyst	i. Conducting performance tests every 8,760 hours or 3 years, whichever comes first, for CO or formaldehyde, as appropriate, to demonstrate that the required CO or formaldehyde, as appropriate, percent reduction is achieved or that your emissions remain at or below the CO or formaldehyde concentration limit; and
		ii. Collecting the approved operating parameter (if any) data according to § 63.6625(b); and
		iii. Reducing these data to 4-hour rolling averages; and
		iv. Maintaining the 4-hour rolling averages within

[a] *After you have demonstrated compliance for two consecutive tests, you may reduce the frequency of subsequent performance tests to annually. If the results of any subsequent annual performance test indicate the stationary RICE is not in compliance with the CO or formaldehyde emission limitation, or you deviate from any of your operating limitations, you must resume semiannual performance tests.*

For each . . .	Complying with the requirement to . . .	You must demonstrate continuous compliance by . . .
		the operating limitations for the operating parameters established during the performance test.
12. Existing limited use CI stationary RICE >500 HP	a. Reduce CO emissions or limit the concentration of CO in the stationary RICE exhaust, and using an oxidation catalyst	i. Conducting performance tests every 8,760 hours or 5 years, whichever comes first, for CO or formaldehyde, as appropriate, to demonstrate that the required CO or formaldehyde, as appropriate, percent reduction is achieved or that your emissions remain at or below the CO or formaldehyde concentration limit; and
		ii. Collecting the catalyst inlet temperature data according to § 63.6625(b); and
		iii. Reducing these data to 4-hour rolling averages; and

[a] *After you have demonstrated compliance for two consecutive tests, you may reduce the frequency of subsequent performance tests to annually. If the results of any subsequent annual performance test indicate the stationary RICE is not in compliance with the CO or formaldehyde emission limitation, or you deviate from any of your operating limitations, you must resume semiannual performance tests.*

For each . . .	Complying with the requirement to . . .	You must demonstrate continuous compliance by . . .
		iv. Maintaining the 4-hour rolling averages within the operating limitations for the catalyst inlet temperature; and
		v. Measuring the pressure drop across the catalyst once per month and demonstrating that the pressure drop across the catalyst is within the operating limitation established during the performance test.
13. Existing limited use CI stationary RICE >500 HP	a. Reduce CO emissions or limit the concentration of CO in the stationary RICE exhaust, and not using an oxidation catalyst	i. Conducting performance tests every 8,760 hours or 5 years, whichever comes first, for CO or formaldehyde, as appropriate, to demonstrate that the required CO or formaldehyde, as appropriate, percent reduction is achieved or that your emissions

[a] *After you have demonstrated compliance for two consecutive tests, you may reduce the frequency of subsequent performance tests to annually. If the results of any subsequent annual performance test indicate the stationary RICE is not in compliance with the CO or formaldehyde emission limitation, or you deviate from any of your operating limitations, you must resume semiannual performance tests.*

For each . . .	Complying with the requirement to . . .	You must demonstrate continuous compliance by . . .
		remain at or below the CO or formaldehyde concentration limit; and
		ii. Collecting the approved operating parameter (if any) data according to § 63.6625(b); and
		iii. Reducing these data to 4-hour rolling averages; and
		iv. Maintaining the 4-hour rolling averages within the operating limitations for the operating parameters established during the performance test.
14. Existing non-emergency 4SLB stationary RICE >500 HP located at an area source of HAP that are not remote stationary RICE and that are operated more than 24 hours per calendar year	a. Install an oxidation catalyst	i. Conducting annual compliance demonstrations as specified in § 63.6640(c) to show that the average reduction of emissions of CO is 93 percent or more, or the

[a] *After you have demonstrated compliance for two consecutive tests, you may reduce the frequency of subsequent performance tests to annually. If the results of any subsequent annual performance test indicate the stationary RICE is not in compliance with the CO or formaldehyde emission limitation, or you deviate from any of your operating limitations, you must resume semiannual performance tests.*

For each . . .	Complying with the requirement to . . .	You must demonstrate continuous compliance by . . .
		average CO concentration is less than or equal to 47 ppmvd at 15 percent O_2; and either ii. Collecting the catalyst inlet temperature data according to § 63.6625(b), reducing these data to 4-hour rolling averages; and maintaining the 4-hour rolling averages within the limitation of greater than 450 °F and less than or equal to 1350 °F for the catalyst inlet temperature; or iii. Immediately shutting down the engine if the catalyst inlet temperature exceeds 1350 °F.
15. Existing non-emergency 4SRB stationary RICE >500 HP located at an area source of HAP that are not remote stationary RICE and that are operated more than 24 hours per calendar year	a. Install NSCR	i. Conducting annual compliance demonstrations as specified in § 63.6640(c) to

[a] *After you have demonstrated compliance for two consecutive tests, you may reduce the frequency of subsequent performance tests to annually. If the results of any subsequent annual performance test indicate the stationary RICE is not in compliance with the CO or formaldehyde emission limitation, or you deviate from any of your operating limitations, you must resume semiannual performance tests.*

For each . . .	Complying with the requirement to . . .	You must demonstrate continuous compliance by . . .
		show that the average reduction of emissions of CO is 75 percent or more, the average CO concentration is less than or equal to 270 ppmvd at 15 percent O_2, or the average reduction of emissions of THC is 30 percent or more; and either ii. Collecting the catalyst inlet temperature data according to § 63.6625(b), reducing these data to 4-hour rolling averages; and maintaining the 4-hour rolling averages within the limitation of greater than or equal to 750 °F and less than or equal to 1250 °F for the catalyst inlet temperature; or iii. Immediately shutting down the

[a] *After you have demonstrated compliance for two consecutive tests, you may reduce the frequency of subsequent performance tests to annually. If the results of any subsequent annual performance test indicate the stationary RICE is not in compliance with the CO or formaldehyde emission limitation, or you deviate from any of your operating limitations, you must resume semiannual performance tests.*

For each . . .	Complying with the requirement to . . .	You must demonstrate continuous compliance by . . .
		engine if the catalyst inlet temperature exceeds 1250 °F.

[a] *After you have demonstrated compliance for two consecutive tests, you may reduce the frequency of subsequent performance tests to annually. If the results of any subsequent annual performance test indicate the stationary RICE is not in compliance with the CO or formaldehyde emission limitation, or you deviate from any of your operating limitations, you must resume semiannual performance tests.*

[78 FR 6715, Jan. 30, 2013]

Table 7 to Subpart ZZZZ of Part 63—Requirements for Reports

As stated in § 63.6650, you must comply with the following requirements for reports:

For each . . .	You must submit a . . .	The report must contain . . .	You must submit the report . . .
1. Existing non-emergency, non-black start stationary RICE 100≤HP≤500 located at a major source of HAP; existing non-emergency, non-black start stationary CI RICE >500 HP located at a major source of HAP; existing non-emergency 4SRB stationary RICE >500 HP located at a major source of HAP; existing non-emergency, non-black start stationary CI RICE >300 HP located at an area source of HAP; new or reconstructed non-emergency stationary RICE >500 HP located at a major source of HAP; and new or reconstructed non-emergency 4SLB stationary RICE 250≤HP≤500 located at a major source of HAP	Compliance report	a. If there are no deviations from any emission limitations or operating limitations that apply to you, a statement that there were no deviations from the emission limitations or operating limitations during the reporting period. If there were no periods during which the CMS, including CEMS and CPMS, was out-of-control, as specified in § 63.8(c)(7), a statement that there were not periods during which the CMS was out-of-control during the reporting period; or	i. Semiannually according to the requirements in § 63.6650(b)(1)-(5) for engines that are not limited use stationary RICE subject to numerical emission limitations; and ii. Annually according to

For each . . .	You must submit a . . .	The report must contain . . .	You must submit the report . . .
			the requirements in § 63.6650(b)(6)-(9) for engines that are limited use stationary RICE subject to numerical emission limitations.
		b. If you had a deviation from any emission limitation or operating limitation during the reporting period, the information in § 63.6650(d). If there were periods during which the CMS, including CEMS and CPMS, was out-of-control, as specified in § 63.8(c)(7), the information in § 63.6650(e); or	i. Semiannually according to the requirements in § 63.6650(b).
		c. If you had a malfunction during the reporting period, the information in § 63.6650(c)(4)	i. Semiannually according to the requirements in § 63.6650(b).
2. New or reconstructed non-emergency stationary RICE that combusts landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis	Report	a. The fuel flow rate of each fuel and the heating values that were used in your calculations, and you must demonstrate that the percentage of heat input provided by landfill gas or digester gas, is equivalent to 10 percent or more of the gross heat input on an annual basis; and	i. Annually, according to the requirements in § 63.6650.

For each . . .	You must submit a . . .	The report must contain . . .	You must submit the report . . .
		b. The operating limits provided in your federally enforceable permit, and any deviations from these limits; and	i. See item 2.a.i.
		c. Any problems or errors suspected with the meters	i. See item 2.a.i.
3. Existing non-emergency, non-black start 4SLB and 4SRB stationary RICE >500 HP located at an area source of HAP that are not remote stationary RICE and that operate more than 24 hours per calendar year	Compliance report	a. The results of the annual compliance demonstration, if conducted during the reporting period	i. Semiannually according to the requirements in § 63.6650(b)(1)-(5).
4. Emergency stationary RICE that operate for the purposes specified in § 63.6640(f)(4)(ii)	Report	a. The information in § 63.6650(h)(1)	i. annually according to the requirements in § 63.6650(h)(2)-(3).

[87 FR 48608, Aug. 10, 2022]

Table 8 to Subpart ZZZZ of Part 63—Applicability of General Provisions to Subpart ZZZZ.

As stated in § 63.6665, you must comply with the following applicable general provisions.

General provisions citation	Subject of citation	Applies to subpart	Explanation
§ 63.1	General applicability of the General Provisions	Yes.	
§ 63.2	Definitions	Yes	Additional terms defined in § 63.6675.
§ 63.3	Units and abbreviations	Yes.	

General provisions citation	Subject of citation	Applies to subpart	Explanation
§ 63.4	Prohibited activities and circumvention	Yes.	
§ 63.5	Construction and reconstruction	Yes.	
§ 63.6(a)	Applicability	Yes.	
§ 63.6(b)(1)-(4)	Compliance dates for new and reconstructed sources	Yes.	
§ 63.6(b)(5)	Notification	Yes.	
§ 63.6(b)(6)	[Reserved]		
§ 63.6(b)(7)	Compliance dates for new and reconstructed area sources that become major sources	Yes.	
§ 63.6(c)(1)-(2)	Compliance dates for existing sources	Yes.	
§ 63.6(c)(3)-(4)	[Reserved]		
§ 63.6(c)(5)	Compliance dates for existing area sources that become major sources	Yes.	
§ 63.6(d)	[Reserved]		
§ 63.6(e)	Operation and maintenance	No.	
§ 63.6(f)(1)	Applicability of standards	No.	
§ 63.6(f)(2)	Methods for determining compliance	Yes.	
§ 63.6(f)(3)	Finding of compliance	Yes.	
§ 63.6(g)(1)-(3)	Use of alternate standard	Yes.	
§ 63.6(h)	Opacity and visible emission standards	No	Subpart ZZZZ does not contain opacity or visible emission standards.
§ 63.6(i)	Compliance extension procedures and criteria	Yes.	
§ 63.6(j)	Presidential compliance exemption	Yes.	
§ 63.7(a)(1)-(2)	Performance test	Yes	Subpart ZZZZ contains performance

General provisions citation	Subject of citation	Applies to subpart	Explanation
	dates		test dates at §§ 63.6610, 63.6611, and 63.6612.
§ 63.7(a)(3)	CAA section 114 authority	Yes.	
§ 63.7(b)(1)	Notification of performance test	Yes	Except that § 63.7(b)(1) only applies as specified in § 63.6645.
§ 63.7(b)(2)	Notification of rescheduling	Yes	Except that § 63.7(b)(2) only applies as specified in § 63.6645.
§ 63.7(c)	Quality assurance/test plan	Yes	Except that § 63.7(c) only applies as specified in § 63.6645.
§ 63.7(d)	Testing facilities	Yes.	
§ 63.7(e)(1)	Conditions for conducting performance tests	No.	Subpart ZZZZ specifies conditions for conducting performance tests at § 63.6620.
§ 63.7(e)(2)	Conduct of performance tests and reduction of data	Yes	Subpart ZZZZ specifies test methods at § 63.6620.
§ 63.7(e)(3)	Test run duration	Yes.	
§ 63.7(e)(4)	Administrator may require other testing under section 114 of the CAA	Yes.	
§ 63.7(f)	Alternative test method provisions	Yes.	
§ 63.7(g)	Performance test data analysis, recordkeeping, and reporting	Yes.	
§ 63.7(h)	Waiver of tests	Yes.	
§ 63.8(a)(1)	Applicability of monitoring requirements	Yes	Subpart ZZZZ contains specific requirements for monitoring at § 63.6625.
§ 63.8(a)(2)	Performance specifications	Yes.	
§ 63.8(a)(3)	[Reserved]		
§ 63.8(a)(4)	Monitoring for control devices	No.	
§ 63.8(b)(1)	Monitoring	Yes.	
§ 63.8(b)(2)-(3)	Multiple effluents and	Yes.	

General provisions citation	Subject of citation	Applies to subpart	Explanation
	multiple monitoring systems		
§ 63.8(c)(1)	Monitoring system operation and maintenance	Yes.	
§ 63.8(c)(1)(i)	Routine and predictable SSM	No	
§ 63.8(c)(1)(ii)	SSM not in Startup Shutdown Malfunction Plan	Yes.	
§ 63.8(c)(1)(iii)	Compliance with operation and maintenance requirements	No	
§ 63.8(c)(2)-(3)	Monitoring system installation	Yes.	
§ 63.8(c)(4)	Continuous monitoring system (CMS) requirements	Yes	Except that subpart ZZZZ does not require Continuous Opacity Monitoring System (COMS).
§ 63.8(c)(5)	COMS minimum procedures	No	Subpart ZZZZ does not require COMS.
§ 63.8(c)(6)-(8)	CMS requirements	Yes	Except that subpart ZZZZ does not require COMS.
§ 63.8(d)	CMS quality control	Yes.	
§ 63.8(e)	CMS performance evaluation	Yes	Except for § 63.8(e)(5)(ii), which applies to COMS.
		Except that § 63.8(e) only applies as specified in § 63.6645.	
§ 63.8(f)(1)-(5)	Alternative monitoring method	Yes	Except that § 63.8(f)(4) only applies as specified in § 63.6645.
§ 63.8(f)(6)	Alternative to relative accuracy test	Yes	Except that § 63.8(f)(6) only applies as specified in § 63.6645.
§ 63.8(g)	Data reduction	Yes	Except that provisions for COMS are not applicable. Averaging periods for demonstrating compliance are specified at §§ 63.6635 and 63.6640.
§ 63.9(a)	Applicability and State	Yes.	

General provisions citation	Subject of citation	Applies to subpart	Explanation
	delegation of notification requirements		
§ 63.9(b)(1)-(5)	Initial notifications	Yes	Except that § 63.9(b)(3) is reserved.
		Except that § 63.9(b) only applies as specified in § 63.6645.	
§ 63.9(c)	Request for compliance extension	Yes	Except that § 63.9(c) only applies as specified in § 63.6645.
§ 63.9(d)	Notification of special compliance requirements for new sources	Yes	Except that § 63.9(d) only applies as specified in § 63.6645.
§ 63.9(e)	Notification of performance test	Yes	Except that § 63.9(e) only applies as specified in § 63.6645.
§ 63.9(f)	Notification of visible emission (VE)/opacity test	No	Subpart ZZZZ does not contain opacity or VE standards.
§ 63.9(g)(1)	Notification of performance evaluation	Yes	Except that § 63.9(g) only applies as specified in § 63.6645.
§ 63.9(g)(2)	Notification of use of COMS data	No	Subpart ZZZZ does not contain opacity or VE standards.
§ 63.9(g)(3)	Notification that criterion for alternative to RATA is exceeded	Yes	If alternative is in use.
		Except that § 63.9(g) only applies as specified in § 63.6645.	
§ 63.9(h)(1)-(6)	Notification of compliance status	Yes	Except that notifications for sources using a CEMS are due 30 days after completion of performance evaluations. § 63.9(h)(4) is reserved.
			Except that § 63.9(h) only applies as specified in § 63.6645.
§ 63.9(i)	Adjustment of	Yes.	

General provisions citation	Subject of citation	Applies to subpart	Explanation
	submittal deadlines		
§ 63.9(j)	Change in previous information	Yes.	
§ 63.9(k)	Electronic reporting procedures	Yes	Only as specified in § 63.9(j).
§ 63.10(a)	Administrative provisions for recordkeeping/ reporting	Yes.	
§ 63.10(b)(1)	Record retention	Yes	Except that the most recent 2 years of data do not have to be retained on site.
§ 63.10(b)(2)(i)-(v)	Records related to SSM	No.	
§ 63.10(b)(2)(vi)-(xi)	Records	Yes.	
§ 63.10(b)(2)(xii)	Record when under waiver	Yes.	
§ 63.10(b)(2)(xiii)	Records when using alternative to RATA	Yes	For CO standard if using RATA alternative.
§ 63.10(b)(2)(xiv)	Records of supporting documentation	Yes.	
§ 63.10(b)(3)	Records of applicability determination	Yes.	
§ 63.10(c)	Additional records for sources using CEMS	Yes	Except that § 63.10(c)(2)-(4) and (9) are reserved.
§ 63.10(d)(1)	General reporting requirements	Yes.	
§ 63.10(d)(2)	Report of performance test results	Yes.	
§ 63.10(d)(3)	Reporting opacity or VE observations	No	Subpart ZZZZ does not contain opacity or VE standards.
§ 63.10(d)(4)	Progress reports	Yes.	
§ 63.10(d)(5)	Startup, shutdown, and malfunction reports	No.	
§ 63.10(e)(1) and (2)(i)	Additional CMS Reports	Yes.	

General provisions citation	Subject of citation	Applies to subpart	Explanation
§ 63.10(e)(2)(ii)	COMS-related report	No	Subpart ZZZZ does not require COMS.
§ 63.10(e)(3)	Excess emission and parameter exceedances reports	Yes.	Except that § 63.10(e)(3)(i) (C) is reserved.
§ 63.10(e)(4)	Reporting COMS data	No	Subpart ZZZZ does not require COMS.
§ 63.10(f)	Waiver for recordkeeping/ reporting	Yes.	
§ 63.11	Flares	No.	
§ 63.12	State authority and delegations	Yes.	
§ 63.13	Addresses	Yes.	
§ 63.14	Incorporation by reference	Yes.	
§ 63.15	Availability of information	Yes.	

[75 FR 9688, Mar. 3, 2010, as amended at 78 FR 6720, Jan. 30, 2013; 85 FR 73912, Nov. 19, 2020]

Appendix A to Subpart ZZZZ of Part 63—Protocol for Using an Electrochemical Analyzer to Determine Oxygen and Carbon Monoxide Concentrations From Certain Engines

1.0 Scope and Application. What is this Protocol?

This protocol is a procedure for using portable electrochemical (EC) cells for measuring carbon monoxide (CO) and oxygen (O_2) concentrations in controlled and uncontrolled emissions from existing stationary 4-stroke lean burn and 4-stroke rich burn reciprocating internal combustion engines as specified in the applicable rule.

1.1 Analytes. What does this protocol determine?

This protocol measures the engine exhaust gas concentrations of carbon monoxide (CO) and oxygen (O_2).

Analyte	CAS No.	Sensitivity
Carbon monoxide (CO)	630-08-0	Minimum detectable limit should be 2 percent of the nominal range or 1 ppm, whichever is less restrictive.
Oxygen (O_2)	*7782-44-7*	

1.2 Applicability. When is this protocol acceptable?

This protocol is applicable to 40 CFR part 63, subpart ZZZZ. Because of inherent cross sensitivities of EC cells, you must not apply this protocol to other emissions sources without specific instruction to that effect.

1.3 Data Quality Objectives. How good must my collected data be?

Refer to Section 13 to verify and document acceptable analyzer performance.

1.4 Range. What is the targeted analytical range for this protocol?

The measurement system and EC cell design(s) conforming to this protocol will determine the analytical range for each gas component. The nominal ranges are defined by choosing up-scale calibration gas concentrations near the maximum anticipated flue gas concentrations for CO and O_2, or no more than twice the permitted CO level.

1.5 Sensitivity. What minimum detectable limit will this protocol yield for a particular gas component?

The minimum detectable limit depends on the nominal range and resolution of the specific EC cell used, and the signal to noise ratio of the measurement system. The minimum detectable limit should be 2 percent of the nominal range or 1 ppm, whichever is less restrictive.

2.0 Summary of Protocol

In this protocol, a gas sample is extracted from an engine exhaust system and then conveyed to a portable EC analyzer for measurement of CO and O_2 gas concentrations. This method provides measurement system performance specifications and sampling protocols to ensure reliable data. You may use additions to, or modifications of vendor supplied measurement systems (e.g., heated or

unheated sample lines, thermocouples, flow meters, selective gas scrubbers, etc.) to meet the design specifications of this protocol. Do not make changes to the measurement system from the as-verified configuration (Section 3.12).

3.0 Definitions

3.1 ***Measurement System.*** The total equipment required for the measurement of CO and O_2 concentrations. The measurement system consists of the following major subsystems:

3.1.1 ***Data Recorder.*** A strip chart recorder, computer or digital recorder for logging measurement data from the analyzer output. You may record measurement data from the digital data display manually or electronically.

3.1.2 ***Electrochemical (EC) Cell.*** A device, similar to a fuel cell, used to sense the presence of a specific analyte and generate an electrical current output proportional to the analyte concentration.

3.1.3 ***Interference Gas Scrubber.*** A device used to remove or neutralize chemical compounds that may interfere with the selective operation of an EC cell.

3.1.4 ***Moisture Removal System.*** Any device used to reduce the concentration of moisture in the sample stream so as to protect the EC cells from the damaging effects of condensation and to minimize errors in measurements caused by the scrubbing of soluble gases.

3.1.5 ***Sample Interface.*** The portion of the system used for one or more of the following: sample acquisition; sample transport; sample conditioning or protection of the EC cell from any degrading effects of the engine exhaust effluent; removal of particulate matter and condensed moisture.

3.2 ***Nominal Range.*** The range of analyte concentrations over which each EC cell is operated (normally 25 percent to 150 percent of up-scale calibration gas value). Several nominal ranges can be used for any given cell so long as the calibration and repeatability checks for that range remain within specifications.

3.3 ***Calibration Gas.*** A vendor certified concentration of a specific analyte in an appropriate balance gas.

3.4 ***Zero Calibration Error.*** The analyte concentration output exhibited by the EC cell in response to zero-level calibration gas.

3.5 ***Up-Scale Calibration Error.*** The mean of the difference between the analyte concentration exhibited by the EC cell and the certified concentration of the up-scale calibration gas.

3.6 ***Interference Check.*** A procedure for quantifying analytical interference from components in the engine exhaust gas other than the targeted analytes.

3.7 ***Repeatability Check.*** A protocol for demonstrating that an EC cell operated over a given nominal analyte concentration range provides a stable and consistent response and is not significantly affected by repeated exposure to that gas.

3.8 ***Sample Flow Rate.*** The flow rate of the gas sample as it passes through the EC cell. In some situations, EC cells can experience drift with changes in flow rate. The flow rate must be monitored and documented during all phases of a sampling run.

3.9 ***Sampling Run.*** A timed three-phase event whereby an EC cell's response rises and plateaus in a sample conditioning phase, remains relatively constant during a measurement data phase, then declines during a refresh phase. The sample conditioning phase exposes the EC cell to the gas sample for a length of time sufficient to reach a constant response. The measurement data phase is the time interval during which gas sample measurements can be made that meet the acceptance criteria of this protocol. The refresh phase then purges the EC cells with CO-free air. The refresh phase replenishes requisite O_2 and moisture in the electrolyte reserve and provides a mechanism to de-gas or desorb any interference gas scrubbers or filters so as to enable a stable CO EC cell response. There are four primary types of sampling runs: pre- sampling calibrations; stack gas sampling; post-sampling calibration checks; and measurement system repeatability checks. Stack gas sampling runs can be chained together for extended evaluations, providing all other procedural specifications are met.

3.10 ***Sampling Day.*** A time not to exceed twelve hours from the time of the pre-sampling calibration to the post-sampling calibration check. During this time, stack gas sampling runs can be repeated without repeated recalibrations, providing all other sampling specifications have been met.

3.11 ***Pre-Sampling Calibration/Post-Sampling Calibration Check.*** The protocols executed at the beginning and end of each sampling day to bracket measurement readings with controlled performance checks.

3.12 ***Performance-Established Configuration.*** The EC cell and sampling system configuration that existed at the time that it initially met the performance requirements of this protocol.

4.0 Interferences.

When present in sufficient concentrations, NO and NO_2 are two gas species that have been reported to interfere with CO concentration measurements. In the likelihood of this occurrence, it is the protocol user's responsibility to employ and properly maintain an appropriate CO EC cell filter or scrubber for removal of these gases, as described in Section 6.2.12.

5.0 Safety. [Reserved]

6.0 Equipment and Supplies.

6.1 What equipment do I need for the measurement system?

The system must maintain the gas sample at conditions that will prevent moisture condensation in the sample transport lines, both before and as the sample gas contacts the EC cells. The essential components of the measurement system are described below.

6.2 Measurement System Components.

6.2.1 ***Sample Probe.*** A single extraction-point probe constructed of glass, stainless steel or other non-reactive material, and of length sufficient to reach any designated sampling point. The sample probe must be designed to prevent plugging due to condensation or particulate matter.

6.2.2 ***Sample Line.*** Non-reactive tubing to transport the effluent from the sample probe to the EC cell.

6.2.3 ***Calibration Assembly (optional).*** A three-way valve assembly or equivalent to introduce calibration gases at ambient pressure at the exit end of the sample probe during calibration checks. The assembly must be designed such that only stack gas or calibration gas flows in the sample line and all gases flow through any gas path filters.

6.2.4 ***Particulate Filter (optional).*** Filters before the inlet of the EC cell to prevent accumulation of particulate material in the measurement system and extend the useful life of the components. All filters must be fabricated of materials that are non-reactive to the gas mixtures being sampled.

6.2.5 ***Sample Pump.*** A leak-free pump to provide undiluted sample gas to the system at a flow rate sufficient to minimize the response time of the measurement system. If located upstream of the EC cells, the pump must be constructed of a material that is non-reactive to the gas mixtures being sampled.

6.2.8 ***Sample Flow Rate Monitoring.*** An adjustable rotameter or equivalent device used to adjust and maintain the sample flow rate through the analyzer as prescribed.

6.2.9 ***Sample Gas Manifold (optional).*** A manifold to divert a portion of the sample gas stream to the analyzer and the remainder to a by-pass discharge vent. The sample gas manifold may also include provisions for introducing calibration gases directly to the analyzer. The manifold must be constructed of a material that is non-reactive to the gas mixtures being sampled.

6.2.10 ***EC cell.*** A device containing one or more EC cells to determine the CO and O_2 concentrations in the sample gas stream. The EC cell(s) must meet the applicable performance specifications of Section 13 of this protocol.

6.2.11 ***Data Recorder.*** A strip chart recorder, computer or digital recorder to make a record of analyzer output data. The data recorder resolution (i.e., readability) must be no greater than 1 ppm for CO; 0.1 percent for O_2; and one degree (either °C or °F) for temperature. Alternatively, you may use a digital or analog meter having the same resolution to observe and manually record the analyzer responses.

6.2.12 ***Interference Gas Filter or Scrubber.*** A device to remove interfering compounds upstream of the CO EC cell. Specific interference gas filters or scrubbers used in the performance-established configuration of the analyzer must continue to be used. Such a filter or scrubber must have a means to determine when the removal agent is exhausted. Periodically replace or replenish it in accordance with the manufacturer's recommendations.

7.0 Reagents and Standards. What calibration gases are needed?

7.1 ***Calibration Gases.*** CO calibration gases for the EC cell must be CO in nitrogen or CO in a mixture of nitrogen and O_2. Use CO calibration gases with labeled concentration values certified by the manufacturer to be within ±5 percent of the label value. Dry ambient air (20.9 percent O_2) is acceptable for calibration of the O_2 cell. If needed, any lower percentage O_2 calibration gas must be a mixture of O_2 in nitrogen.

7.1.1 ***Up-Scale CO Calibration Gas Concentration.*** Choose one or more up-scale gas concentrations such that the average of the stack gas measurements for each stack gas sampling run are between 25 and 150 percent of those concentrations. Alternatively, choose an up-scale gas that

does not exceed twice the concentration of the applicable outlet standard. If a measured gas value exceeds 150 percent of the up-scale CO calibration gas value at any time during the stack gas sampling run, the run must be discarded and repeated.

7.1.2 ***Up-Scale O_2 Calibration Gas Concentration.***

Select an O_2 gas concentration such that the difference between the gas concentration and the average stack gas measurement or reading for each sample run is less than 15 percent O_2. When the average exhaust gas O_2 readings are above 6 percent, you may use dry ambient air (20.9 percent O_2) for the up-scale O_2 calibration gas.

7.1.3 ***Zero Gas.*** Use an inert gas that contains less than 0.25 percent of the up-scale CO calibration gas concentration. You may use dry air that is free from ambient CO and other combustion gas products (e.g., CO_2).

8.0 Sample Collection and Analysis

8.1 ***Selection of Sampling Sites.***

8.1.1 ***Control Device Inlet.*** Select a sampling site sufficiently downstream of the engine so that the combustion gases should be well mixed. Use a single sampling extraction point near the center of the duct (e.g., within the 10 percent centroidal area), unless instructed otherwise.

8.1.2 ***Exhaust Gas Outlet.*** Select a sampling site located at least two stack diameters downstream of any disturbance (e.g., turbocharger exhaust, crossover junction or recirculation take-off) and at least one-half stack diameter upstream of the gas discharge to the atmosphere. Use a single sampling extraction point near the center of the duct (e.g., within the 10 percent centroidal area), unless instructed otherwise.

8.2 ***Stack Gas Collection and Analysis.*** Prior to the first stack gas sampling run, conduct that the pre-sampling calibration in accordance with Section 10.1. Use Figure 1 to record all data. Zero the analyzer with zero gas. Confirm and record that the scrubber media color is correct and not exhausted. Then position the probe at the sampling point and begin the sampling run at the same flow rate used during the up-scale calibration. Record the start time. Record all EC cell output responses and the flow rate during the “sample conditioning phase” once per minute until constant readings are obtained. Then begin the “measurement data phase” and record readings every 15 seconds for at least two minutes (or eight readings), or as otherwise required to achieve two continuous minutes of data that meet the specification given in Section 13.1. Finally, perform the “refresh phase” by introducing dry air, free from CO and other combustion gases, until several minute-to-minute readings of consistent value have been obtained. For each run use the “measurement data phase” readings to calculate the average stack gas CO and O_2 concentrations.

8.3 ***EC Cell Rate.*** Maintain the EC cell sample flow rate so that it does not vary by more than ±10 percent throughout the pre-sampling calibration, stack gas sampling and post-sampling calibration check. Alternatively, the EC cell sample flow rate can be maintained within a tolerance range that does not affect the gas concentration readings by more than ±3 percent, as instructed by the EC cell manufacturer.

9.0 Quality Control (Reserved)

10.0 Calibration and Standardization

10.1 ***Pre-Sampling Calibration.*** Conduct the following protocol once for each nominal range to be used on each EC cell before performing a stack gas sampling run on each field sampling day. Repeat the calibration if you replace an EC cell before completing all of the sampling runs. There is no prescribed order for calibration of the EC cells; however, each cell must complete the measurement data phase during calibration. Assemble the measurement system by following the manufacturer's recommended protocols including for preparing and preconditioning the EC cell. Assure the measurement system has no leaks and verify the gas scrubbing agent is not depleted. Use Figure 1 to record all data.

10.1.1 ***Zero Calibration.*** For both the O_2 and CO cells, introduce zero gas to the measurement system (e.g., at the calibration assembly) and record the concentration reading every minute until readings are constant for at least two consecutive minutes. Include the time and sample flow rate. Repeat the steps in this section at least once to verify the zero calibration for each component gas.

10.1.2 ***Zero Calibration Tolerance.*** For each zero gas introduction, the zero level output must be less than or equal to ±3 percent of the up-scale gas value or ±1 ppm, whichever is less restrictive, for the CO channel and less than or equal to ±0.3 percent O_2 for the O_2 channel.

10.1.3 ***Up-Scale Calibration.*** Individually introduce each calibration gas to the measurement system (e.g., at the calibration assembly) and record the start time. Record all EC cell output responses and the flow rate during this “sample conditioning phase” once per minute until readings are constant for at least two minutes. Then begin the “measurement data phase” and record readings every 15 seconds for a total of two minutes, or as otherwise required. Finally, perform the “refresh phase” by introducing dry air, free from CO and other combustion gases, until readings are constant for at least two consecutive minutes. Then repeat the steps in this section at least once to verify the calibration for each component gas. Introduce all gases to flow through the entire sample handling system (i.e., at the exit end of the sampling probe or the calibration assembly).

10.1.4 ***Up-Scale Calibration Error.*** The mean of the difference of the “measurement data phase” readings from the reported standard gas value must be less than or equal to ±5 percent or ±1 ppm for CO or ±0.5 percent O_2, whichever is less restrictive, respectively. The maximum allowable deviation from the mean measured value of any single “measurement data phase” reading must be less than or equal to ±2 percent or ±1 ppm for CO or ±0.5 percent O_2, whichever is less restrictive, respectively.

10.2 ***Post-Sampling Calibration Check.*** Conduct a stack gas post-sampling calibration check after the stack gas sampling run or set of runs and within 12 hours of the initial calibration. Conduct up-scale and zero calibration checks using the protocol in Section 10.1. Make no changes to the sampling system or EC cell calibration until all post-sampling calibration checks have been recorded. If either the zero or up-scale calibration error exceeds the respective specification in Sections 10.1.2 and 10.1.4 then all measurement data collected since the previous successful calibrations are invalid and re-calibration and re-sampling are required. If the sampling system is disassembled or the EC cell calibration is adjusted, repeat the calibration check before conducting the next analyzer sampling run.

11.0 Analytical Procedure

The analytical procedure is fully discussed in Section 8.

12.0 Calculations and Data Analysis

Determine the CO and O_2 concentrations for each stack gas sampling run by calculating the mean gas concentrations of the data recorded during the “measurement data phase”.

13.0 Protocol Performance

Use the following protocols to verify consistent analyzer performance during each field sampling day.

13.1 ***Measurement Data Phase Performance Check.*** Calculate the mean of the readings from the “measurement data phase”. The maximum allowable deviation from the mean for each of the individual readings is ±2 percent, or ±1 ppm, whichever is less restrictive. Record the mean value and maximum deviation for each gas monitored. Data must conform to Section 10.1.4. The EC cell flow rate must conform to the specification in Section 8.3.

> *Example:* A measurement data phase is invalid if the maximum deviation of any single reading comprising that mean is greater than ±2 percent *or* ±1 ppm (the default criteria). For example, if the mean = 30 ppm, single readings of below 29 ppm and above 31 ppm are disallowed).

13.2 ***Interference Check.*** Before the initial use of the EC cell and interference gas scrubber in the field, and semi-annually thereafter, challenge the interference gas scrubber with NO and NO_2 gas standards that are generally recognized as representative of diesel-fueled engine NO and NO_2 emission values. Record the responses displayed by the CO EC cell and other pertinent data on Figure 1 or a similar form.

13.2.1 ***Interference Response.*** The combined NO and NO_2 interference response should be less than or equal to ±5 percent of the up-scale CO calibration gas concentration.

13.3 ***Repeatability Check.*** Conduct the following check once for each nominal range that is to be used on the CO EC cell within 5 days prior to each field sampling program. If a field sampling program lasts longer than 5 days, repeat this check every 5 days. Immediately repeat the check if the EC cell is replaced or if the EC cell is exposed to gas concentrations greater than 150 percent of the highest up-scale gas concentration.

13.3.1 ***Repeatability Check Procedure.*** Perform a complete EC cell sampling run (all three phases) by introducing the CO calibration gas to the measurement system and record the response. Follow Section 10.1.3. Use Figure 1 to record all data. Repeat the run three times for a total of four complete runs. During the four repeatability check runs, do not adjust the system except where necessary to achieve the correct calibration gas flow rate at the analyzer.

13.3.2 ***Repeatability Check Calculations.*** Determine the highest and lowest average "measurement data phase" CO concentrations from the four repeatability check runs and record the results on Figure 1 or a similar form. The absolute value of the difference between the maximum and minimum average values recorded must not vary more than ±3 percent or ±1 ppm of the up-scale gas value, whichever is less restrictive.

14.0 Pollution Prevention (Reserved)

15.0 Waste Management (Reserved)

16.0 Alternative Procedures (Reserved)

17.0 References

(1) ***"Development of an Electrochemical Cell Emission Analyzer Test Protocol"*** , Topical Report, Phil Juneau, Emission Monitoring, Inc., July 1997.

(2) ***"Determination of Nitrogen Oxides, Carbon Monoxide, and Oxygen Emissions from Natural Gas-Fired Engines, Boilers, and Process Heaters Using Portable Analyzers"*** , EMC Conditional Test Protocol 30 (CTM-30), Gas Research Institute Protocol GRI-96/0008, Revision 7, October 13, 1997.

(3) ***"ICAC Test Protocol for Periodic Monitoring"*** , EMC Conditional Test Protocol 34 (CTM-034), The Institute of Clean Air Companies, September 8, 1999.

(4) ***"Code of Federal Regulations"*** , Protection of Environment, 40 CFR, Part 60, Appendix A, Methods 1-4; 10.

TABLE 1: APPENDIX A—SAMPLING RUN DATA.

Facility_____ Engine I.D._____ Date_____

Run Type:	(_)	(_)	(_)	(_)
(X)	Pre-Sample Calibration	Stack Gas Sample	Post-Sample Cal. Check	Repeatability Check

Run #	1	1	2	2	3	3	4	4	Time	Scrub. OK	Flow- Rate
Gas	O_2	CO	O_2	CO	O_2	CO	O_2	CO			
Sample Cond. Phase											
"											
"											
"											
"											
Measurement Data Phase											
"											
"											
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"											
"											
"											
"											
"											
"											
"											
Mean											
Refresh Phase											
"											
"											
"											
"											

[78 FR 6721, Jan. 30, 2013]

Appendix D

MANUFACTURER SPECIFICATIONS AND VENDOR STATEMENT

P85-P114, P116-P135, P137-P202, P204-P233

FOR MKE09/10/11 REFERENCE

Submittal - For Record

Microsoft - MKE03 - COLO - C3000D6E

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™

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SUBMITTAL

TO

Microsoft

FOR

MKE03/04

CUMMINS GENERATOR SETS
Model: C3000 QSK95

Generator

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)

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- Bill of Materials
- Genset Data Sheets
- QSK95 Specification Sheet
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- Alternator Data Sheet
- IBC Certification
- Warranty Statesment

Generator Enclosure

- Tier4 UL142
- Mechanical Drawings
- Sound Data
- Elevation Drawing
- Electrical Drawings
- Enclosure Data Sheets

Generator Main Circuit Breaker

- 4000A Switchboard Elevation Drawing Exertherm
- Breaker Aux Contacts
- Cut Sheets

High Resistive Ground

- Front Panel Layout

Generator PAC SWGR (Technibus)

- SWGR Drawings
- Spec Sheets

EPMS Submittal

- EPMS Cabinet
- Point to Point Diagram
- Schematics
- Points List
- Spec Sheets

Specification CDE

Sales and Service

BOM Genset

Product Code	Description
Install-US-Stat	U.S. EPA, Stationary Emergency Application
C3000 D6E	C3000D6E, Diesel Genset, 60Hz, 3000kW-Standby Rating
A331-2	Duty Rating - Standby Power (ESP)
L170-2	Emission Certification, EPA, Tier 2, NSPS CI Stationary Emergency
L090-2	Listing - UL 2200
L193-2	NFPA 110 Type 10 Level 1 Capable
L228-2	Cert - Seismic, IBC2000, IBC2003, IBC2006, IBC2009, IBC2011
L239-2	Auxiliary Supply Voltage - 120V, 1 Phase, 2W
R002-2	Voltage - 277/480, 3 Phase, Wye, 4 Wire
B801-2	Alternator - 60Hz, 3Phase, 480 Volt, 125/105/80C - Standby/Prime/Continuous
A416-2	Alternator Heater, 110/220 (120/240) Volt AC
B225-2	Stator Winding Temperature Sensors, 2 RTD per Phase
B244-2	Bearing Temperature Sensor RTDs
C286-2	Fuel Filters - Stage 1 Redundant
H609-2	Control Mounting - Left Facing
H704-2	PowerCommand 3.3 Controller, Paralleling Capable
A362-2	Control Cabinet Heater, 120 Volt AC
H244-2	Gauge - Exhaust Gas Temperature
H678-2	LCD Control Display
H731-2	Display - Exhaust Port Temp, Exhaust gas temperature sensors (EGTS) are mounted in each cylinder head of the engine for improved diagnostic capability
KA08-2	Alarm - Audible, Engine Shutdown
KX24-2	Relays - User Configured
H536-2	Control Display Language - English
K028-2	Circuit Breaker - None
A334-2	Engine Starter - 24 Volt DC Motor
D041-2	Engine Air Cleaner - Normal Duty
A333-2	Battery Charging Alternator
E128-2	Engine Cooling - Radiator, High Ambient Air Temperature, Ship Loose

Product Code	Description
H389-2	Shutdown - Low Coolant Level
H737-2	Coolant Heater - 400/480 Volts AC, 40F Minimum Ambient Temperature
H268-2	Extension - Oil Drain
H663-2	Priming - Engine Lube Oil, Starting Only
H607-2	Engine Oil Filters, Full Flow with Bypass
H732-2	Breather - Coalescor
L010-2	Test Record - Strip Chart
L023-2	Test Record - Safety Shutdowns
L024-2	Test Record - Exhaust Temperature
L025-2	Test Record - Ambient Temperature and Pressure
L026-2	Cummins Certified Test Record
L028-2	Genset Warranty - 2 Years Base
L050-2	Literature - English
A358-2	Packing - Standard. This is the standard packing for domestic over the-road deliveries

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)

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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.

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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.

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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.

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

Note: Consult factory for other voltages.

Generator Set Options and Accessories

Engine

- 480 V thermostatically controlled coolant heater for ambient above 4.5 °C (40 °F)
- Heavy duty air cleaner
- Redundant fuel filter
- Air starter
- Redundant electric starting
- Eliminator oil filter system
- Lube oil make up
- Coalescing breather filter

Alternator

- 80 °C rise
- 105 °C rise
- 125 °C rise
- 150 °C rise
- Differential current transformers

Cooling System

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

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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

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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

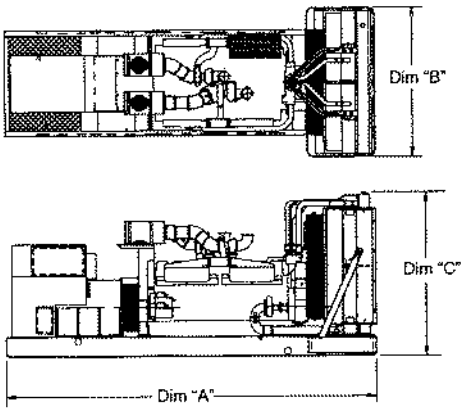
Ratings Definitions

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.

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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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Specification Sheet

PowerCommand® 3.3 Generator Set Digital Integrated Control System

Bargraph Optional

Introduction

The PowerCommand® 3.3 control system is a microprocessor-based generator set monitoring, metering, and control system, which is comprised of PowerCommand® Control 3300 and the Human Machine Interface 320. PCC3300 supports multiple operation modes including:

- Standalone,
- Synchronization only,
- Isolated bus paralleling,
- Utility single generator set paralleling,
- Utility multiple generator set paralleling,
- Utility single generator set paralleling with power transfer control (automatic mains failure),
- Isolated bus paralleling with Masterless Load Demand

PowerCommand® Control 3300 is designed to meet the exacting demands of the harsh and diverse environments of today's typical power generation applications for Full Authority Electronic or Hydromechanical engine power generator sets.

Offering enhanced reliability and performance over more conventional generator set controls via the integration of all generator control functions into a single system, PCC3300 is your Power of One generator set control solution.

Benefits and Features

- 320 x 240 pixels graphical LED backlit LCD
- Multiple languages supported
- AmpSentry™ protection provides industry-leading generator overcurrent protection
- Digital Power Transfer Control (Automatic Mains Failure) provides load transfer operation in open transition, closed transition, or soft (ramping) transfer modes
- Extended Paralleling (Peak Shave/Base Load) regulates the genset real and reactive power output while paralleled to the utility. Power can be regulated at either the genset or utility bus monitoring point
- Digital frequency synchronization and voltage matching
- Isochronous Load Sharing
- Droop kW and kVAr control
- Real time clock for fault and event time stamping
- Exerciser clock and time of day start/stop initiate a test with or without load, or a Base Load or Peak Shave session
- Digital automatic voltage regulation is provided using three phase sensing and full wave FET type regulator, which is compatible with either shunt or PMG excited systems with a standard AUX103 AVR or an option for a more powerful high-current field drive capability AUX106 AVR
- Digital engine speed governing is provided on applicable platforms
- Generator set monitoring (including metering) and protection with PCC3300 measuring voltage, current, kW and kVAr offering a measurement accuracy of 1%
- Utility / AC Bus metering and protection with PCC3300 voltage, current, kW and kVAr offering a measurement accuracy of 1%
- 12 V (DC) and 24 V (DC) battery operation
- RS-485 Modbus® interface for interconnecting to customer equipment
- Warranty and service – Cummins Power Generation offers a comprehensive warranty and worldwide distributor service network
- Global regulatory certification and compliance: PCC3300 is suitable for use on gensets that are designed, manufactured, tested and certified to relevant UL, NFPA, ISO, IEC, Mil Std. and CE standards

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PowerCommand® Generator Set Digital Control System PCC 3300

Introduction

PCC3300 is an industry-leading digital generator set control suitable for usage on a wide range of diesel and lean burn natural gas generator sets in both standalone as well as paralleling applications.

PowerCommand® is compatible with either shunt or PMG excitation, and is suitable for usage with reconnectable or non-reconnectable generators. Configuration for any frequency, voltage and power connection from 120 V (AC) to 600 V (AC) line-to-line or 601 V (AC) to 45k V (AC) with an external PT is supported. The PCC3300 derives its own power from the generator set starting batteries and functions over a voltage range of 8 V (DC) to 30 V (DC).

Features

- PCC3300 supports configurable control features via software download using InPower PC-compatible software
- 12 V (DC) and 24 V (DC) battery operation
- Digital automatic voltage regulation is provided using three phase sensing and full wave FET type regulator, which is compatible with either shunt or PMG excited systems with a standard AUX103 AVR or an option for a more powerful high-current field drive capability AUX106 AVR
- Digital engine speed governing on applicable platform is provided, which is capable of providing isochronous frequency regulation
- Full authority J1939 CANBus® prime mover communications and control is provided for platforms with an Engine Control Module (ECM)
- AmpSentry" protection provides industry-leading alternator overcurrent protection:
  - Time-based generator protection applicable to both line-to-line and line-to-neutral, that can detect an unbalanced fault condition and swiftly react appropriately. Balanced faults can also be detected by AmpSentry and appropriate acted upon.
  - Reduces the risk of Arc Flash due to thermal overload or electrical faults by inverse time protection
- Generator set monitoring offers status information for all critical prime mover and generator functions
- AC and DC digital generator set metering is provided. AC measurements are configurable for single or three phase sensing with PCC3300 measuring voltage, current, kW and kVAr offering a measurement accuracy of 1%
- Battery monitoring system continually monitors the battery output and warns of the potential occurrence of a weak battery condition
- Relay drivers for prime mover starter, fuel shutoff (FSO), glow plug/spark ignition power and switched B+ applications are provided
- Integrated generator set protection is offered to protect the prime mover and generator
- Real time clock for fault and event time stamping
- Exerciser clock and time of day start/stop initiate a test with or without load, or a Base Load or Peak Shave session
- Digital Power Transfer Control (Automatic Mains Failure) provides load transfer operation in open transition, closed transition, or soft (ramping) transfer modes
- Extended Paralleling (Peak Shave/Base Load) regulates the genset real and reactive power output while paralleled to the utility. Power can be regulated at either the genset or utility bus monitoring point
- Digital frequency synchronization and voltage matching
- Isochronous Load Sharing
- Droop kW and kVAr Control
- The synchronization check function provides adjustments for phase angle window, voltage window, frequency window and time delay
- Utility / AC Bus metering and protection with PCC3300 voltage, current, kW and kVAr offering a measurement accuracy of 1%
- Advanced serviceability is offered via InPower™, a PC-based software service tool
- PCC3300 is designed for reliable operation in harsh environments with the unit itself being a fully encapsulated module
- RS-485 ModBus interface for interconnecting to customer equipment
- Native on PCC3300: Four discrete inputs, two dry contact relay outputs and two low-side driver outputs are provided and are all configurable.
  - Optional extra PCC3300 input and output capability available via AUX101
- Warranty and service – Cummins Power Generation offers a comprehensive warranty and worldwide distributor service network
- Global regulatory certification and compliance: PCC3300 is suitable for use on gensets that are designed, manufactured, tested and certified to relevant UL, NFPA, ISO, IEC, Mil Std. and CE standards

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Base Control Functions

HMI capability

Options: Local and remote HMI320 options are available

Operator adjustments: The HMI320 includes provisions for many set up and adjustment functions.

Genset hardware data: Access to the control and software part number, genset rating in kVA and genset model number is provided from the HMI320 or InPower.

Data logs: Information concerning all of the following parameters is periodically logged and available for viewing; engine run time, controller on time, number of start attempts, total kilowatt hours, and load profile. (Control logs data indicating the operating hours at percent of rated kW load, in 5% increments. The data is presented on the operation panel based on total operating hours on the generator.)

Fault history: Provides a record of the most recent fault conditions with control date and time stamp. Up to 32 events are stored in the control non-volatile memory.

Alternator data

- Voltage (single or three phase line-to-line and line-to-neutral)
- Current (single or three phase)
- kW, kVAr, Power Factor, kVA (three phase and total)
- Frequency

For Lean Burn Natural Gas Engine applications:

- Alternator heater status
- Alternator winding temperature (per phase) as well as alternator drive end and non-drive end bearing

Utility/AC bus data

- Voltage (three phase line-to-line and line-to-neutral)
- Current (three phase and total)
- kW, kVAR, Power Factor, kVA (three phase and total)
- Frequency

AmpSentry: 3x current regulation for downstream tripping/motor inrush management. Thermal damage curve (3-phase short) or fixed timer (2 sec for 1-Phase Short or 5 sec for 2-Phase short).

Engine data

- Starting battery voltage
- Engine speed
- Engine temperature
- Engine oil pressure
- Engine oil temperature
- Intake manifold temperature
- Coolant temperature
- Comprehensive Full Authority Engine (FAE) data (where applicable)

Lean Burn Natural Gas (LBNG) application parameters include:

- Safety shutoff valve status
- Valve proving status
- Downstream gas pressure
- Gas inlet pressure
- Gas mass flow rate
- Control valve position
- Gas outlet pressure
- Manifold pressure and temperature
- Throttle position
- Compressor outlet pressure
- Turbo speed
- Compressor bypass position
- Cylinder configuration (e.g., drive end and non-drive end configurations)
- Coolant pressure 1 and 2 as well as coolant temperature 1 and 2 for both HT/LT respectively
- Exhaust port temperature (up to 18 cylinders)
- Pre-filter oil pressure
- Exhaust back pressure
- Parent ECM internal temperature and isolated battery voltage
- Speed bias
- Child ECM internal temperature and isolated battery voltage
- Knock level, spark advance, and knock count (for up to 18 cylinders)
- Auxiliary supply disconnector status
- Engine heater status
- Coolant circulating pump status
- Lube oil priming pump status
- Lube oil status
- Oil heater status
- Derate authorization status
- Start system status
- Ventilator fan status
- Ventilation louvre status
- Radiator fan status
- DC PSU status
- Start inhibit/enable status and setup

Service adjustments – The HMI320 includes provisions for adjustment and calibration of genset control functions. Adjustments are protected by a password. Functions include:

- Engine speed governor adjustments
- Voltage regulation adjustments
- Cycle cranking
- Configurable fault set up
- Configurable input and output set up
- Meter calibration
- Paralleling setup
- Display language and units of measurement

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Prime Mover Control

SAE-J1939 CAN interface to full authority ECMs (where applicable). Provides data transfer between genset and engine controller for control, metering and diagnostics.

12 V (DC) or 24 V (DC) nominal battery voltage is supported by PCC3300 for normal operation.

Temperature dependant prime mover governing dynamics: This function is supported enabling the engine to be responsive when warm and more stable when operating at lower temperature via providing control and modification over electronic governing parameters as a function of engine temperature.

Isochronous governing is provided in order to control prime mover speed within ±0.25% of nominal rated speed for any steady state load from no load to full load. During operation frequency drift should not exceed ±0.5% of nominal frequency given a 33ºC (or 60ºF) chance in ambient temperature within an eight-hour period.

Droop electronic speed is governing capability is natively offered by PCC3300 to permit droop from 0% to 10% between no load to full load.

Remote start capability is built into the PCC3300 as the unit accepts a ground signal from remote devices to automatically command the starting of the generator set as well as the reaching of rated speed, voltage and frequency or otherwise run at idle speed until prime mover temperature is adequate. The presence of a remote start signal shall cause the PCC3300 to leave sleep mode and return to normal power mode. PCC3300 supports an option for delayed start or stop.

Remote Start Integrity: In compliance with NEC2017 Start Signal Integrity standard – NFPA70 Article 700.10(D)(3), the remote start circuit from ATS to PCC3300 is continuously monitored for signal disturbance due to broken, disconnected or shorted wires via a configurable input. Loss of signal integrity results in activation of a remote start signal.

Remote and local emergency stopping capability: PCC3300 accepts ground signal from a locally or remoted mounted emergency stop switch to cause the generator set to immediately shutdown. The generator set is prevented from either running or cranking with the emergency stop switch engaged. If PCC3300 is in sleep mode, then the activation of any emergency stop switch shall return PCC3300 is normal powered state along with the activation of the corresponding shutdown and run-prevention states.

Sleep mode: PowerCommand 3.3 supports a configurable low current draw state, which is design with consideration to the needs of prime applications or others application without a battery charger (in order to minimize battery current drain).

Automatic prime mover starting: Any generator set controlled by PCC3300 is capable of automatic starting achieved via either magnetic pickup or main alternator output frequency. PCC3300 additionally supports configurable glow plug control where applicable.

Prime mover cycle cranking: PCC3300 supports configurable starting cycles and rest periods. Built in starter protection are incorporated to prevent the operator from specifying a starting sequence that may be damaging.

Configurable time delay functionality: PCC3300 supports time delayed generator set starting and stopping (for cooldown). Permissible time delays are as follows (noting a default setting is 0 seconds):

1. Start delay: 0 seconds to 300 seconds prior to starting after receiving a remote start signal.
2. Stop delay: 0 seconds to 600 seconds prior to shut down after receiving a signal to stop in normal operation modes.

Lean Burn Natural Gas application specific parameters

PCC3300 supports prime mover inhibiting in order to permit application-specific processes (i.e. Auxiliaries) to be started first.

Generator Control

PCC3300 performs both Genset voltage sensing and Genset voltage regulation as follows:

- Voltage sensing is integrated into PCC3300 via three phase line-to-line sensing that is compatible with shunt or PMG excitation systems
- Automatic voltage regulation is accomplished by using a three phase fully rectified input and has a FET output for good motor starting capability.

Major features of generator control include:

Digital output voltage regulation - Capable of regulating output voltage to within +/-1.0% for any loads between no load and full load. Voltage drift will not exceed +/-1.5% for a 40 ºC (104 ºF) change in temperature in an eight-hour period. On engine starting or sudden load acceptance, voltage is controlled to a maximum of 5% overshoot over nominal level.

The automatic voltage regulator feature can be disabled to allow the use of an external voltage regulator.

Droop voltage regulation - Control can be adjusted to droop from 0-10% from no load to full load.

Torque-matched V/Hz overload control - The voltage roll-off set point and rate of decay (i.e. the slope of the V/Hz curve) is adjustable in the control.

Fault current regulation - PowerCommand® will regulate the output current on any phase to a maximum of three times rated current under fault conditions for both single phase and three phase faults. In conjunction with a permanent magnet generator, it will provide three times rated current on all phases for motor starting and short circuit coordination purpose.

Cylinder Cut-off System (CCS): PCC 3300 supports Cylinder Cut-off System which is used to operate the engines on half bank at no load and light load conditions. CCS has below benefits on engine

performance- improved emission standards, improved fuel efficiency, reduced hydrocarbons, reduced white smoke, reduced wet stacking and higher exhaust temperature at light loads to improve turbocharger operations and catalyst performance.

Step Timing Control (STC): PCC 3300 supports STC functionality which is used to advance the engine timing of a hydro-mechanical engine during start up and light load conditions. During ADVANCED injection timing, it:

- Improves cold weather idling characteristics
- Reduces cold weather white smoke
- Improves light load fuel economy
- Reduces injector carboning

Paralleling Functions

First Start Sensor™ system – PowerCommand® provides a unique control function that positively prevents multiple gensets from simultaneously closing to an isolated bus under black start conditions. The First Start Sensor system is a communication system between the gensets that allows the gensets to work together to determine which genset is a system should be the first to close to the bus. The system includes an independent backup function, so that if the primary system is disabled the required functions are still performed.

Synchronizing – Control incorporates a digital synchronizing function to force the genset to match the frequency, phase and voltage of another source such as a utility grid. The synchronizer includes provisions to provide proper operation even with highly distorted bus voltage waveforms. The synchronizer can match other sources over a range of 60-110% of nominal voltage and -24 to +6 hertz. The synchronizer function is configurable for slip frequency synchronizing for applications requiring a known direction of power flow at instant of breaker closure or for applications where phase synchronization performance is otherwise inadequate.

Load sharing control – The genset control includes an integrated load sharing control system for both real (kW) and reactive (kVar) loads when the genset(s) are operating on an isolated bus. The control system determines kW load on the engine and kVar load on the alternator as a percent of genset capacity, and then regulates fuel and excitation systems to maintain system and genset at the same percent of load without impacting voltage or frequency regulation. The control can also be configured for operation in droop mode for kW or Kvar load sharing.

Load govern control– When PowerCommand® receives a signal indicating that the genset is paralleled with an infinite source such as a utility (mains) service, the genset will operate in load govern mode. In this mode the genset will synchronize and close to the bus, ramp to a pre-programmed kW and kVar load level, and then operate at that point. Control is adjustable for kW values from 0-100% of standby rating, and 0.7-1.0 power factor (lagging). Default setting is 80% of standby and 1.0 power factor. The control includes inputs to allow independent control of kW and kVar load level by a remote device while in the load govern mode. The rate of load increase and decrease is also adjustable in the control. In addition, the control can be configured for operation in kW or kVAR load govern droop.

Load demand control – The control system includes the ability to respond to an external signal to initiate load demand operation. On command, the genset will ramp to no load, open its paralleling breaker, cool down, and shut down. On removal of the command, the genset will immediately start, synchronize, connect, and ramp to its share of the total load on the system.

Sync check – The sync check function decides when permissive conditions have been met to allow breaker closure. Adjustable criteria are: phase difference from 0.1-20 deg, frequency difference from 0.001-1.0 Hz, voltage difference from 0.5-10%, and a dwell time from 0.5-5.0 sec. Internally the sync check is used to perform closed transition operations. An external sync check output is also available.

Genset and utility/AC bus source AC metering – The control provides comprehensive three phase AC metering functions for both monitored sources, including: 3-phase voltage (L-L and L-N) and current, frequency, phase rotation, individual phase and totalized values of kW, kVAR, kVA and Power Factor; totalized positive and negative kW-hours, kVAR-hours, and kVA-hours. Three wire or four wire voltage connection with direct sensing of voltages to 600V, and up to 45kV with external transformers. Current sensing is accomplished with either 5 amp or 1 CT secondaries and with up to 10,000 amp primary. Maximum power readings are 32,000kW/kVAR/kVA.

Power transfer control – provides integrated automatic power transfer functions including source availability sensing, genset start/stop and transfer pair monitoring and control. The transfer/retransfer is configurable for open transition, fast closed transition (less than 100msec interconnect time), or soft closed transition (load ramping) sequences of operation. Utility source failure will automatically start genset and transfer load, retransferring when utility source returns. Test will start gensets and transfer load if test with load is enabled. Sensors and timers include:

Under voltage sensor: 3-phase L-N or L-L under voltage sensing adjustable for pickup from 85-100% of nominal. Dropout adjustable from 75-98% of pickup. Dropout delay adjustable from 0.1-30 sec.

Over voltage sensor: 3-phase L-N or L-L over voltage sensing adjustable for pickup from 95-99% of dropout. Dropout adjustable from 105-135% of nominal. Dropout delay adjustable from 0.5-120 sec. Standard configuration is disabled and is configurable to enabled in the field using the HMI or InPower service tools.

Over/Under frequency sensor: Center frequency adjustable from 45-65 Hz. Dropout bandwidth adjustable from 0.3-5% of center frequency beyond pickup bandwidth. Pickup bandwidth adjustable from 0.3-20% of center frequency. Field configurable to enable.

Loss of phase sensor: Detects out of range voltage phase angle relationship. Field configurable to enable.

Phase rotation sensor: Checks for valid phase rotation of source. Field configurable to enable.

Breaker tripped: If the breaker tripped input is active, the associated source will be considered as unavailable.

Timers: Control provides adjustable start delay from 0 - 300sec, stop delay from 0 - 800sec, transfer delay from 0-120sec, retransfer delay from 0-1800sec, programmed transition delay from 0-60sec, and maximum parallel time from 0-1800sec.

Negative Sequence Current Protection: PCC3300 supports this protection natively in order to determine if the generator is at any point was running subject to negative phase sequencing.

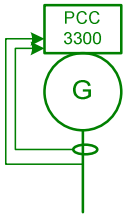
Breaker control – Utility and Genset breaker interfaces include separate relays for opening and closing breaker, as well as inputs for both 'a' and 'b' breaker position contacts and tripped status. Breaker diagnostics include Contact Failure, Fail to Close, Fail to Open, Fail to Disconnect, and Tripped. Upon breaker failure, appropriate control action is taken to maintain system integrity.

Exerciser clock –The exerciser clock (when enabled) allows the system to be operated at preset times in either test without load, test with load, or extended parallel mode. A Real Time Clock is built in. Up to 12 different programs can be set for day of week, time of day, duration, repeat interval, and mode. For example, a test with load for 1 hour every Tuesday at 2AM can be programmed. Up to 6 different exceptions can also be set up to block a program from running during a specific date and time period.

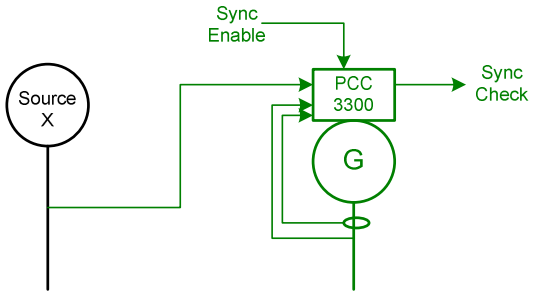
Extended paralleling – In extended paralleling mode (when enabled) the controller will start the genset and parallel to a utility source and then govern the real and reactive power output of the genset based on the desired control point. The control point for the real power (kW) can be configured for either the genset metering point ("Base Load") or the utility metering point ("Peak Shave"). The control point for the reactive power (kVAR or Power Factor) can also be independently configured for either the genset metering point or the utility metering point. This flexibility would allow base kW load from the genset while maintaining the utility power factor at a reasonable value to avoid penalties due to low power factor. The System always operates within genset ratings. The control point can be changed while the system is in operation. Set points can be adjusted via hardwired analog input or adjusted through an operator panel display or service tool.

Application types – Controller is configured to operating in one of six possible application types. These topologies are often used in combinations in larger systems, with coordination of the controllers in the system either by external device or by interlocks provided in the control. Topologies that may be selected in the control include:

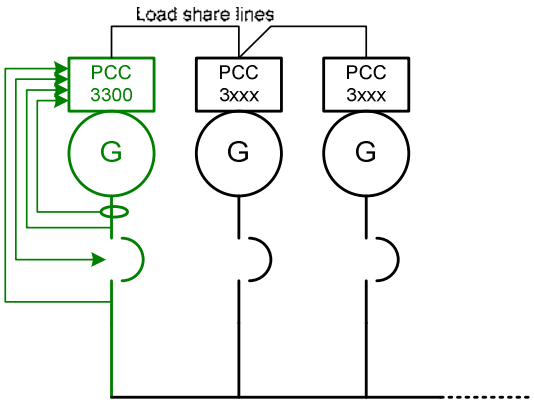
Standalone: Control provides monitoring, protection and control in a non-paralleling application.



Synchronizer only: control will synchronize the genset to other source when commanded to either via a hardwired or Modbus driven input.



Isolated Bus: allows the genset to perform a dead bus closure or synchronize to the bus and isochronously share kW and kVAR loads with other gensets.



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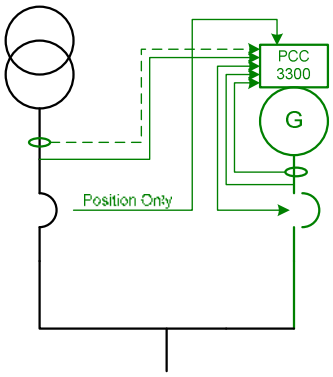
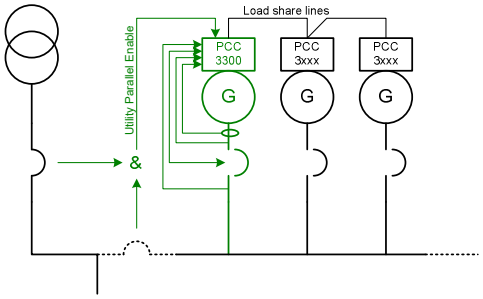
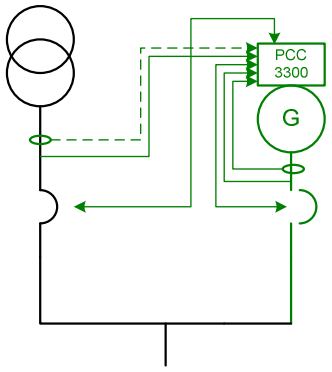
Utility Single: Control monitors one genset and utility. The control will automatically start and provide power to a load if the utility fails. The control will also resynchronize the genset back to the utility and provides extended paralleling capabilities.



Utility Multiple: Supports all functionality of Isolated Bus and provides extended paralleling to the utility. Extended paralleling load set points follow a constant setting; dynamically follow an analog input, Modbus register or HMI.

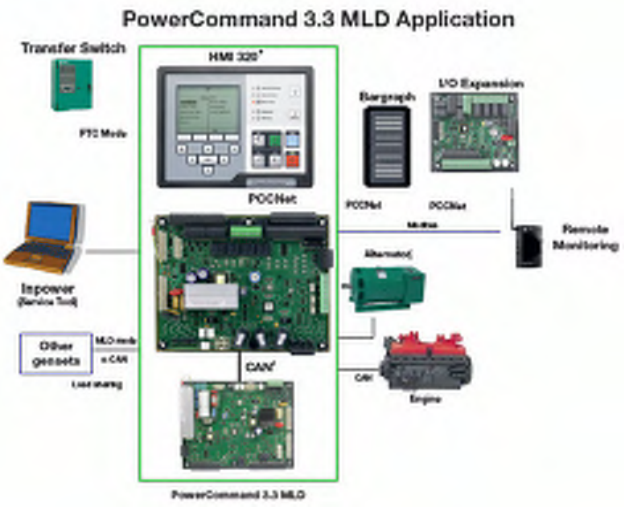


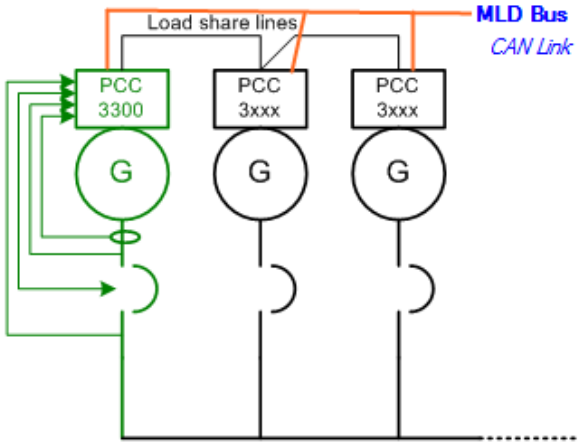
Power Transfer Control: Control operates a single genset/single utility transfer pair in open transition, fast closed transition, or soft closed transition. Extended paralleling functionality also provides base load and peak shave options.



Masterless Load Demand (Optional Feature):

PowerCommand® 3.3 with Masterless Load Demand (MLD) technology enables generator sets to start/stop automatically based on load demand. Masterless Load Demand-capable generators are equipped with an additional s-CAN network connection that allows sharing of information amongst paralleled generator sets. MLD has been designed for hassle-free installation, commissioning and operation. MLD functionality. Integrated on-board system logic provides the MLD topology control without the need for any additional system.





PCC3300 External Voltage and Frequency Biasing Inputs

PCC3300 supports externally driven voltage and frequency biasing capability in order to permit external paralleling (if intending to use this feature please contact your local distributor for further information).

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Protective Functions

On operation of a protective function the control will indicate a fault by illuminating the appropriate status LED on the HMI, as well as display the fault code and fault description on the LCD. The nature of the fault and time of occurrence are logged in the control. The service manual and InPower service tool provide service keys and procedures based on the service codes provided. Protective functions include:

Battle short mode

When enabled and the *battle short* switch is active, the control will allow some shutdown faults to be bypassed. If a bypassed shutdown fault occurs, the fault code and description will still be annunciated, but the genset will not shutdown. This will be followed by a *fail to shutdown* fault. Emergency stop shutdowns and others that are critical for proper operation (or are handled by the engine ECM) are not bypassed. Please refer to the Control Application Guide or Manual for list of these faults.

Derate

The Derate function reduces output power of the genset in response to a fault condition. If a Derate command occurs while operating on an isolated bus, the control will issue commands to reduce the load on the genset via contact closures or Modbus. If a Derate command occurs while in utility parallel mode, the control will actively reduce power by lowering the base load kW to the derated target kW.

Configurable alarm and status inputs

The control accepts up to four alarm or status inputs (configurable contact closed to ground or open) to indicate a configurable (customer-specified) condition.

The control is programmable for warning, derate, shutdown, shutdown with cooldown or status indication and for labeling the input.

Emergency stop

Annunciated whenever either emergency stop signal is received from external switch.

General prime mover protection

Low and high battery voltage warning - Indicates status of battery charging system (failure) by continuously monitoring battery voltage.

Weak battery warning - The control system will test the battery each time the genset is signaled to start and indicate a warning if the battery indicates impending failure.

Low coolant level warning – Can be set up to be a warning or shutdown.

Low coolant temperature warning – Indicates that engine temperature may not be high enough for a 10 second start or proper load acceptance.

Fail to start (overcrank) shutdown - The control system will indicate a fault if the genset fails to start by the completion of the engine crack sequence.

Fail to crank shutdown - Control has signaled starter to crank engine but engine does not rotate.

Cranking lockout - The control will not allow the starter to attempt to engage or to crank the engine when the engine is rotating.

Fault simulation –The control in conjunction with InPower software, will accept commands to allow a technician to verify the proper operation of the control and its interface by simulating failure modes or by forcing the control to operate outside of its normal operating ranges. InPower also provides a complete list of faults and settings for the protective functions provided by the controller.

For Lean Burn Natural Gas Engine applications:

Off load running (protection) – This feature protects the engine in the event the genset is being called to go off load for too long.

Hydro Mechanical fuel system engine protection:

Overspeed shutdown – Default setting is 115% of nominal

Low lube oil pressure warning/shutdown – Level is preset (configurable with InPower or HMI) to match the capabilities of the engine used. Control includes time delays to prevent nuisance alarms.

High lube oil temperature warning/shutdown – Level is preset (configurable with InPower or HMI) to match the capabilities of the engine used. Control includes time delays to prevent nuisance alarms.

High engine temperature warning/shutdown – Level is preset (configurable with InPower or HMI) to match the capabilities of the engine used. Control includes time delays to prevent nuisance alarms.

Low coolant temperature warning – Indicates that engine temperature may not be high enough for a 10 second start or proper load acceptance.

High intake manifold temperature shutdown – Level is preset (configurable with InPower or HMI) to match the capabilities of the engine used. Control includes time delays to prevent nuisance alarms.

Full authority electronic engine protection:

Engine fault detection is handled inside the engine ECM. Fault information is communicated via the SAE-J1939 data link for annunciation in the HMI.

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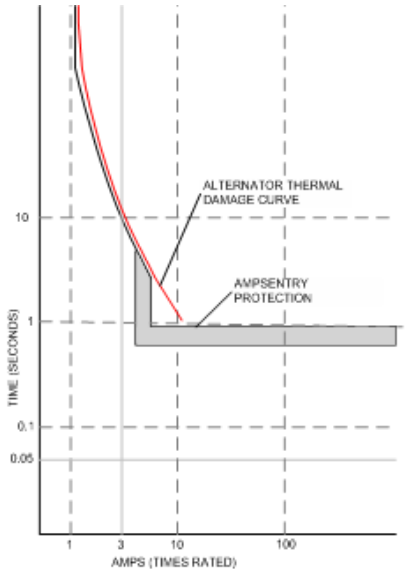
Alternator Protection

AmpSentry protective relay - A comprehensive monitoring and control system integral to the PowerCommand® Control System that guards the electrical integrity of the alternator and power system by providing protection against a wide array of fault conditions in the genset or in the load. It also provides single and three phase fault current regulation (3x Current) so that downstream protective devices have the maximum current available to quickly clear fault conditions without subjecting the alternator to potentially catastrophic failure conditions. Thermal damage curve (3 phase short) or fixed timer (2sec for 1P short, 5sec for 2P short). See document R1053 for a full-size time over current curve. The control does not included protection required for interconnection to a utility (mains) service.



AmpSentry Maintenance Mode (AMM) - Instantaneous tripping, if AmpSentry Maintenance mode is active (50mS response to turn off AVR excitation/shutdown genset) for arc flash reduction when personnel are near genset.

High AC voltage shutdown (59) - Output voltage on any phase exceeds preset values. Time to trip is inversely proportional to amount above threshold. Values adjustable from 105-125% of nominal voltage, with time delay adjustable from 0.1-10 seconds. Default value is 110% for 10 seconds.

Low AC voltage shutdown (27) - Voltage on any phase has dropped below a preset value. Adjustable over a range of 50-95% of reference voltage, time delay 2-20 seconds. Default value is 85% for 10 seconds. Function tracks reference voltage. Control does not nuisance trip when voltage varies due to the control directing voltage to drop, such as during a V/Hz roll-off or synchronizing.

Under frequency shutdown (81 u) - Genset output frequency cannot be maintained. Settings are adjustable from 2-10 Hz below reference governor set point, for a 5-20 second time delay. Default: 6 Hz, 10 seconds. Under frequency protection is disabled when excitation is switched off, such as when engine is operating in idle speed mode.

Over frequency shutdown/warning (81o) - Genset is operating at a potentially damaging frequency level. Settings are adjustable from 2-10 Hz above nominal governor set point for a 1-20 second time delay. Default: 6 Hz, 20 seconds, disabled.

Overcurrent warning/shutdown (51) - Implementation of the thermal damage curve with instantaneous trip level calculated based on current transformer ratio and application power rating.

Loss of sensing voltage shutdown - Shutdown of genset will occur on loss of voltage sensing inputs to the control.

Field overload shutdown - Monitors field voltage to shutdown genset when a field overload condition occurs.

Over load (kW) warning - Provides a warning indication when engine is operating at a load level over a set point. Adjustment range: 80-140% of application rated kW, 0-120 second delay. Defaults: 105%, 60 seconds.

Reverse power shutdown (32) - Adjustment range: 5-20% of standby kW rating, delay 1-15 seconds. Default: 10%, 3 seconds.

Reverse Var shutdown (40) - Shutdown level is adjustable: 15-50% of rated Var output, delay 10-60 seconds. Default: 20%, 10 seconds.

Short circuit protection - Output current on any phase is more than 175% of rating and approaching the thermal damage point of the alternator. Control includes algorithms to protect alternator from repeated over current conditions over a short period of time.

Negative sequence overcurrent warning (46) – Control protects the generator from damage due to excessive imbalances in the three phase load currents and/or power factors.

Custom overcurrent warning/shutdown (51) – Control provides the ability to have a custom time overcurrent protection curve in addition to the AmpSentry protective relay function.

Ground fault overcurrent (51G) – Control detects a ground fault either by an external ground fault relay via a contact input or the control can measure the ground current from an external current transformer. Associated time delays and thresholds are adjustable via InPower or HMI.

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Paralleling Protection

Breaker fail to close Warning: When the control signals a circuit breaker to close, it will monitor the breaker auxiliary contacts and verify that the breaker has closed. If the control does not sense a breaker closure within an adjustable time period after the close signal, the fail to close warning will be initiated.

Breaker fail to open warning: The control system monitors the operation of breakers that have been signaled to open. If the breaker does not open within and adjustable time delay, a Breaker Fail to Open warning is initiated.

Breaker position contact warning: The controller will monitor both 'a' and 'b' position contacts from the breaker. If the contacts disagree as to the breaker position, the breaker position contact warning will be initiated.

Breaker tripped warning: The control accepts inputs to monitor breaker trip / bell alarm contact and will initiate a breaker tripped warning if it should activate.

Fail to disconnect warning: In the controller is unable to open either breaker, a fail to disconnect warning is initiated. Typically, this would be mapped to a configurable output, allowing an external device to trip a breaker.

Fail to synchronize warning: Indicates that the genset could not be brought to synchronization with the bus. Configurable for adjustable time delay of 10 -900 seconds, 120 default.

Phase sequence sensing warning: Verifies that the genset phase sequence matches the bus prior to allowing the paralleling breaker to close.

Maximum parallel time warning (power transfer control mode only): During closed transition load transfers, control independently monitors paralleled time. If time is exceeded, warning is initiated and genset is disconnected.

Bus or genset PT input calibration warning: The control system monitors the sensed voltage from the bus and genset output voltage potential transformers. When the paralleling breaker is closed, it will indicate a warning condition if the read values are different.

Field Control Interface

Input signals to the PowerCommand® control include:

- Coolant level (where applicable)
- Fuel level (where applicable)
- Remote emergency stop
- Remote fault reset
- Remote start
- Rupture basin
- Start type signal
- Battle short
- Load demand stop
- Synchronize enable
- Genset circuit breaker inhibit
- Utility circuit breaker inhibit
- Single mode verify
- Transfer inhibit – prevent transfer to utility (in power transfer control mode)
- Retransfer inhibit – prevent retransfer to genset (in power transfer control mode)
- kW and kVAR load setpoints

Configurable inputs - Control includes (4) input signals from customer discrete devices that are configurable for warning, shutdown or status indication, as well as message displayed

Input signals for Lean Burn Natural Gas Engine applications:

- Gearbox oil pressure/temperature protection
- Fire fault
- Earth fault support as a discrete input via an appropriate secondary detection device
- Differential fault
- DC power supply fault
- Genset Interface Box (GIB) isolator open fault
- Start inhibit/enable (x3)
- Radiator fan trip
- Ventilator fan trip
- Ventilation louvers closed
- Start system trip
- Alternator heater trip
- Alternator heater status
- Alternator winding temperature (PT100 RTDx3)
- Alternator drive end bearing temperature (PT100 RTD)
- Alternator non-drive end bearing temperature (PT100 RTD)

Output signals from the PowerCommand® control include:

- Load dump signal: Operates when the genset is in an overload condition.
- Delayed off signal: Time delay-based output which will continue to remain active after the control has removed the run command. Adjustment range: 0 - 120 seconds. Default: 0 seconds.

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- Configurable relay outputs: Control includes (4) relay output contacts (3 A, 30VDC). These outputs can be configured to activate on any control warning or shutdown fault as well as ready to load, not in auto, common alarm, common warning and common shutdown.
- Ready to load (genset running) signal: Operates when the genset has reached 90% of rated speed and voltage and latches until genset is switched to off or idle mode.
- Paralleling circuit breaker relays outputs: Control includes (4) relay output contacts (3.5A, 30 VDC) for opening and closing of the genset and utility breakers.

Output Signals for Lean Burn Natural Gas Engine applications:

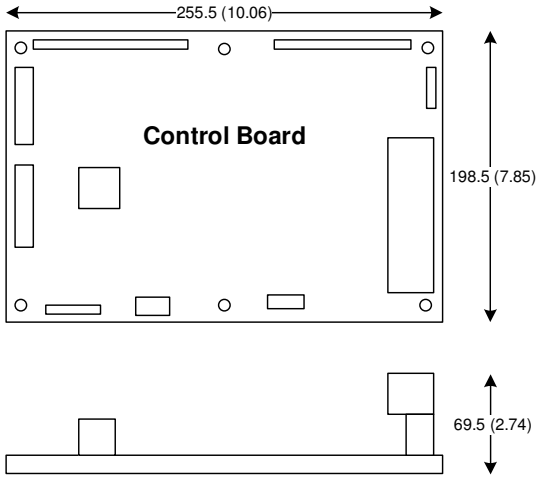
- Start inhibit/enable event
- Emergency stop event
- Ventilator fan run control
- Louvre control
- Radiator fan control
- Alternator heater control
- Engine at idle speed event

Communications connections include:

- PC tool interface: This RS-485 communication port allows the control to communicate with a personal computer running InPower software.
- Modbus RS-485 port: Allows the control to communicate with external devices such as PLCs using Modbus protocol.

  Note - An RS-232 or USB to RS-485 converter is required for communication between PC and control.
- Networking: This RS-485 communication port allows connection from the control to the other Cummins Power Generation products.

Mechanical Drawing



PowerCommand® Human Machine Interface HMI320

Description

This control system includes an intuitive operator interface panel that allows for complete genset control as well as system metering, fault annunciation, configuration and diagnostics. The interface includes five genset status LED lamps with both internationally accepted symbols and English text to comply with customer's needs. The interface also includes an LED backlit LCD display with tactile feel soft-switches for easy operation and screen navigation. It is configurable for units of measurement and has adjustable screen contrast and brightness.

The *run/off/auto* switch function is integrated into the interface panel.

All data on the control can be viewed by scrolling through screens with the navigation keys. The control displays the current active fault and a time-ordered history of the five previous faults.

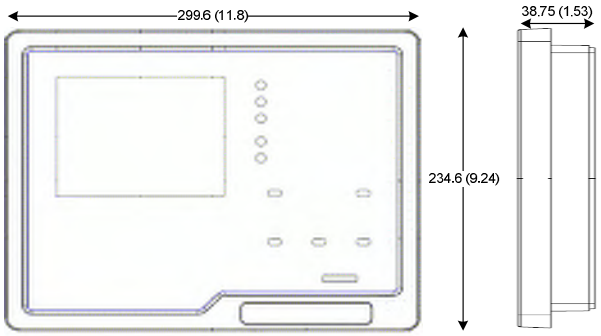
Features:

- LED indicating lamps
  - genset running
  - remote start
  - not in auto
  - shutdown
  - warning
  - auto
  - manual and stop
  - Circuit breaker open (if equipped)
  - Circuit breaker closed (if equipped)
- 320 x 240 pixels graphic LED backlight LCD.
- Four tactile feel membrane switches for LCD defined operation. The functions of these switches are defined dynamically on the LCD.
- Seven tactile feel membrane switches dedicated screen navigation buttons for up, down, left, right, ok, home and cancel.
- Six tactile feel membrane switches dedicated to control for auto, stop, manual, manual start, fault reset and lamp test/panel lamps.
- Two tactile feel membrane switches dedicated to control of circuit breaker (where applicable).
- Allows for complete genset control setup.
- Certifications: Suitable for use on gensets that are designed, manufactured, tested and certified to relevant UL, NFPA, ISO, IEC, Mil Std. and CE standards.
- Languages supported: English, Spanish, French, German, Italian, Greek, Portuguese, Finnish, Norwegian, Danish, Russian (Cyrillic), Chinese, Hungarian, Japanese, Polish, Korean, Romanian, Brazilian Portuguese, Turkish, Dutch, and Czech

Communications connections include:

- PC tool interface - This RS-485 communication port allows the HMI to communicate with a personal computer running InPower.
- This RS-485 communication port allows the HMI to communicate with the main control board.

Mechanical Drawing



HMI

Dimensions: mm (inches)

Software

InPower (beyond 6.5 version) is a PC-based software service tool that is designed to directly communicate to PowerCommand® gensets and transfer switches, to facilitate service and monitoring of these products.

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Environment

The control is designed for proper operation without recalibration in ambient temperatures from -40 ºC (-40 ºF) to +70º C (158 ºF), and for storage from -55 ºC (-67 ºF) to +80 ºC (176 ºF). Control will operate with humidity up to 95%, non-condensing.

The HMI is designed for proper operation in ambient temperatures from -20 ºC (-4 ºF) to +70 ºC (158 ºF), and for storage from -30 ºC (-22 ºF) to +80 ºC (176 ºF).

The control board is fully encapsulated to provide superior resistance to dust and moisture. Display panel has a single membrane surface, which is impervious to effects of dust, moisture, oil and exhaust fumes. This panel uses a sealed membrane to provide long reliable service life in harsh environments.

The control system is specifically designed and tested for resistance to RFI/EMI and to resist effects of vibration to provide a long reliable life when mounted on a genset. The control includes transient voltage surge suppression to provide compliance to referenced standards.

Certifications

PowerCommand® meets or exceeds the requirements of the following codes and standards:

- NFPA 110 for level 1 and 2 systems.
- ISO 8528-4: 1993 compliance, controls and switchgear.
- CE marking: The control system is suitable for use on generator sets to be CE-marked.
- EN 50081-1,2 residential/light industrial emissions or industrial emissions.
- EN 50082-1,2 residential/light industrial or industrial susceptibility.
- ISO 7637-2, level 2; DC supply surge voltage test.
- Mil Std 202C, Method 101 and ASTM B117: Salt fog test.
- UL 6200 recognized, suitable for use on UL 2200 Listed generator sets.
- CSA C282-M1999 compliance
- CSA 22.2 No. 14 M91 industrial controls.
- PowerCommand® control systems and generator sets are designed and manufactured in ISO 9001 certified facilities.
- ROHS (Restriction of Hazardous substance) complaint both for HMI 320 & PCC3300v2.

Reference Documents

Please refer to the following reference documents available in the PowerSuite library:

- PowerCommand™ 3.3. Application Guide
- T-037: PowerCommand Control Application Manual (ANSI Protective Functions)
- T-040: PowerCommand 3.3 Paralleling Application Guide

Please refer to the following reference documents available on Cummins Quickserve:

- Service Manuals for PC3.3 (non-MLD) and PC3.3 (MLD)
- Modbus Register Mapping

Warranty

All components and subsystems are covered by an express limited one-year warranty. Other optional and extended factory warranties and local distributor maintenance agreements are available.

PCCNet COMPATIBLE

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Exhaust emission data sheet
C3000 D6e
60 Hz Diesel generator set
EPA Tier 2

Engine Information:

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

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.

Specification Sheet

Battery and Accessories

Battery Specifications

Battery Part Number	Group Size	CCA	Reserve Capacity	Battery	Voltage	Length	Width	Height	Ship Weight lbs	Quarts Electrolyte
0416-0579	24	420	70	Dry	12	10.2	6.6	8.9	20	6.0
0416-0579-01	24	420	70	Wet	12	10.2	6.6	8.9	36	6.0
0416-1330	24XL	810	146	Wet	12	10.3	9.0	6.6	43	5.9
0416-1051	26	530	80	Wet	12	8.2	6.8	8.1	31	3.7
0416-1040	31	800	160	Dry	12	13.0	6.8	9.4	65	4.2
0416-0796	31	725	150	Wet	12	12.7	6.0	9.3	62	4.2
0416-0980	31	1000	185	Wet	12	13.0	6.8	9.5	59	4.2
A045P632	34	850	NA	Wet	12	10.3	6.6	8.0	NA	NA
0416-1291	34	800	100	Sealed	12	10.0	6.9	7.9	38	4.0
A030Y976	4D	1050	290	Wet	12	20.7	8.7	10.0	100	NA
0416-0439	8D	1400	430	Dry	12	20.8	10.7	9.5	110	16.0
0416-1264	8D	730	420	Dry	12	20.7	10.8	9.5	110	16.0
0416-1105	8D	1400	430	Wet	12	20.8	10.8	9.5	125	16.0
A062X621	24	800	135	Wet	12	10.1	6.8	8.7	42	N/A
A062X662	34	800	120	Wet	12	10.2	6.9	7.9	38	N/A

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Application – Diesel

Listed below, by set model, is the specific battery size designed to fit the skid mounted battery rack (larger batteries, if required, may not fit the standard skid mounted rack.)

Model	Current Spec	Battery Size*	Supported Part Number*	Battery CCA*	Genset Minimum CCA	Battery Voltage	Starting (Genset) Voltage	Required Battery Quantity
C10 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C15 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C20 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C25 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C30 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C35 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C40 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C50 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C50 D6C	B	34	0416-1291	810	1700	12	12	2
C60 D6	A	26 34	0416-1051 A045P632	530 850	545	12	12	1
C60 D6C	B	34	0416-1291	810	1700	12	12	2
C80 D6C	B	34	0416-1291	810	1700	12	12	2
C100 D6C	B	34	0416-1291	810	1700	12	12	2
C125 D6C	B	34	0416-1291	810	1700	12	12	2
C3000 D6	A	8D	0416-0439	1400	1400	12	24	6
C3000 D6E	A	8D	0416-1105	1400	1400	12	24	6
C3250 D6	A	8D	0416-0439	1400	1400	12	24	6
C3250 D6E	A	8D	0416-0439	1400	1400	12	24	6
C3500 D5	A	8D	0416-0439	1400	1400	12	24	6
C3500 D5E	A	8D	0416-0439	1400	1400	12	24	6
C3500 D6	A	8D	0416-0439	1400	1400	12	24	6
C3500 D6E	A	8D	0416-0439	1400	1400	12	24	6
C3750 D5	A	8D	0416-0439	1400	1400	12	24	6
C3750 D5E	A	8D	0416-0439	1400	1400	12	24	6
DFEJ	P	24 34	A062X621 A062X662	800 800	1400	12	24	4
DFEK	P	24 34	A062X621 A062X662	800 800	1400	12	24	4
DQCA	R	34	A062X662	800	1400	12	24	4
DQCB	R	34	A062X662	800	1400	12	24	4
DQCC	R	34	A062X662	800	1400	12	24	4
DQDAA	L	4D	A030Y976	1050	750	12	24	2
DQDAB	K	4D	A030Y976	1050	750	12	24	2
DQDAC	K	4D	A030Y976	1050	750	12	24	2
DQFAA	K	34	A062X662	800	1600	12	24	4
DQFAB	K	34	A062X662	800	1600	12	24	4
DQFAC	K	34	A062X662	800	1600	12	24	4
DQFAD	K	34	A062X662	800	1600	12	24	4
DQFAH	D	34	A062X662	800	1600	12	24	4
DQGAA	C	8D	0416-0439	1400	1400	12	24	4
DQGAB	C	8D	0416-0439	1400	1400	12	24	4
DQGAE	E	8D	0416-0439	1400	1800	12	24	4
DQGAF	E	8D	0416-0439	1400	1800	12	24	4
DQHAB	H	8D	0416-0439	1400	1400	12	24	4

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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.

Generator PAC TIER4 UL142

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.

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):	24,700 lbs.

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:

1	TITLE SHEET
2	TANK TOP VIEW
3	TANK FRONT VIEW
4	SKID TOP VIEW
5	SKID FRONT VIEW
6	ENCLOSURE END VIEWS
7	ENCLOSURE RIGHT ELEVATION
8	ENCLOSURE LEFT ELEVATION
9	ENCLOSURE TOP VIEW
10	ENCLOSURE ROOF VIEW
11	SHIPPING DETAILS
12	ELECTRICAL DIAGRAM
13	ELECTRICAL DIAGRAM 2
14	ELECTRICAL DIAGRAM 3
15	ELECTRICAL DIAGRAM 4
16	SUGGESTED PAD LAYOUT
17	DETAIL PAGE 1
18	DETAIL PAGE 2
19	DETAIL PAGE 3
20	RIGGING

REVISION NOTES:

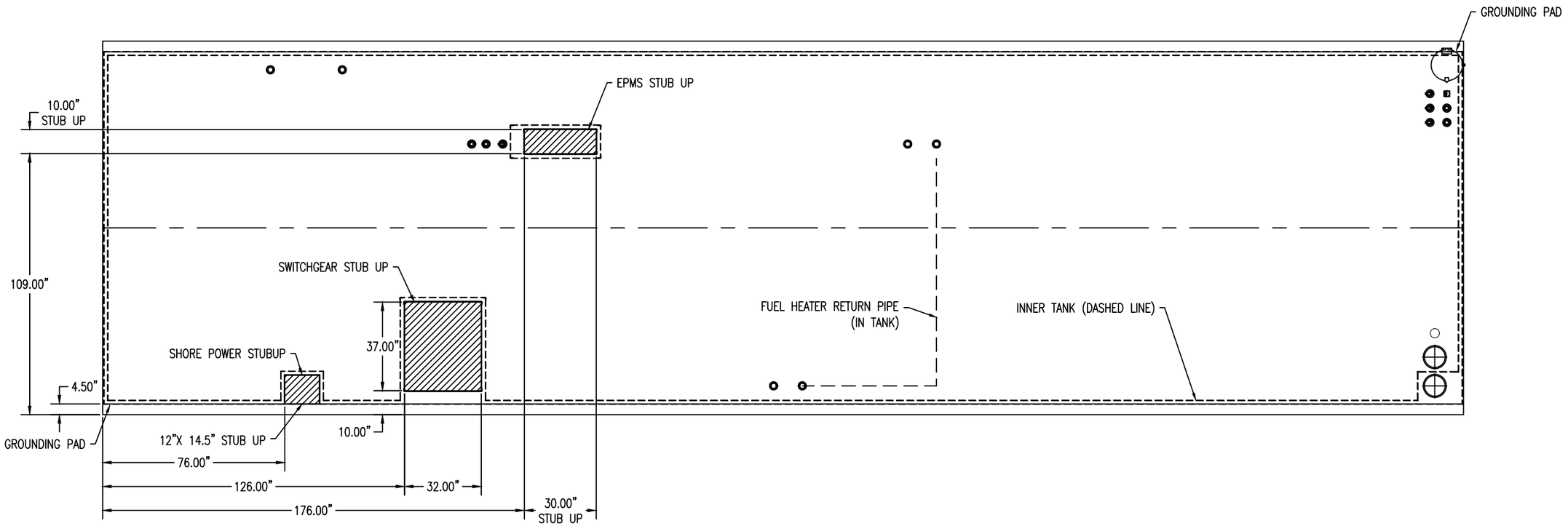
REV L: RE-ROUTED EXHAUST UP THROUGH PLENUM. 12-15-2023 E91-ML

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 J	
REV DATE: 12-15-2023	
JOB NUMBER: 28164	REV: L
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

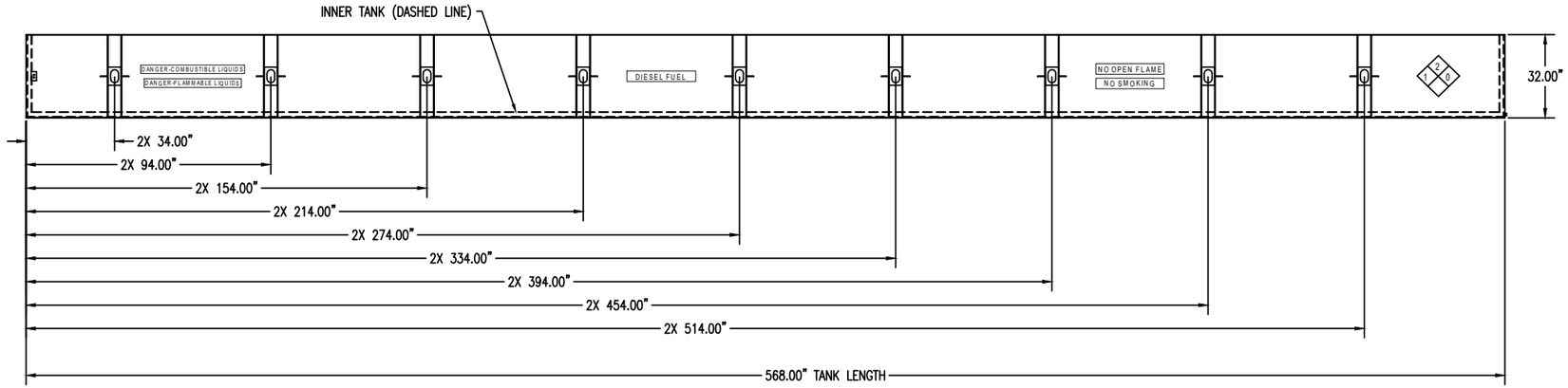
QUOTE: 15918-REV J

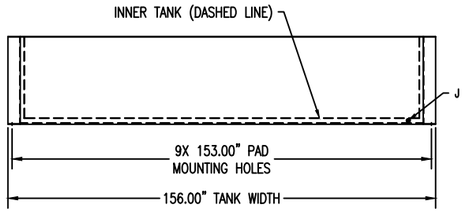
REV DATE: 12-15-2023

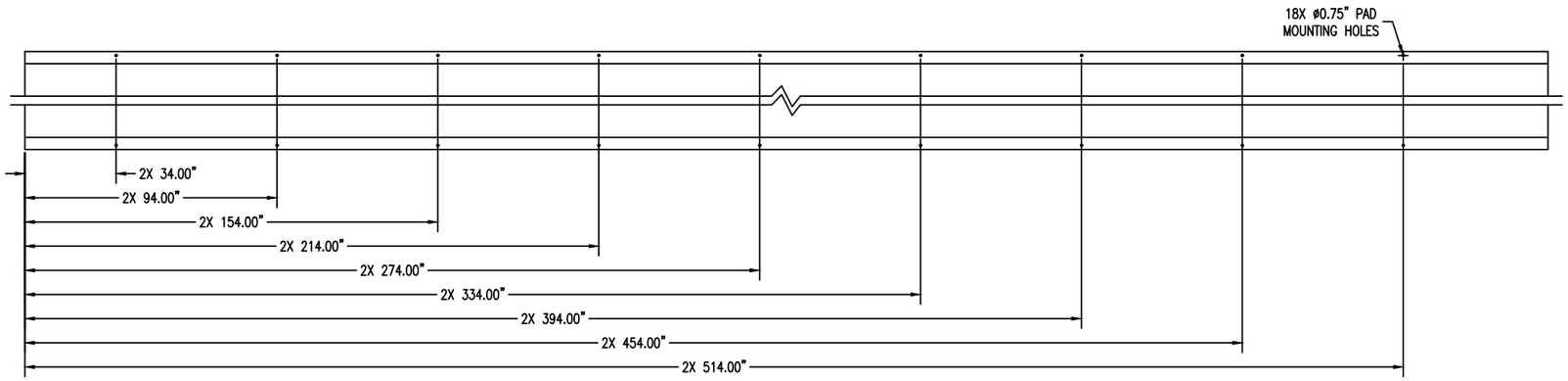
JOB NUMBER: 28164

REV: L

SHEET: 2 OF 20







TANK FRONT VIEW

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 J

REV DATE: 12-15-2023

JOB NUMBER:	REV:
28164	L

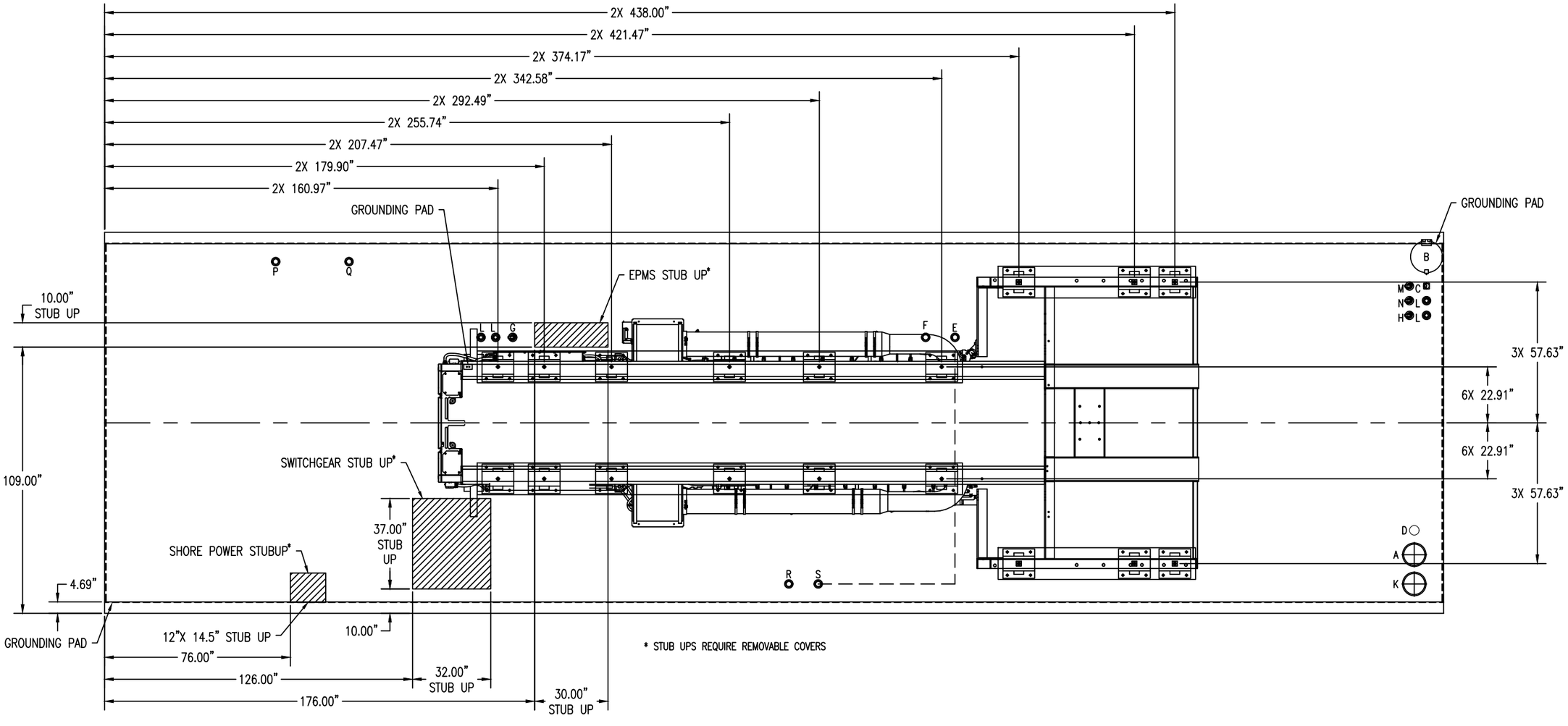
SHEET: 3 OF 20

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

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

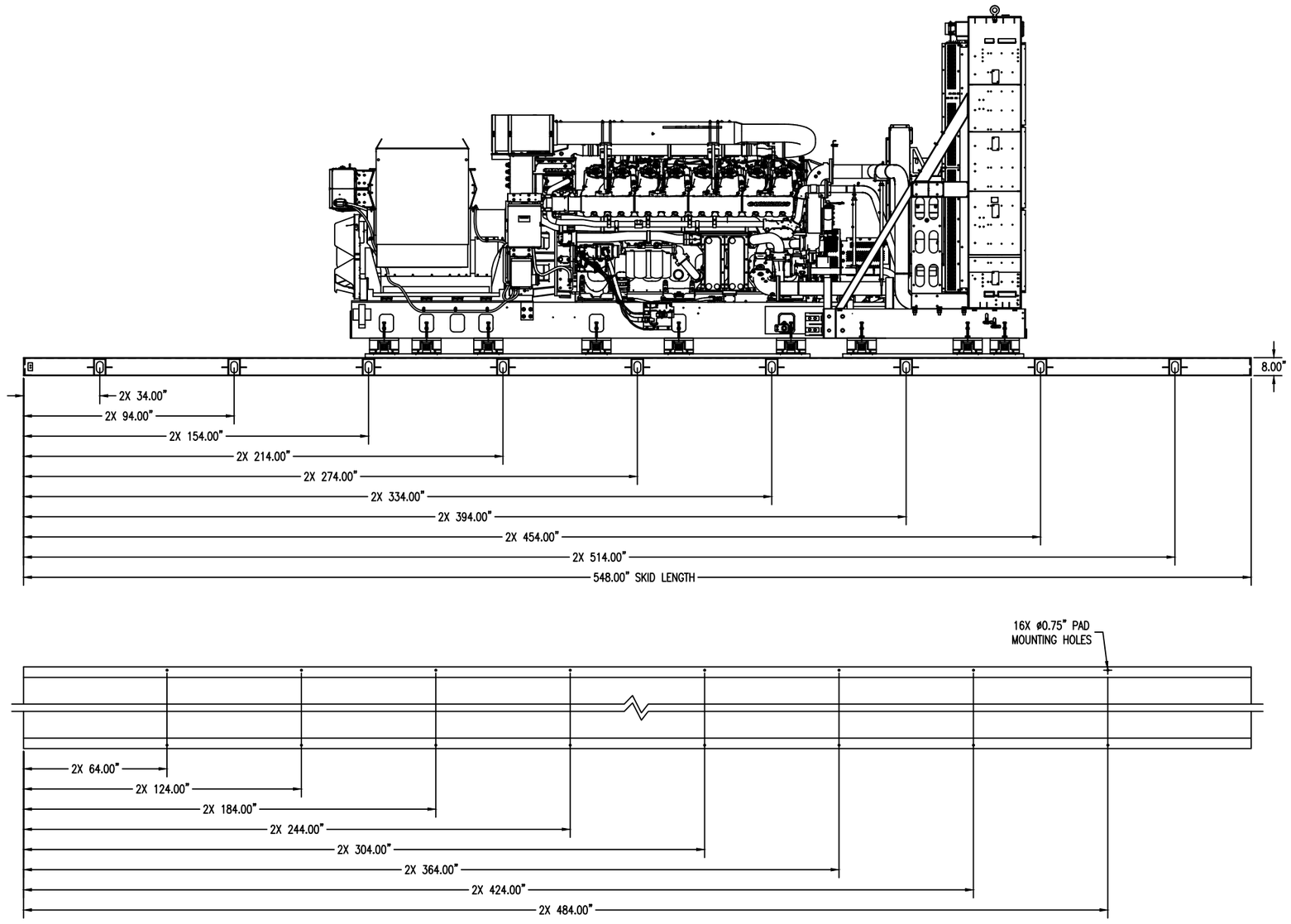
QUOTE: 15918-REV J

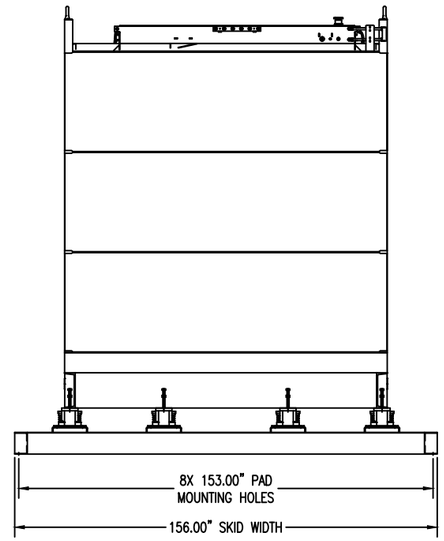
REV DATE: 12-15-2023

JOB NUMBER: 28164

REV: L

SHEET: 4 OF 20





SKID FRONT 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

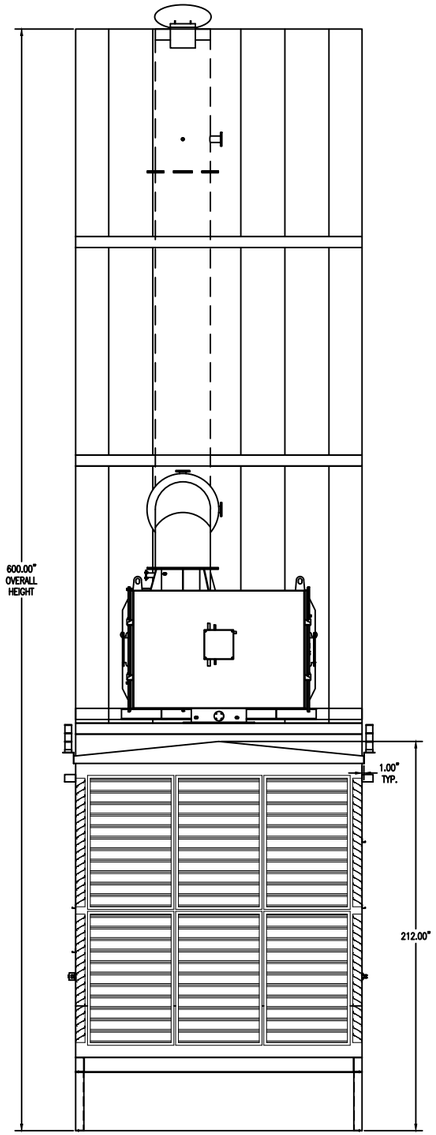
QUOTE: 15918-REV J

REV DATE: 12-15-2023

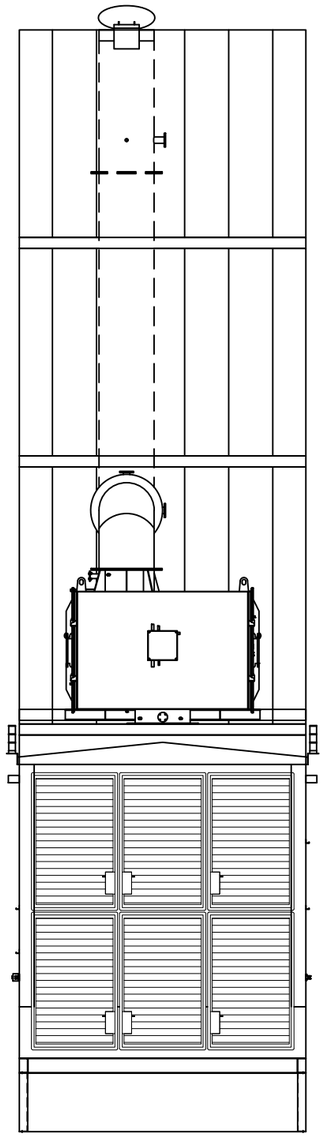
JOB NUMBER: 28164

REV: L

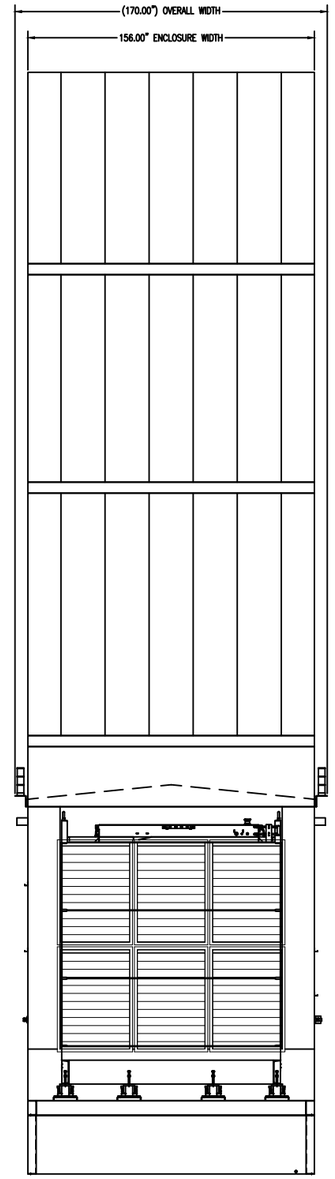
SHEET: 5 OF 20



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

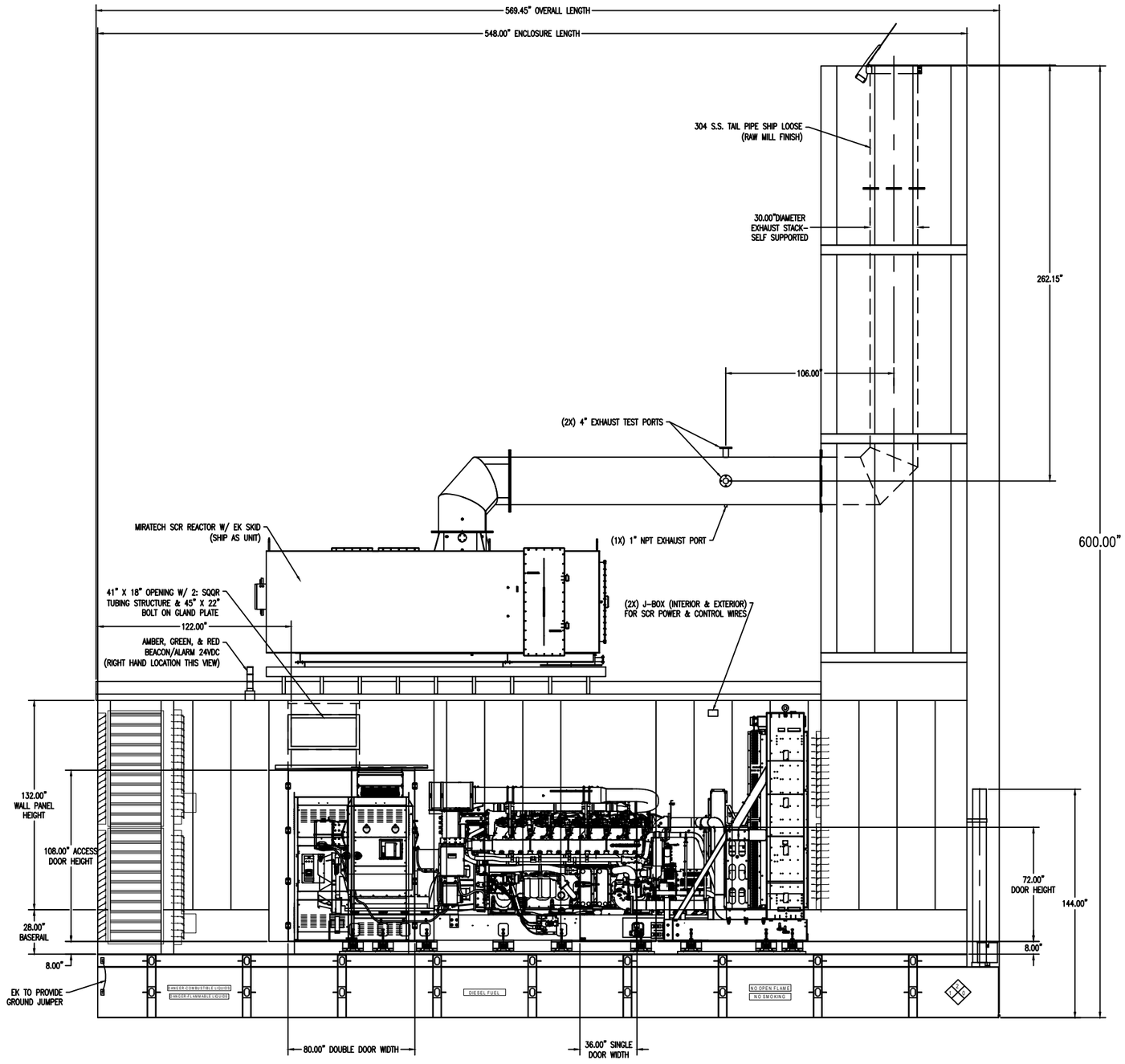
DRAWN BY:	SCALE:
SLL	NTS

QUOTE: 15918-REV J

REV DATE: 12-15-2023

JOB NUMBER:	REV:
28164	L

SHEET: 6 OF 20



RIGHT SIDE ELEVATION

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

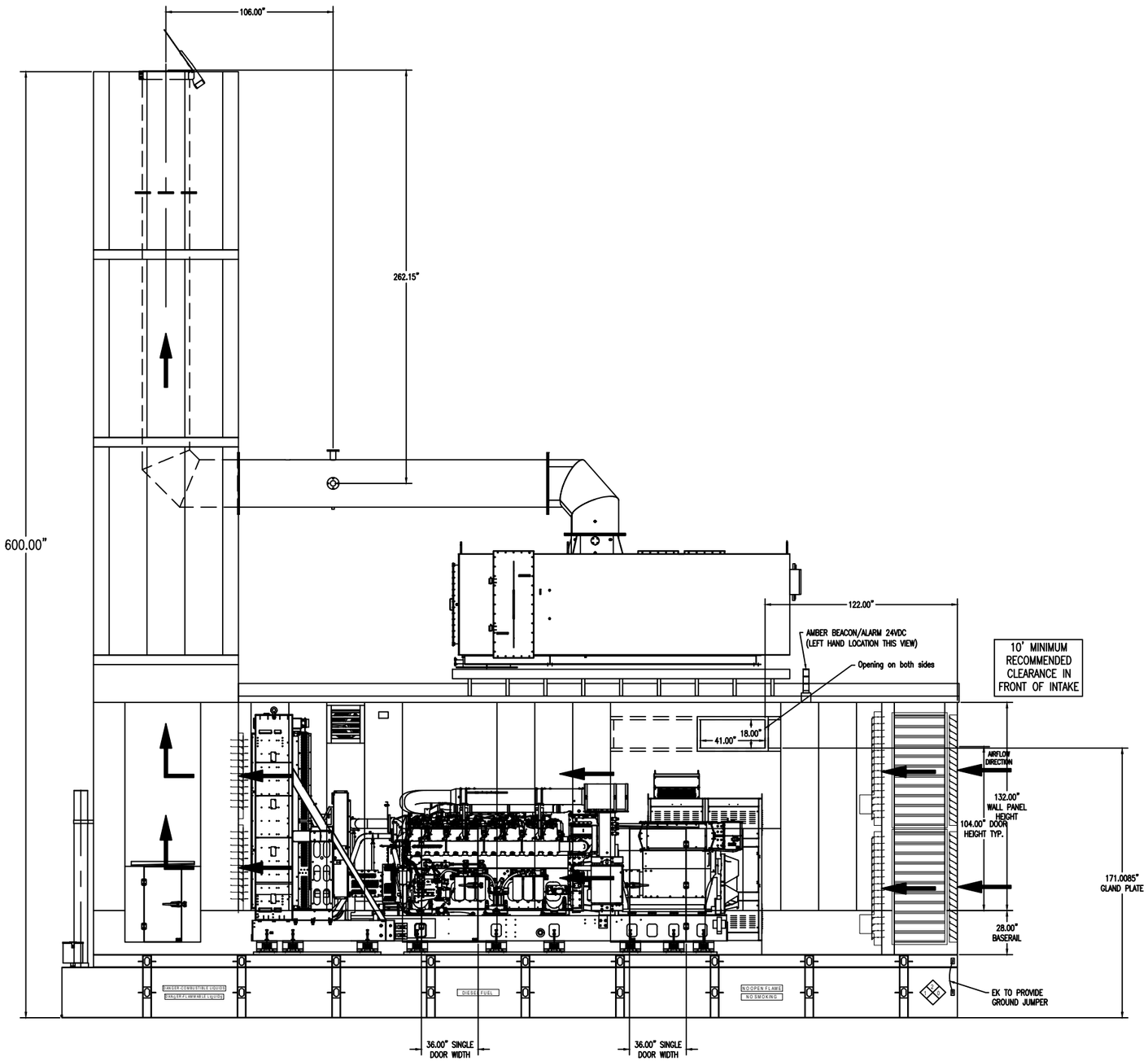
QUOTE: 15918-REV J

REV DATE: 12-15-2023

JOB NUMBER: 28164

REV: L

SHEET: 7 OF 20



LEFT SIDE ELEVATION

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 J

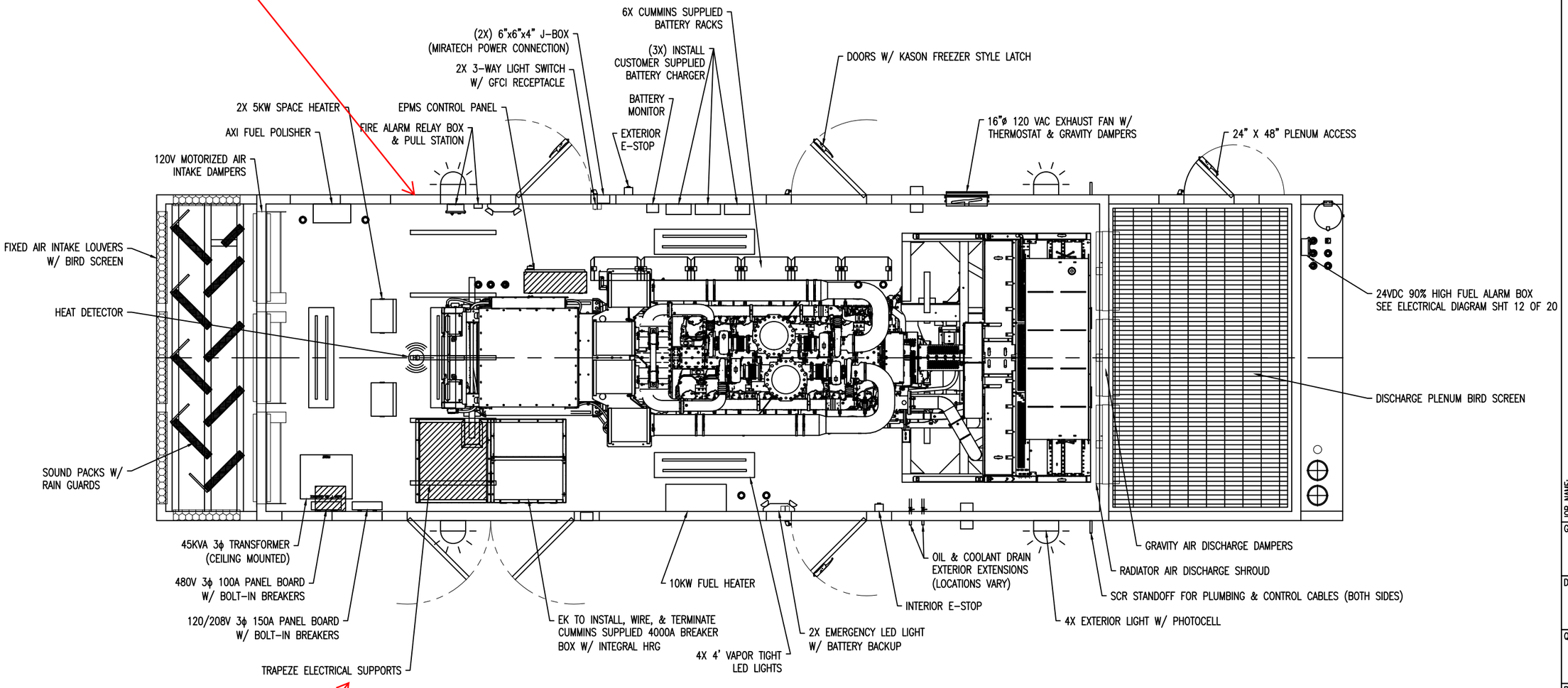
REV DATE: 12-15-2023

JOB NUMBER: 28164

REV: L

SHEET: 8 OF 20

Show exterior weather rated horn strobe location.



Per Cummins: Interior roof has provisions for contractor to bolt unistrut from ceiling to support cable bus.

Contractor to coordinate supports with Cummins.

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: SLL

SCALE: NTS

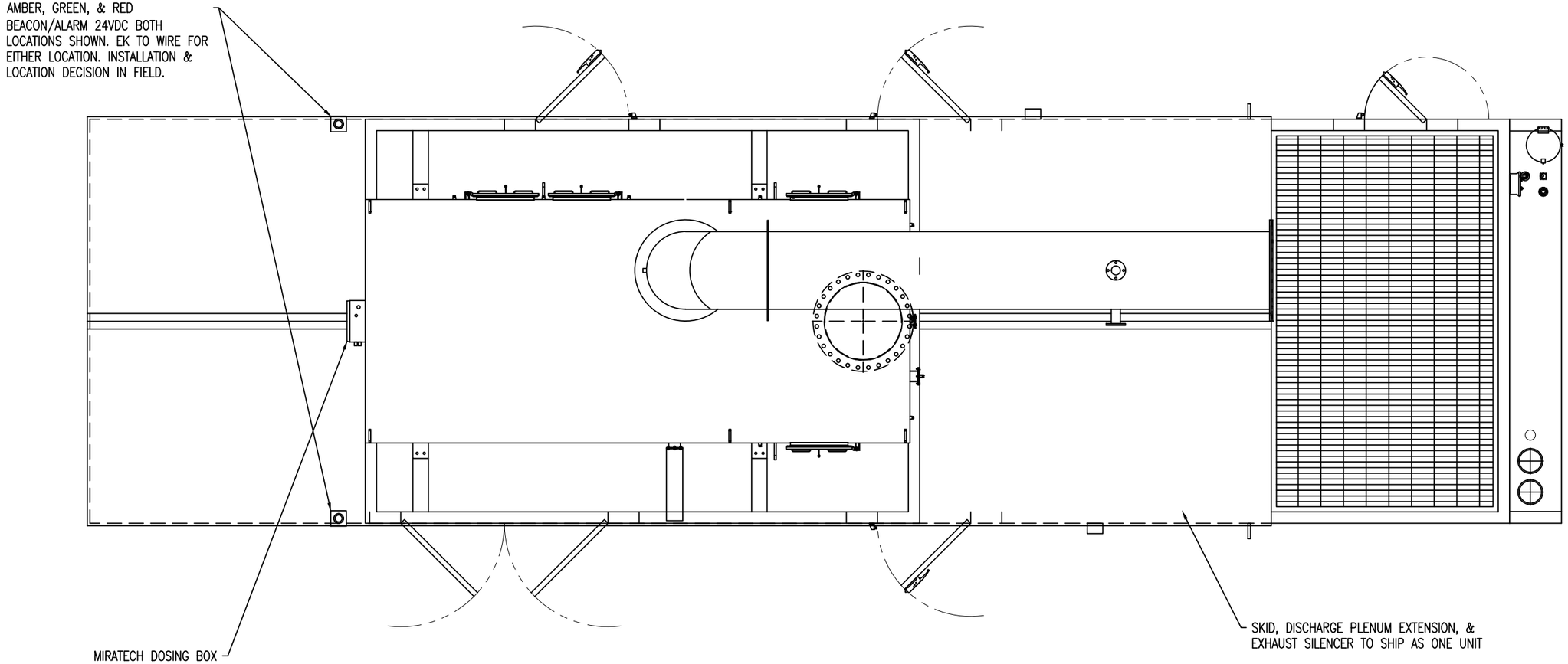
QUOTE: 15918-REV J

REV DATE: 12-15-2023

JOB NUMBER: 28164

REV: L

SHEET: 9 OF 20



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

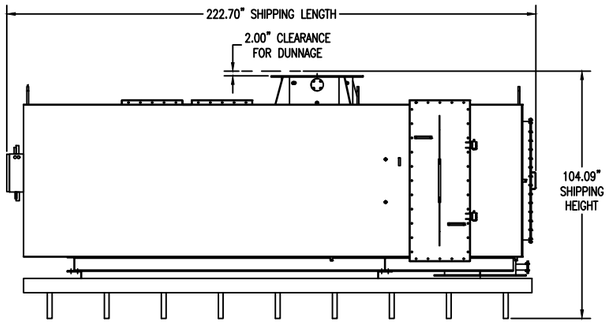
QUOTE: 15918-REV J

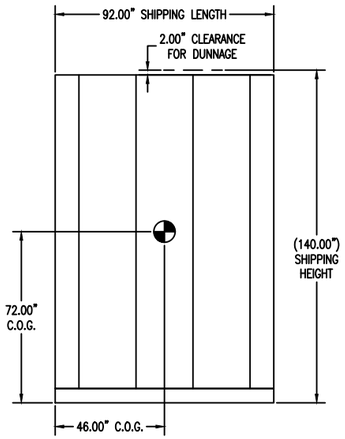
REV DATE: 12-15-2023

JOB NUMBER: 28164

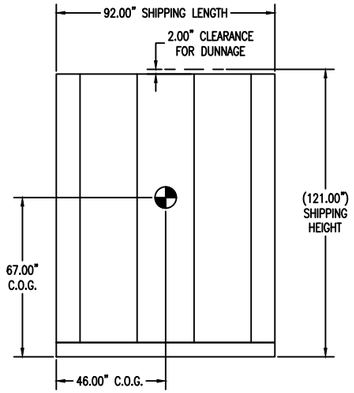
REV: L

SHEET: 10 OF 20

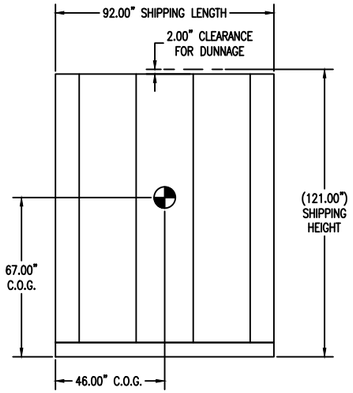




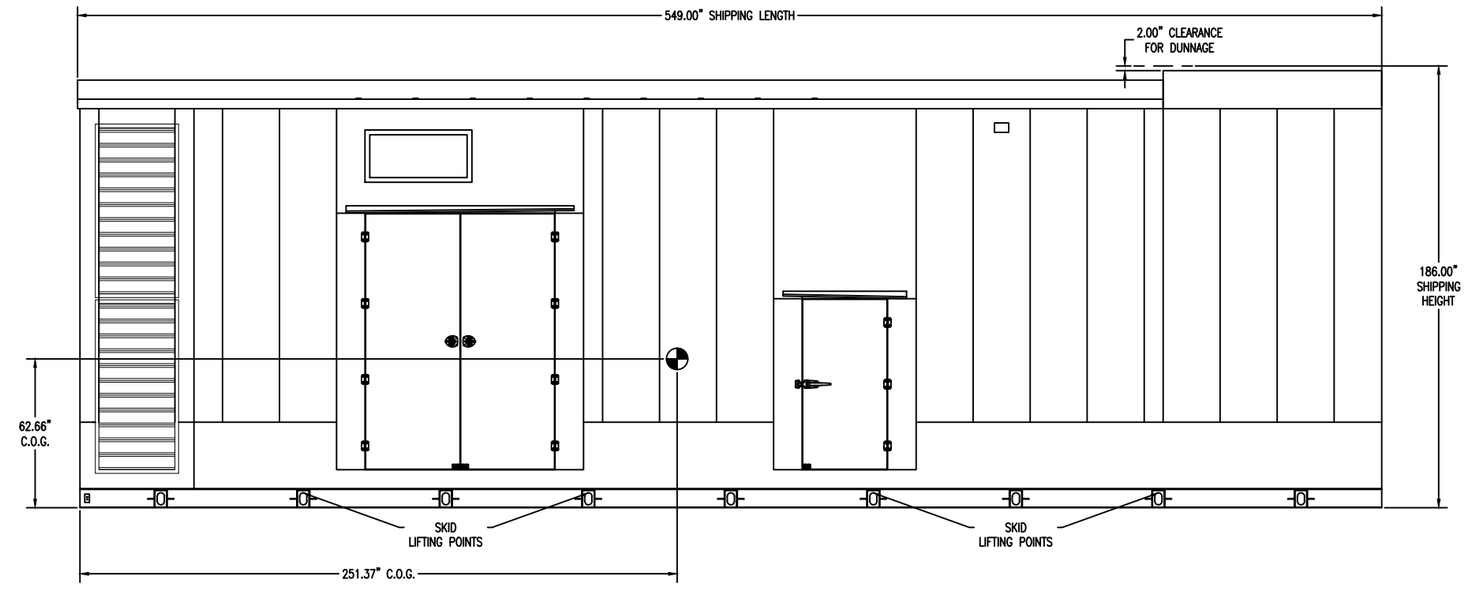
PLENUM EXT #1

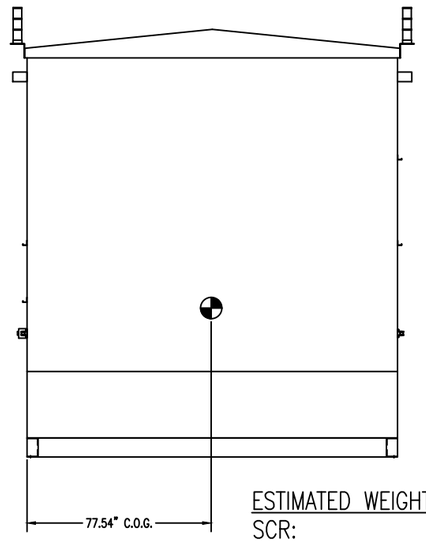


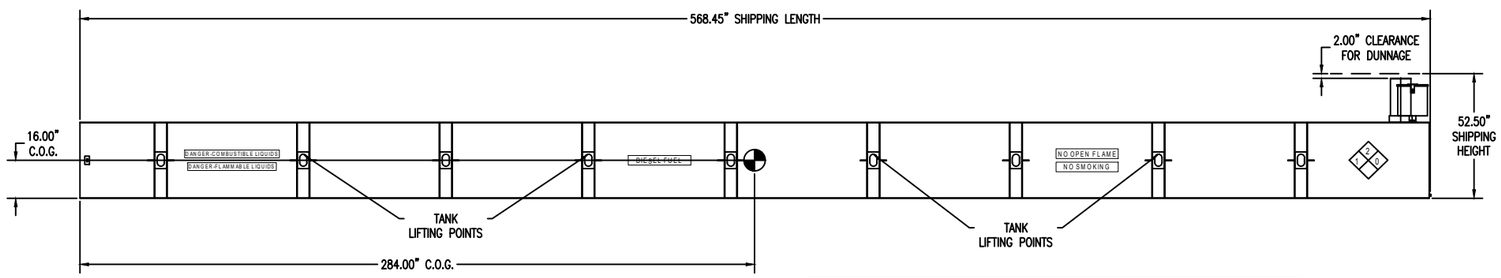
PLENUM EXT #2



PLENUM EXT #3







PLANNED SHIPPING CONFIGURATION

Please confirm weights have been updated for 50' stack design.

ESTIMATED WEIGHTS:

SCR:	3,500 LBS.
SKID:	3,000 lbs.
PLENUM EXT 1:	3,800 lbs.
PLENUM EXT 2:	1,592.5 lbs.
PLENUM EXT 3:	1,592.5 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)

APPROVAL SIGNATURE:

DATE:

GENERATOR: C3000 D6e QSK95-G9 3000KW

DRAWN BY: SLL

SCALE: NTS

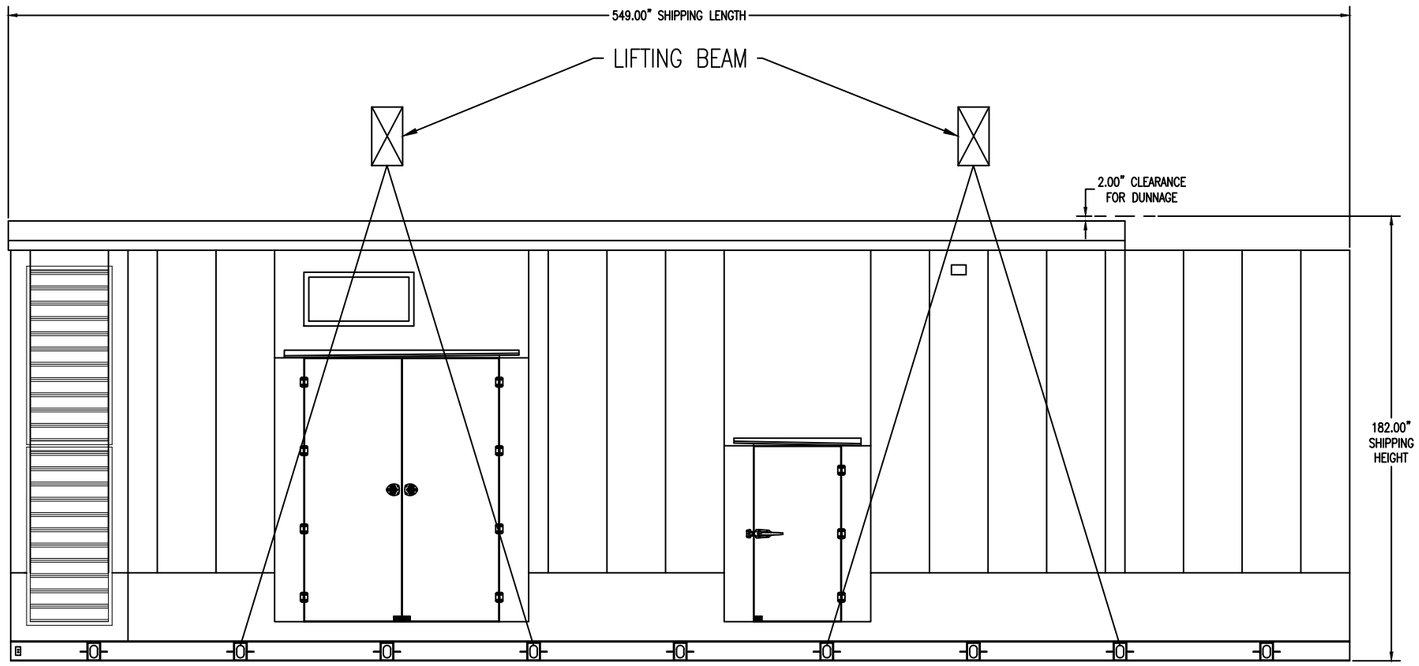
QUOTE: 15918-REV J

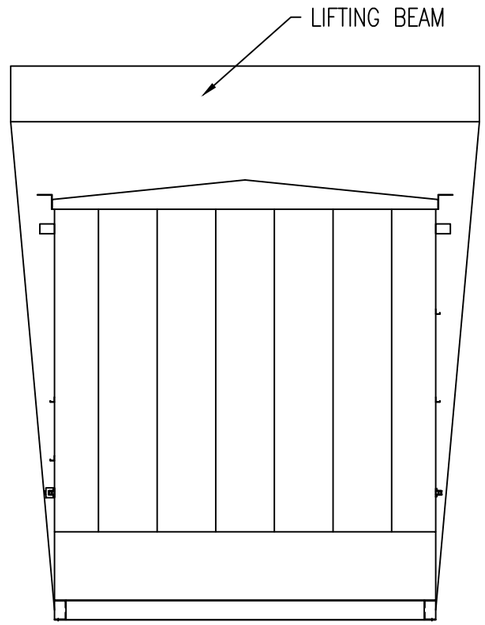
REV DATE: 12-15-2023

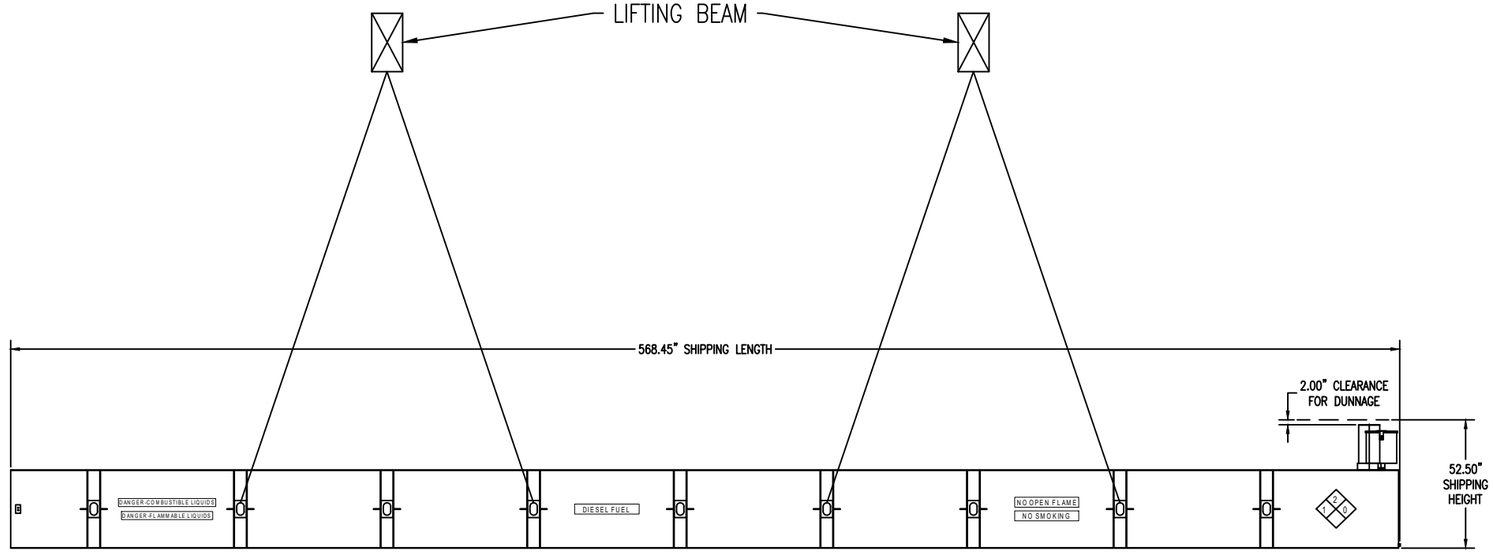
JOB NUMBER: 28164

REV: L

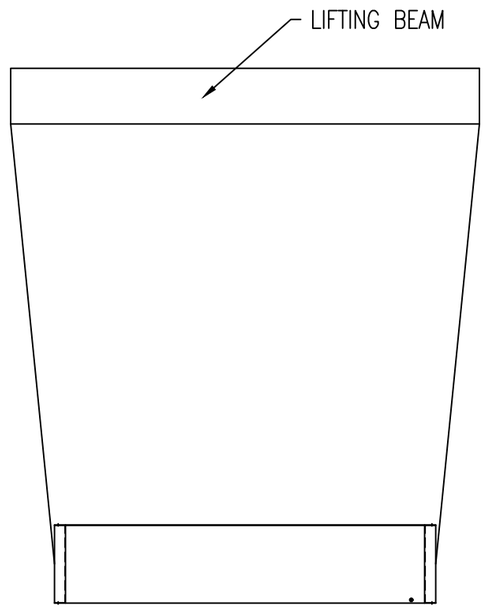
SHEET: 11 OF 20







SUGGESTED PAD LAYOUT



RIGGING DIAGRAM IS FOR REFERENCE ONLY.

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

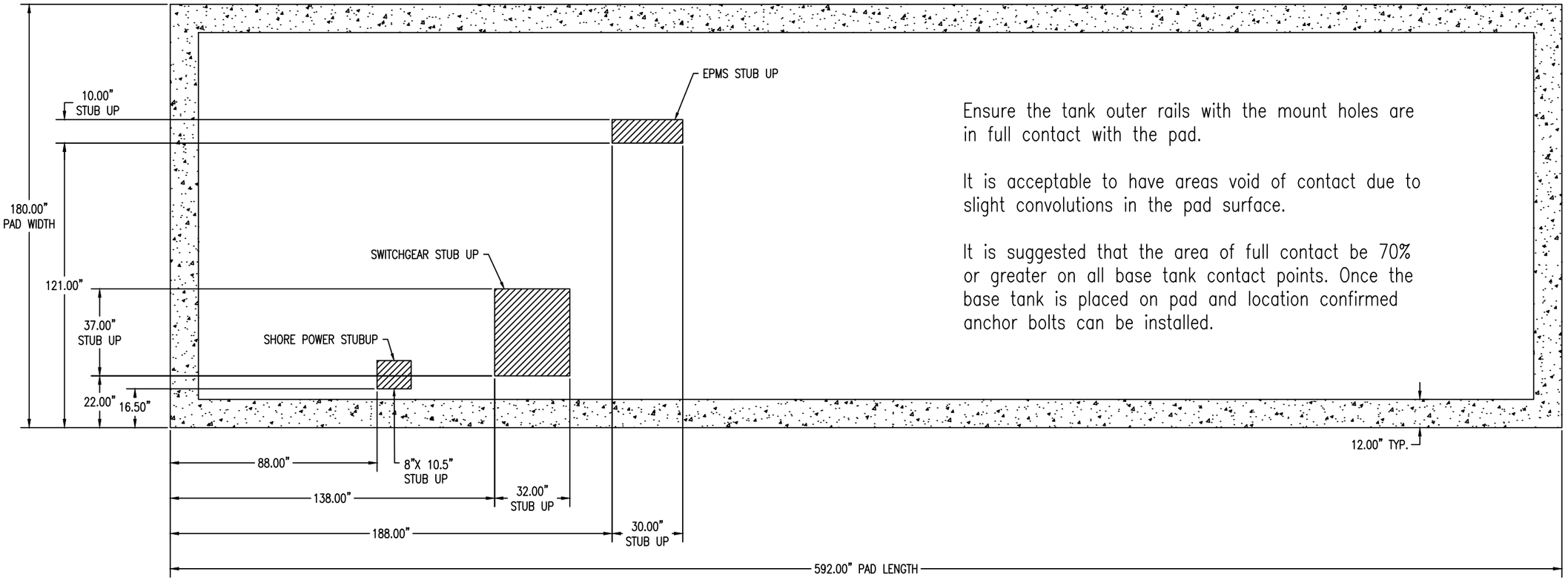
QUOTE: 15918-REV J

REV DATE: 12-15-2023

JOB NUMBER: 28164

REV: L

SHEET: 20 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

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

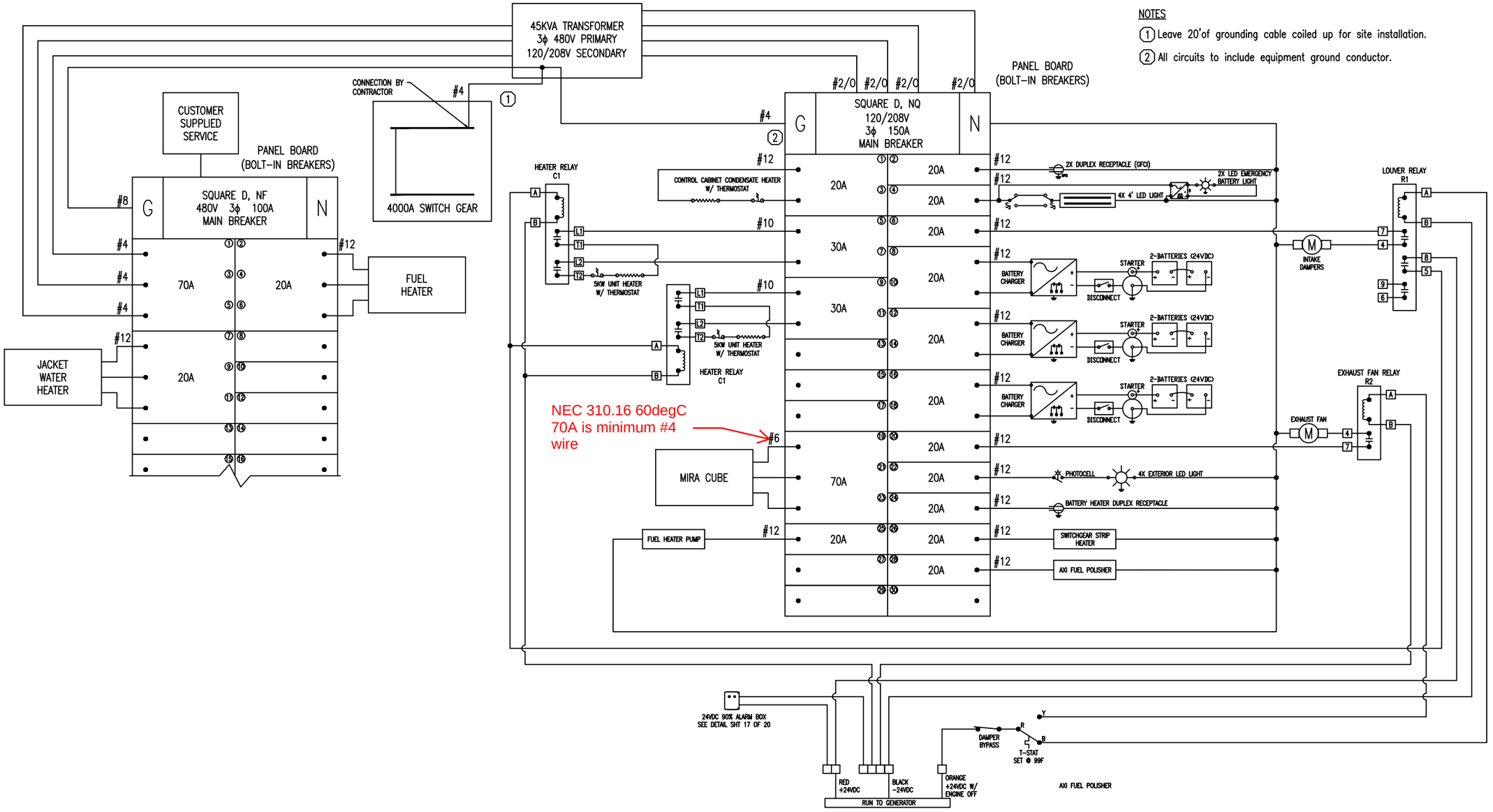
QUOTE: 15918-REV J

REV DATE: 12-15-2023

JOB NUMBER: 28164

REV: L

SHEET: 16 OF 20



ELECTRICAL DIAGRAM

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

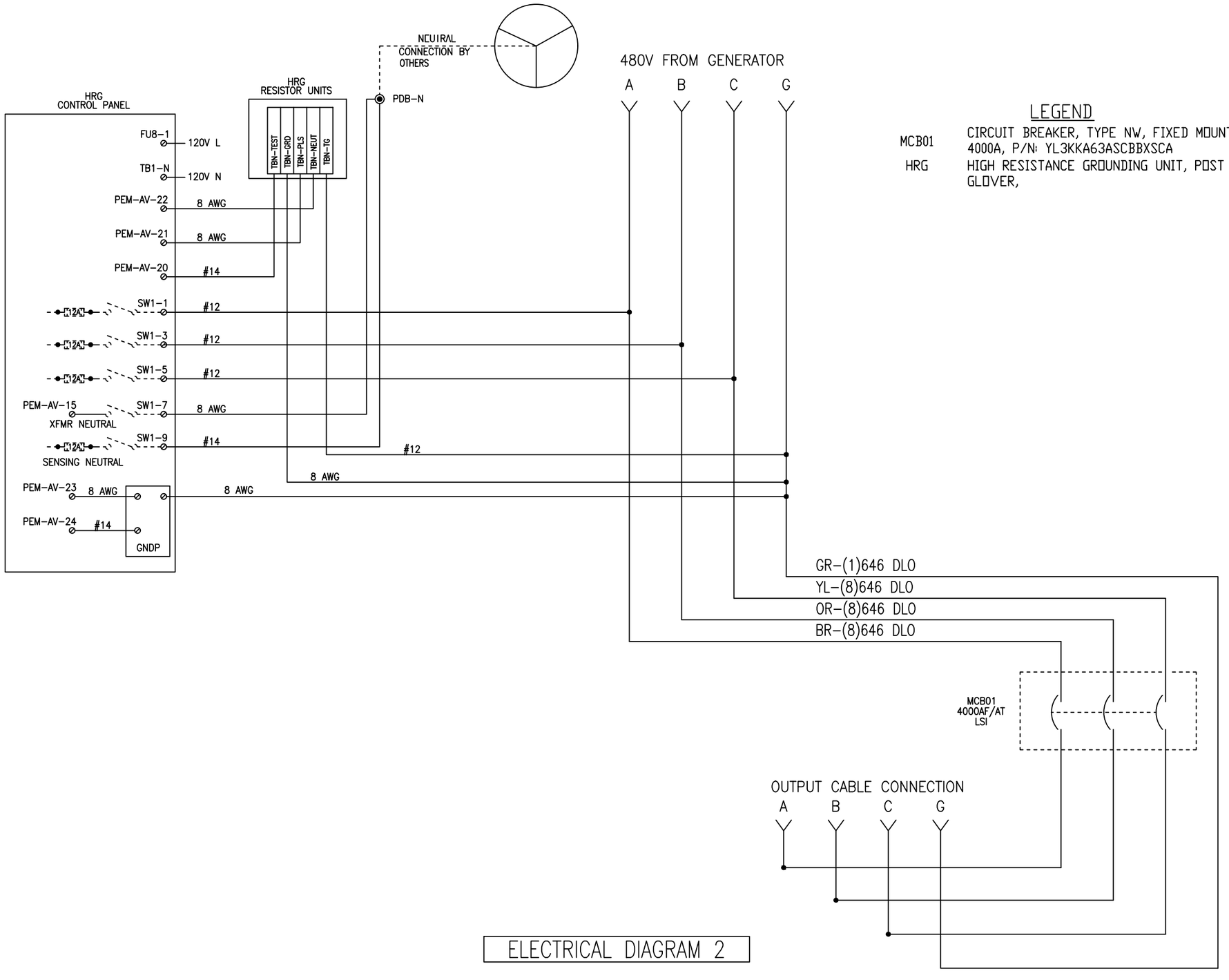
QUOTE: 15918-REV J

REV DATE: 12-15-2023

JOB NUMBER: 28164

REV: L

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 J

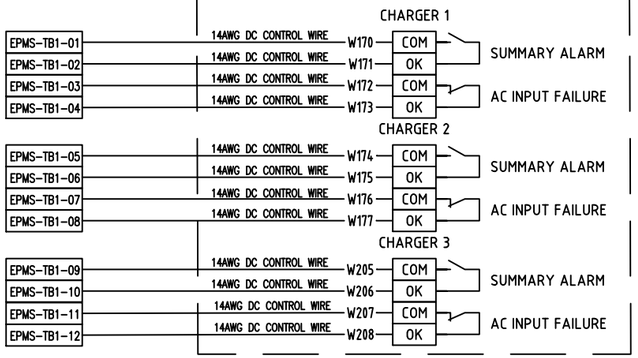
REV DATE: 12-15-2023

JOB NUMBER: 28164

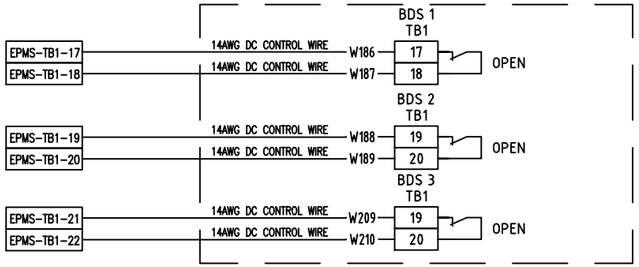
REV: L

SHEET: 13 OF 20

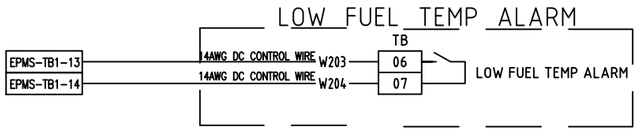
BATTERY CHARGERS



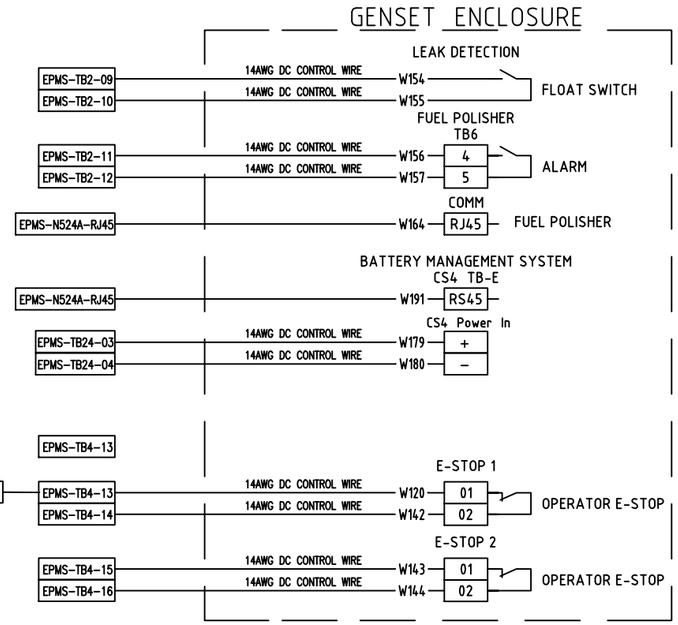
BATTERY DISCONNECT SWITCH



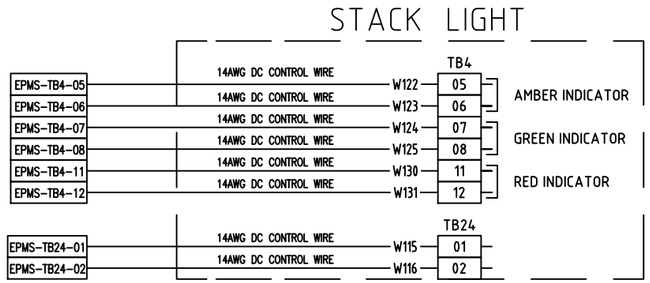
LOW FUEL TEMP ALARM



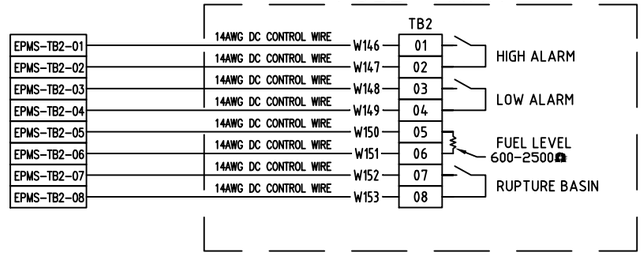
GENSET ENCLOSURE



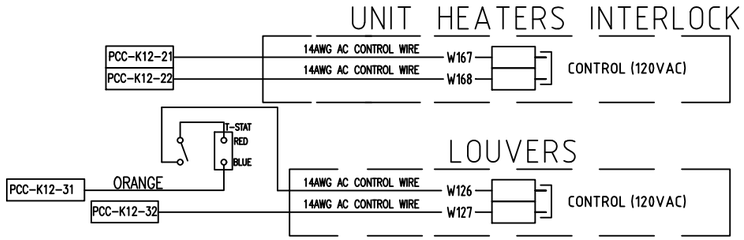
STACK LIGHT



FUEL TANK

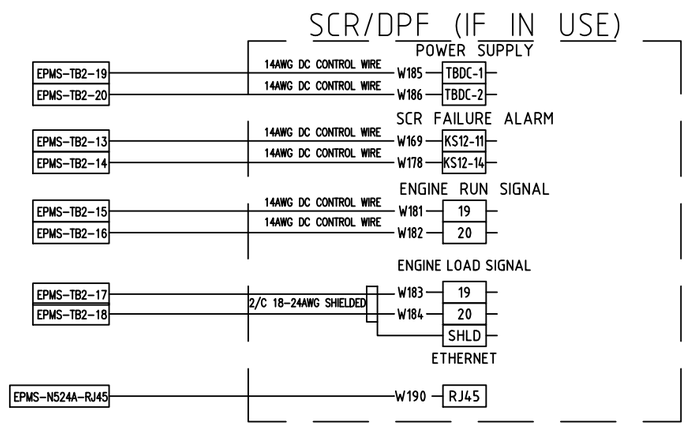


UNIT HEATERS INTERLOCK



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: SLL

SCALE: NTS

QUOTE: 15918-REV J

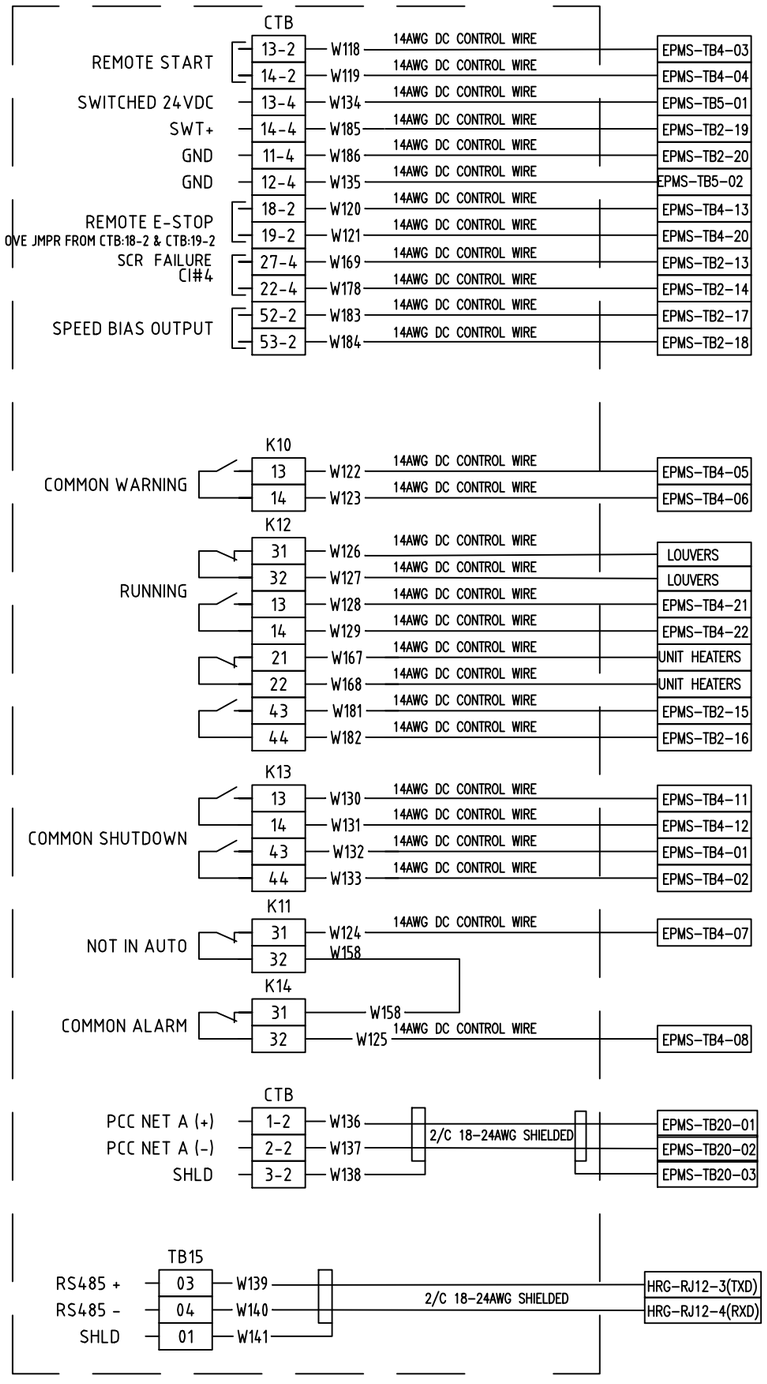
REV DATE: 12-15-2023

JOB NUMBER: 28164

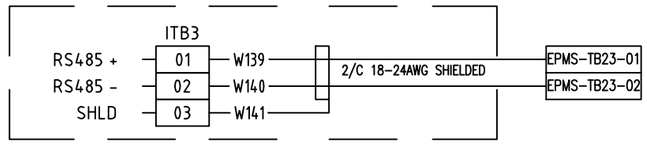
REV: L

SHEET: 14 OF 20

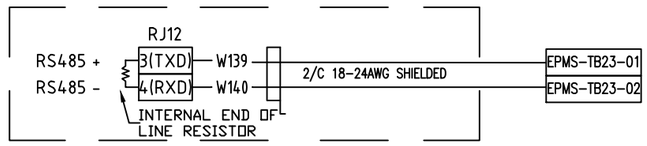
GENSET CONTROL



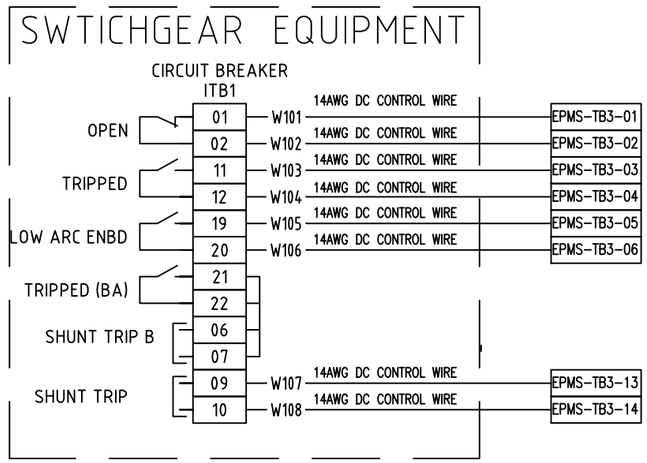
TMS



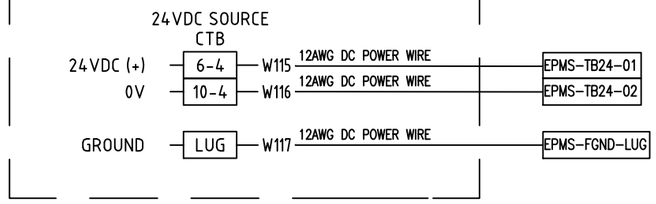
HRG



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 J

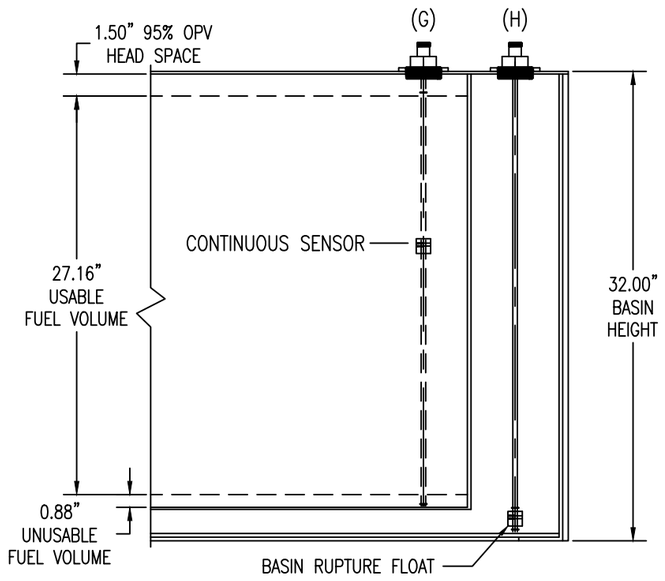
REV DATE: 12-15-2023

JOB NUMBER: 28164

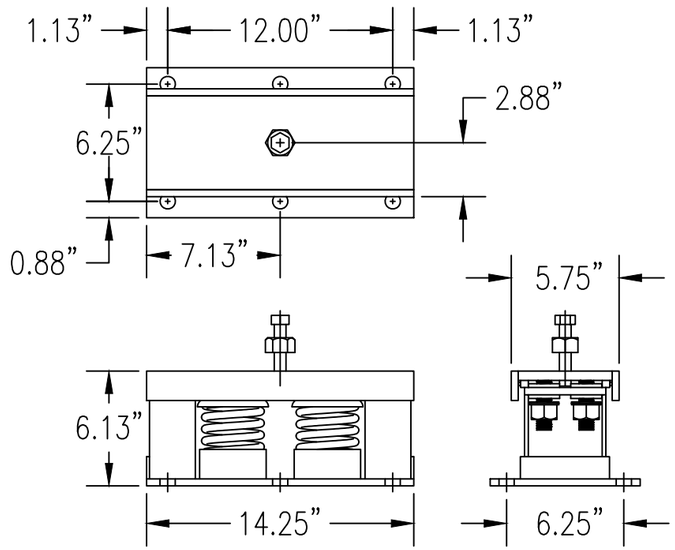
REV: L

SHEET: 15 OF 20

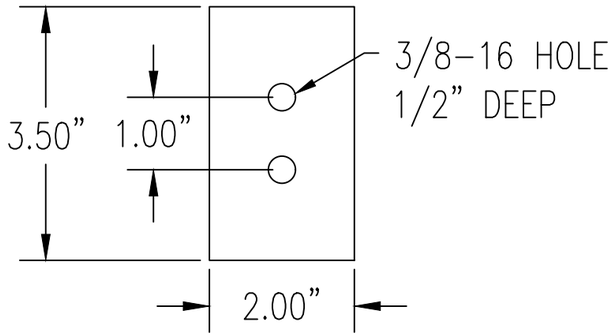
GENSET ALARM FLOAT DETAILS (NTS)



ISOLATOR DETAIL (NTS)

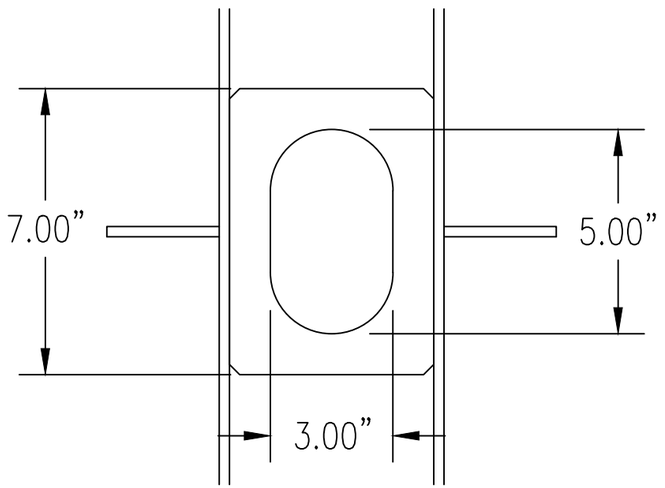


GROUNDING PAD DETAILS (NTS)



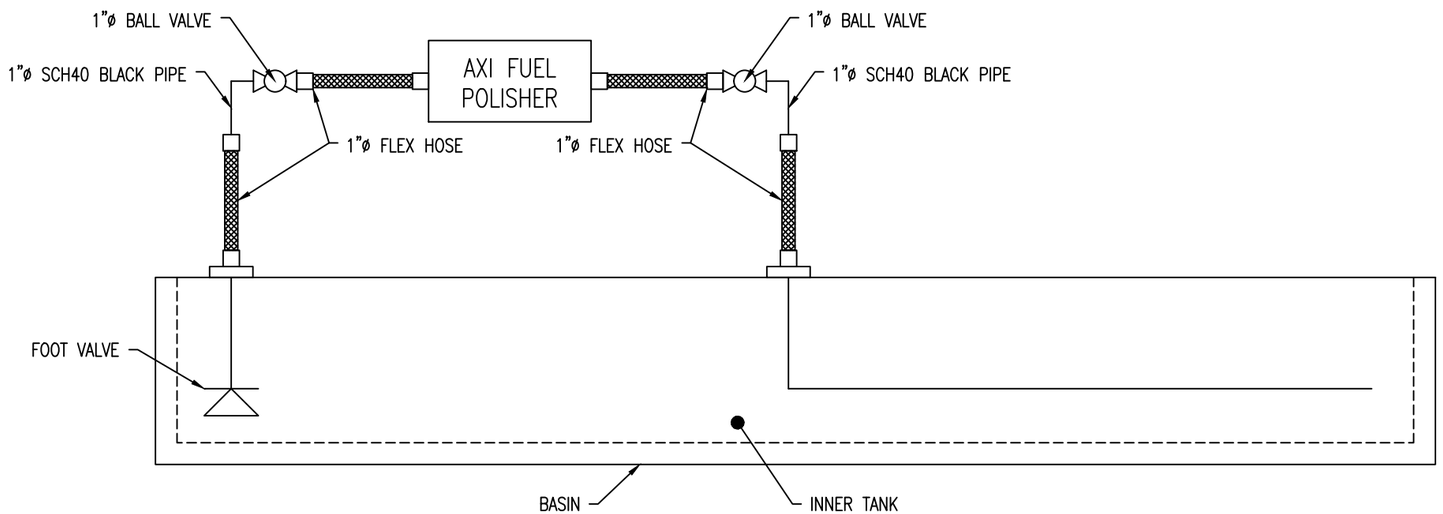
(2X) OPPOSIDE CORNERS TANK
(2X) OPPOSITE CORNERS SKID
(1X) BEHIND LEFT GENSET MOUNTING CHANNEL

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)



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

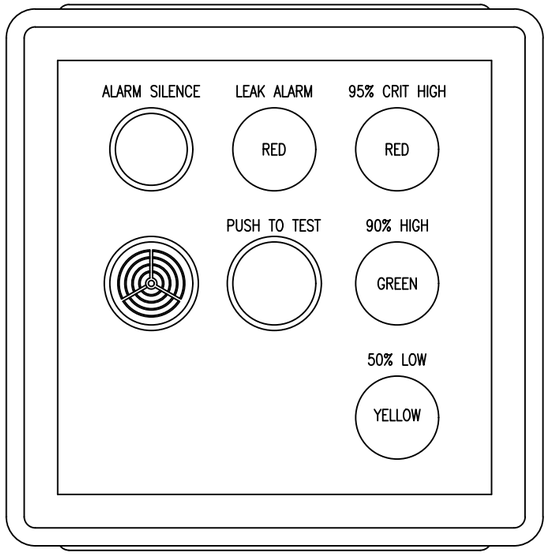
QUOTE: 15918-REV J

REV DATE: 12-15-2023

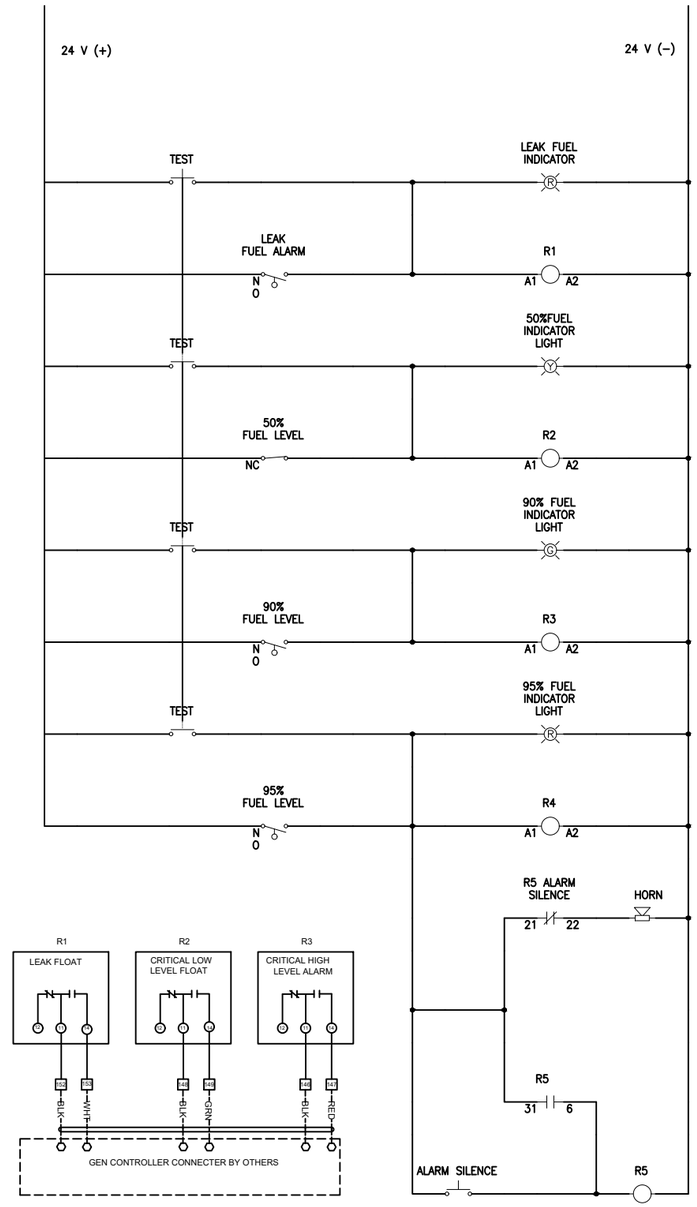
JOB NUMBER:	REV:
28164	L

SHEET: 17 OF 20

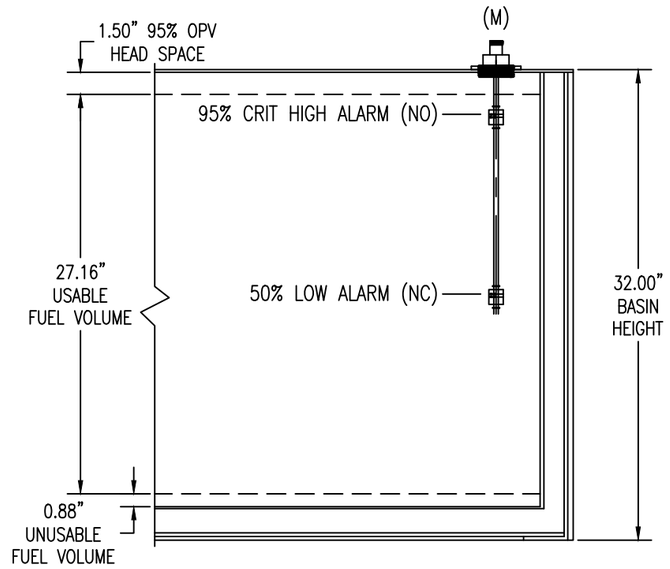
HIGH FUEL ALARM BOX DETAILS
24 VDC / 90%CH, 90%H, 50%L & LEAK (NTS)



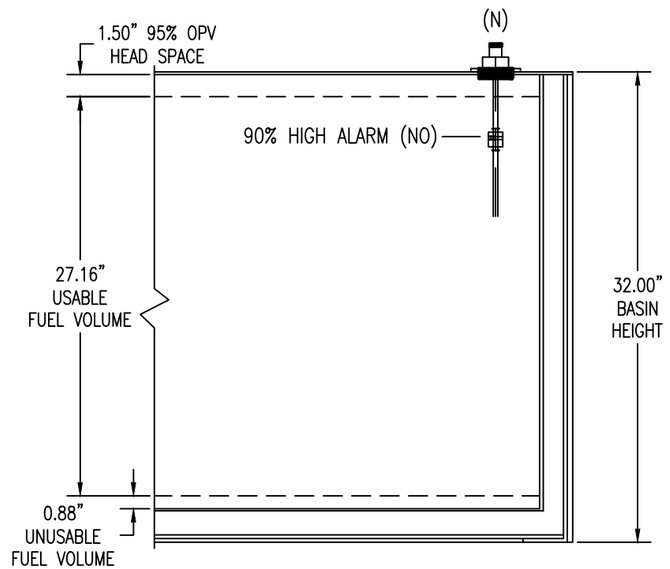
HIGH FUEL ALARM BOX SCHEMATIC
24VDC/95% C.HIGH, 90% HIGH, 50% C.LOW, & LEAK ALARM
(NTS)



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

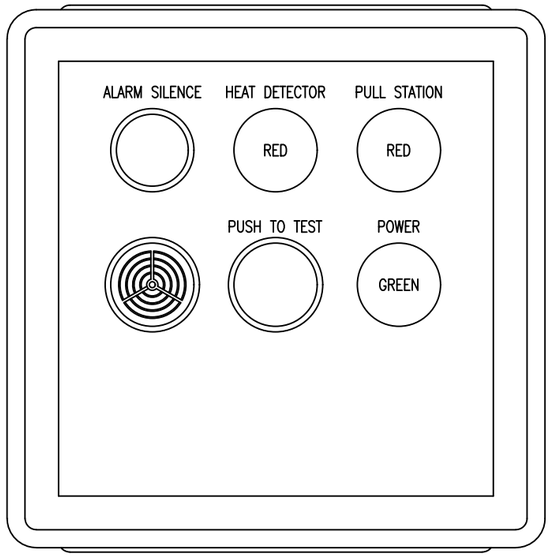
QUOTE: 15918-REV J

REV DATE: 12-15-2023

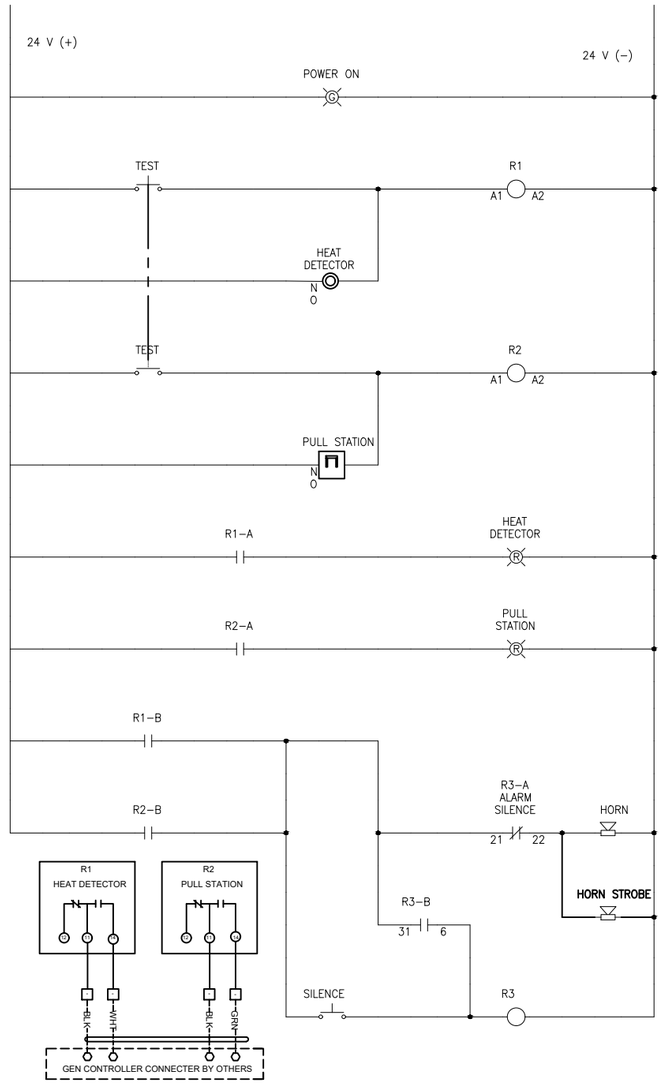
JOB NUMBER:	REV:
28164	L

SHEET: 18 OF 20

FIRE ALARM BOX DETAILS
24 VDC / HEAT DETECTOR & PULL STATION (NTS)



FIRE ALARM BOX SCHEMATIC
24VDC HEAT DETECTOR & PULL STATION
(NTS)



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 J

REV DATE: 12–15–2023

JOB NUMBER: 28164

REV: L

SHEET: 19 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.

Master Scope of Supply

Project Name: CPG MKE 03-04
Proposal Number: GL-23-005046
Sales Order: 37199
Customer PO: 0707051062

Date: 11/27/2023
Revision: 0

MIRATECH Scope of Supply

Model Number	Description	Quantity	
		Per Engine	Total
M3BZ-80S-70S-J-23110246-R4	**DOC/SCR/DPF-Ready Housing**	-	-
M3BZ-80S-70S-J-23110246-HSG	DOC/SCR/DPF-Ready Housing	1	39
STS-M3S-70	SCR Tray Set	2	78
SCRC-044-150-450	SCR Catalyst	140	5460
MECR-OX-SB2269-2400-1650-291	Oxidation Catalyst	4	156
FACINS-M3BZ-80S-70S	**Emission Insulation Blanket**	1	39
ACIS-3	**SCR Control System**	-	-
SP-A3C-60-22070041	SCR Controller	1	39
SP-CA115-UL-23050045	Air Compressor	1	39
SP-SPS-23080093	Reactant Pump	1	39
FILTER115	Reactant Filter	1	39
SEN115-U-WT	Dosing Box	1	39
DEN115-700-U	Injector	1	39
TT-14-FLEX60-32-1112	Temperature Sensor	2	78
NP-18	Bypass Probe	2	78
PT-0-40	Differential Pressure Sensor	1	39
NOX-24V	NOx Sensor	2	78
WH-NOX-24V-50-SL	Wiring Harness	2	78
Commissioning & Startup	**Commissioning & Startup**	1	39
SP-FREIGHT	**Freight**	1	39
SP-RTS-700-23080124	**Reactant Tank System**	1	39

Master Scope of Supply

Project Name: CPG MKE 03-04
Proposal Number: GL-23-005046
Sales Order: 37199
Customer PO: 0707051062

Date: 11/27/2023
Revision: 0

Customer Equipment Scope of Supply

Description	Item / Set Quantity	
	Per Engine	Total
Exhaust Piping entering/exiting SCR system		
Expansion Joints		
30" ANSI Flange Hardware and Gasket Set		

Customer Tubing Scope of Supply

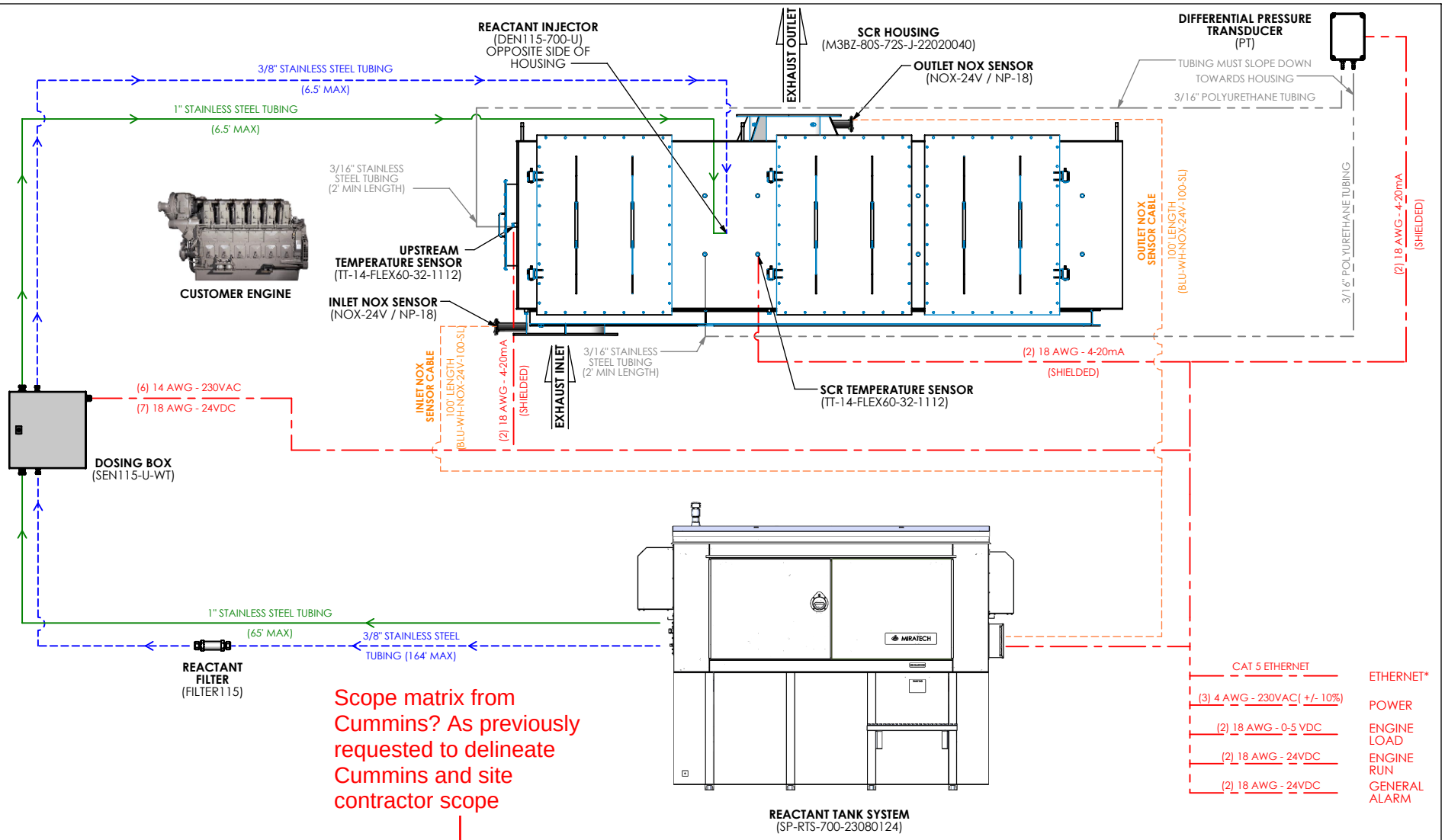
Beginning and End Location	Description
Reactant Pump - Dosing Box Tubing	3/8" Stainless Steel Tubing - 164' Max
Reactant Dosing Box - Injector Tubing	3/8" Stainless Steel Tubing - 6.5' Max
Air Compressor - Dosing Box Tubing	1" Stainless Steel Tubing - 65' Max
Air Dosing Box - Injector Tubing	1" Stainless Steel Tubing - 6.5' Max
Pre-DPF - Pressure Sensor Tubing	3/16" Stainless Steel Tubing (2' Min) & 1/4" Polyurethane Tubing
Post-DPF - Pressure Sensor Tubing	3/16" Stainless Steel Tubing (2' Min) & 1/4" Polyurethane Tubing

Customer Wiring Scope of Supply

Gauge and Signal Required
14 AWG - 230 VAC
4 AWG - 230 VAC
18 AWG - 24 VDC / 4-20 mA
Shielded - 18 AWG - 24 VDC
CAT 5 Ethernet

Table of Revisions

Description	Revision	Date
Original Release	0	11/27/2023



COMPONENT MODELS

- REACTANT TANK SYSTEM - *(SP-RTS-700-23080124)*
- DOSING BOX - *(SEN115-U-WT)*
- REACTANT INJECTOR - *(DEN115-700-U)*
- NOx PROBE - *(NP-18)*

PROJECT NAME	CPG MKE 03-04
PROPOSAL NUMBER	GL-23-005046
SALES ORDER NO.	37199
CUSTOMER P.O.	0707051062

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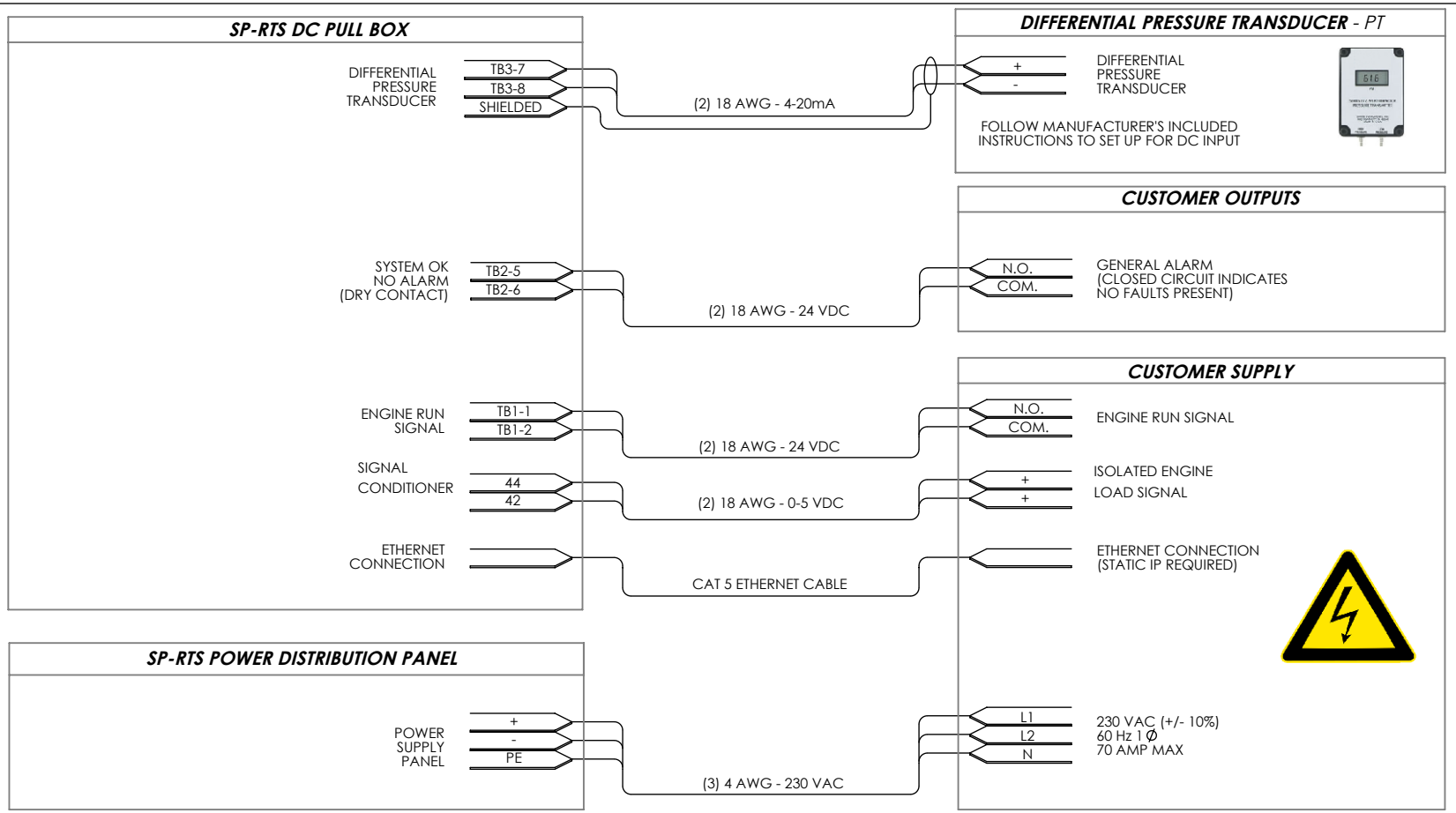
DO NOT SCALE DRAWING

DRAWN	GEP	DATE	2/16/2022
REVIEWED BY	JWS	DATE	2/16/2022

MIRATECH

M3-RTS-ACIS-3
System Interconnect

DRAWING	CPG MKE 03-04 - M3-RTS-ACIS-3 SI	REV	0
SIZE	A	NOT TO SCALE	SHEET 1 OF 1



NOTES:

- ITEMS MARKED WITH AN ASTERISK (*) ARE PRE-WIRED AS PART OF THE REACTANT TANK SYSTEM
- ALL SHIELDED CABLE SHOULD BE TWISTED TYPE - MINIMUM 6 TURNS/FOOT
- ALL CABLE RUNS SHOULD BE CLEARLY LABELED AT ORIGIN AND DESTINATION
- WIRE SIZES SHOWN ARE MINIMUM REQUIREMENTS

PROJECT NAME	**CPG MKE 03-04**
PROPOSAL NUMBER	**GL-23-005046**
SALES ORDER NO.	**37199**
CUSTOMER P.O.	**0707051062**

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DRAWN	GEP	DATE	12/20/2021
REVIEWED BY	JWS	DATE	12/20/2021

MIRATECH

ACIS-3 115 RTS
Wiring Interconnect

DRAWING	CPG MKE 03-04 - ACIS-3 RTS WI	REV	0
SIZE	A	NOT TO SCALE	SHEET 1 OF 3

SCR CONTROLLER - SP-A3C*

BOOSTER PUMP POWER SUPPLY
- TB230-7
- TB230-8
- TB230-9

(3) 14 AWG - 230 VAC

COMPRESSOR START
- TB2-3
- TB2-4

(2) 18 AWG - 24 VDC

COMPRESSOR SIGNAL
- TB1-5
- TB1-6

(2) 18 AWG - 24 VDC

SP-RTS POWER DISTRIBUTION PANEL*

230 VAC (+/- 10%)
60 Hz 1 Ø
10 AMP
- 9
- 11
- PE

(3) 12 AWG - 230 VAC

SP-RTS AC PULL BOX

INJECTOR DRIVE
- TB230-11
- TB230-12
- TB230-13
- TB230-10

(4) 14 AWG - 230 VAC

POWER SUPPLY
- TB230-16
- TB230-17

(2) 14 AWG - 230 VAC

SP-RTS DC PULL BOX

DOSING VALVE
- TB2-2
- TB2-1

(2) 18 AWG - 24 VDC

AIR PRESSURE
- TB1-3
- TB1-4

(2) 18 AWG - 24 VDC

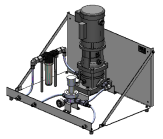
FLOW METER
- TB1-7
- TB1-10
- TB1-8

(3) 18 AWG - 24 VDC

REACTANT BOOSTER PUMP - SP-SPS*

BOOSTER PUMP POWER SUPPLY

WIRE PUMP PER WIRING SCHEMATIC ON BACK OF PUMP NAMEPLATE



AIR COMPRESSOR - SP-CA115*

COMPRESSOR START
- X82-1
- X82-2

COMPRESSOR SIGNAL
- X83-1
- X83-2

COMPRESSOR POWER
- X80-L1
- X80-L2/N
- X80-PE

DOSING BOX - SEN115-U-WT

INJECTOR DRIVE
- X4-1
- X4-2
- X4-N
- X4-5/PE

HEATING ELEMENT
- X4-6
- X4-7

DOSING VALVE
- X4-10
- X4-11

AIR PRESSURE
- X4-12
- X4-13

FLOW METER
- X4-14
- X4-15
- X4-16

NOTES:

- ITEMS MARKED WITH AN ASTERISK (*) ARE PRE-WIRED AS PART OF THE REACTANT TANK SYSTEM
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- ALL CABLE RUNS SHOULD BE CLEARLY LABELED AT ORIGIN AND DESTINATION
- WIRE SIZES SHOWN ARE MINIMUM REQUIREMENTS

PROJECT NAME	**CPG MKE 03-04**
PROPOSAL NUMBER	**GL-23-005046**
SALES ORDER NO.	**37199**
CUSTOMER P.O.	**0707051062**

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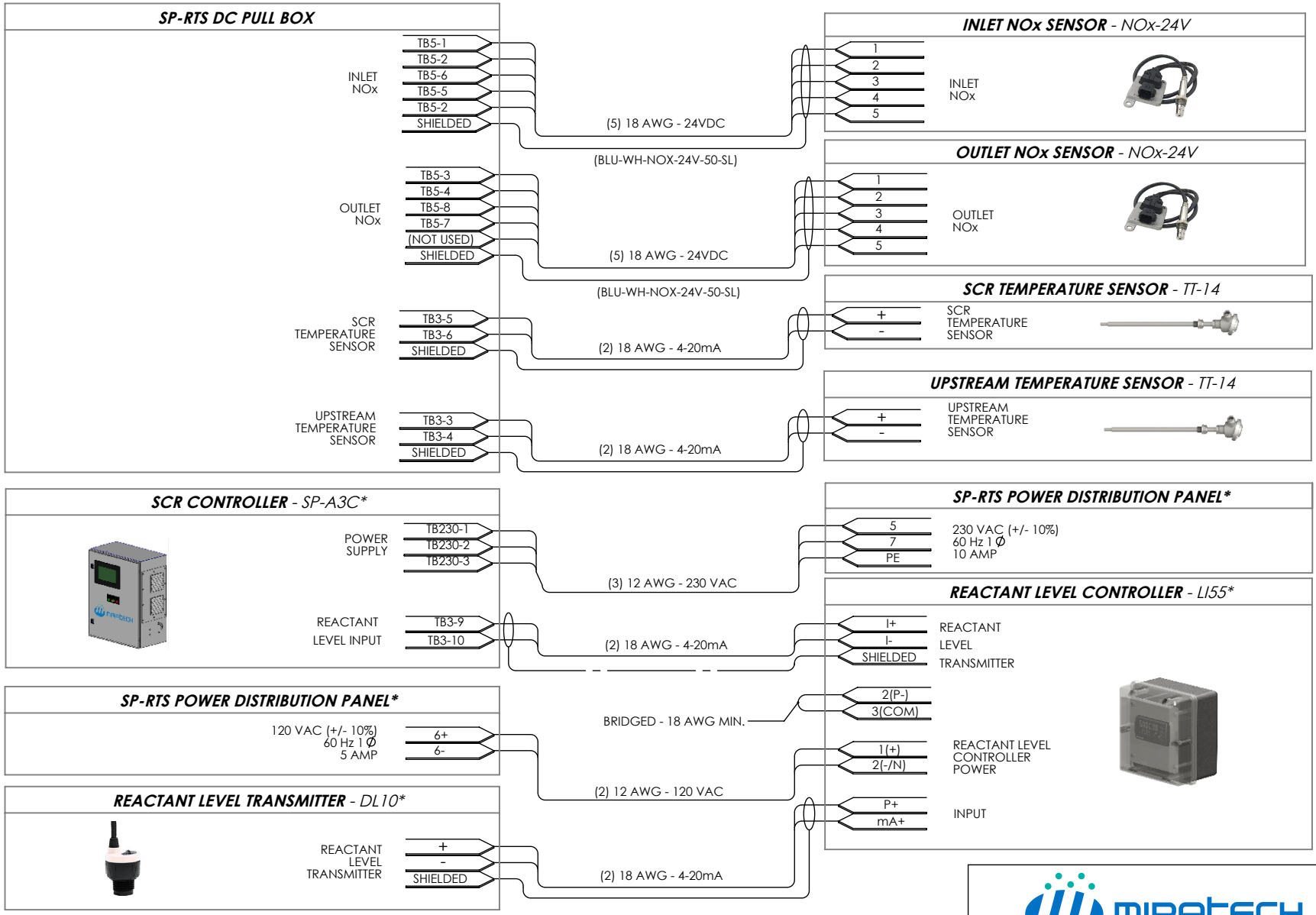
DO NOT SCALE DRAWING

DRAWN	GEP	DATE	12/20/2021
REVIEWED BY	JWS	DATE	12/20/2021

MIRATECH

ACIS-3 115 RTS Wiring Interconnect

DRAWING	CPG MKE 03-04 - ACIS-3 RTS WI	REV	0
SIZE	A	NOT TO SCALE	SHEET 2 OF 3



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- ALL CABLE RUNS SHOULD BE CLEARLY LABELED AT ORIGIN AND DESTINATION
- WIRE SIZES SHOWN ARE MINIMUM REQUIREMENTS

PROJECT NAME	**CPG MKE 03-04**
PROPOSAL NUMBER	**GL-23-005046**
SALES ORDER NO.	**37199**
CUSTOMER P.O.	**0707051062**

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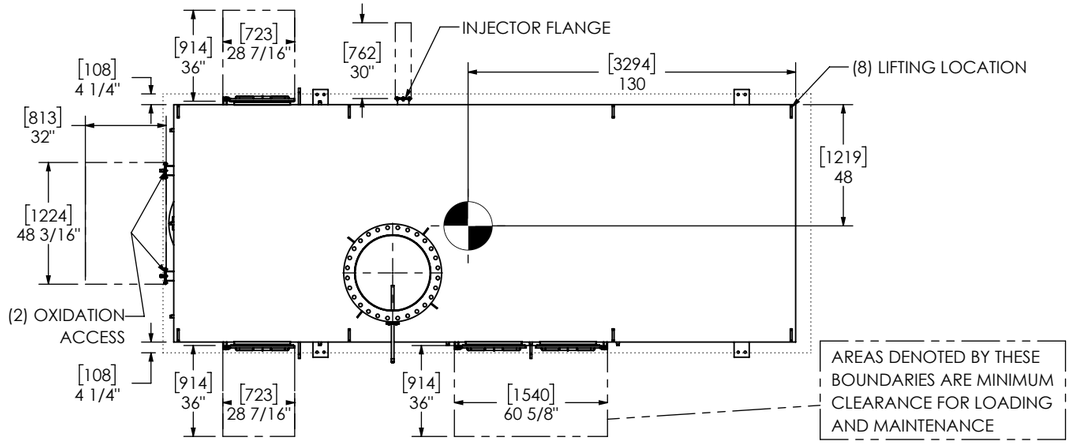
DO NOT SCALE DRAWING

DRAWN	GEP	DATE	12/20/2021
REVIEWED BY	JWS	DATE	12/20/2021

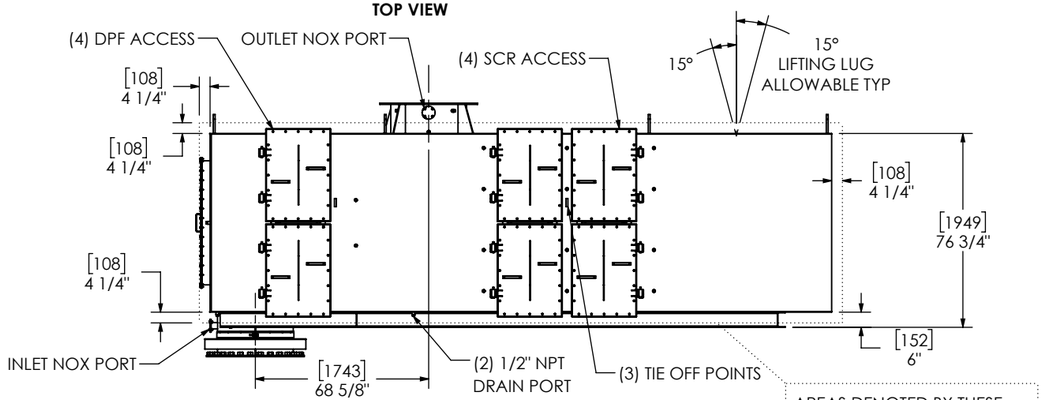
MIRATECH

ACIS-3 115 RTS Wiring Interconnect

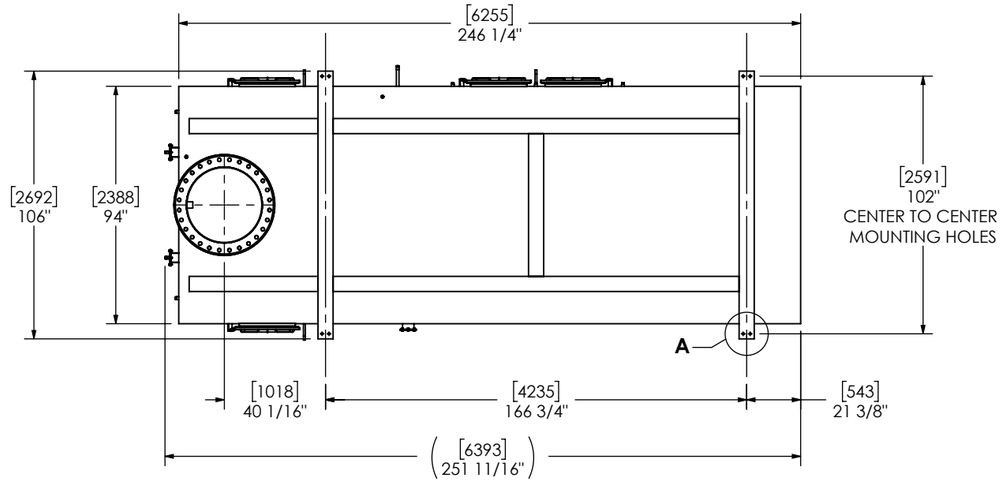
DRAWING	CPG MKE 03-04 - ACIS-3 RTS WI	REV	0
SIZE	A	NOT TO SCALE	SHEET 3 OF 3



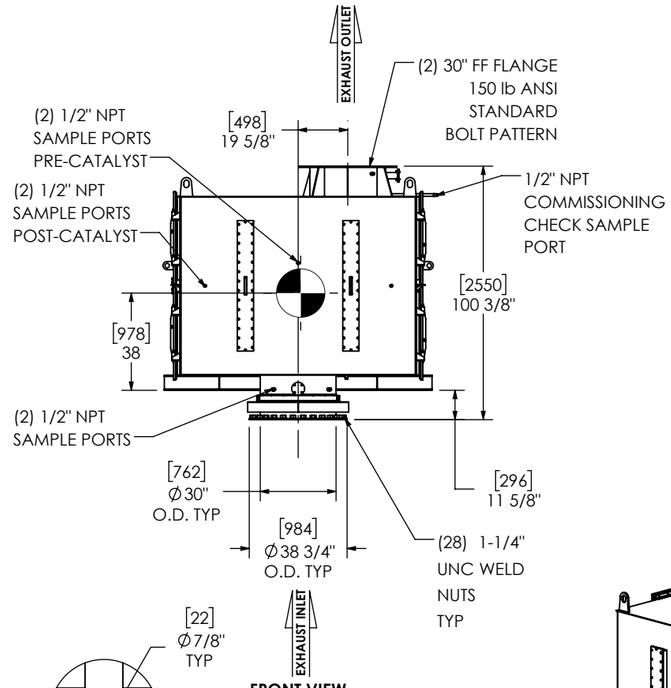
TOP VIEW



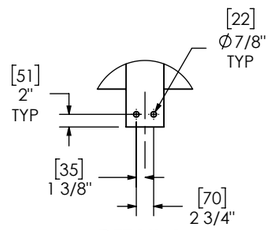
SIDE VIEW



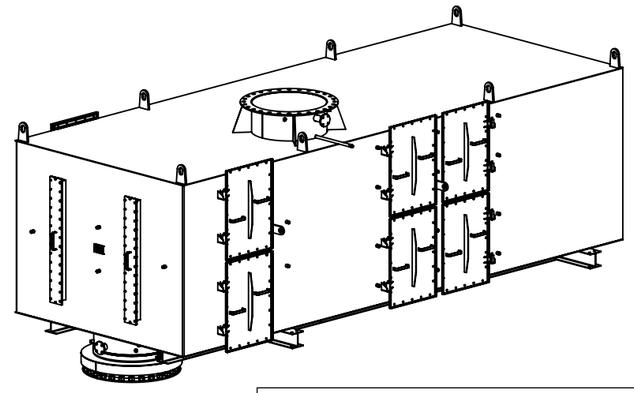
BOTTOM VIEW



FRONT VIEW



DETAIL A
SCALE 1 : 24



WEIGHTS (APPROXIMATE)	
EMPTY HOUSING	12000 lb
ONE (1) FULL SCR CATALYST LAYER	1225 lb
TWO (2) FULL SCR CATALYST LAYERS	2450 lb
ONE (1) FULL DPF LAYER	1400 lb
TWO (4) OXIDATION ELEMENTS	159 lb
INSULATION AND SHEATHING	2342 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 (8) LIFTING LOCATIONS

MATERIAL CONSTRUCTION:

- CARBON STEEL

PAINT:

- HIGH TEMPERATURE DARK GRAY (MIRATECH COATING SYSTEM 2)

PROJECT NAME	CPG MKE 03-04
PROPOSAL NUMBER	GL-23-005046
SALES ORDER NO.	37199
CUSTOMER P.O.	0707051062

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DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED
ANGLES MACH: ±2° BEND: ±3°
INCHES: ±1/8 MILLIMETERS: ±3

DO NOT SCALE DRAWING

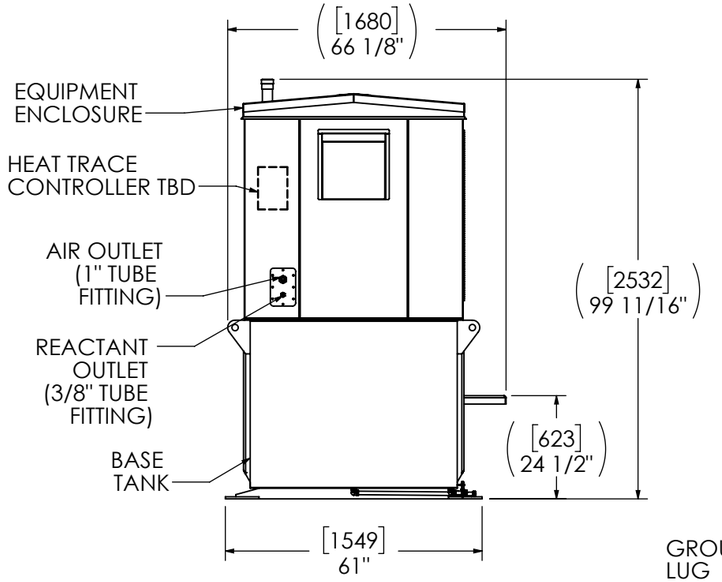
DRAWN	DATE
JDS	11/27/2023
REVIEWED BY	DATE
MSC	11/27/2023

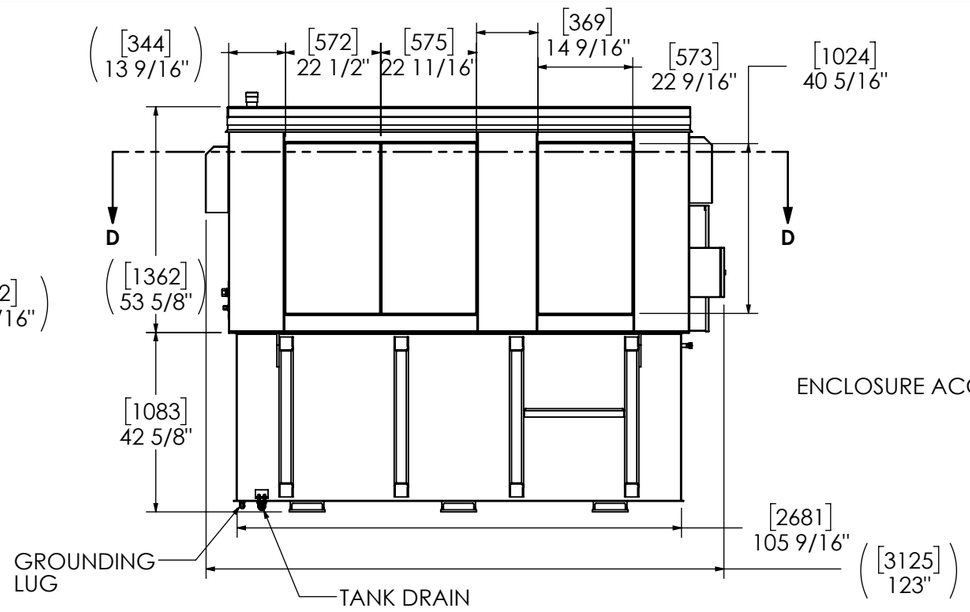
MIRATECH

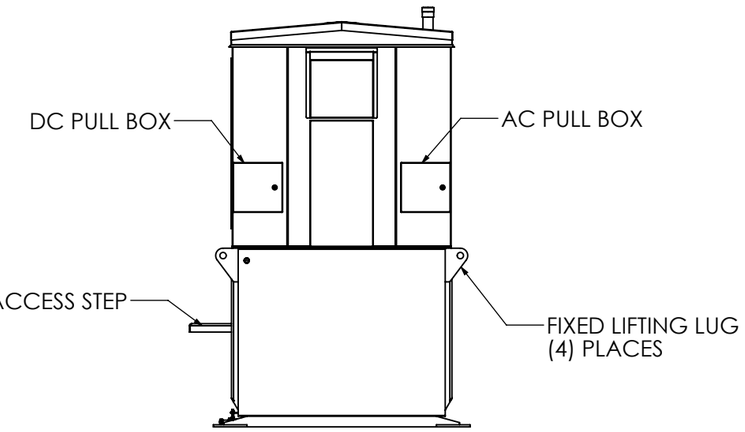
M3BZ-80S-70S-J-23110246
Submittal Drawing

DRAWING	REV
M3BZ-80S-70S-J-23110246 SD	0

SIZE			
B	SCALE 1:60		SHEET 1 OF 1



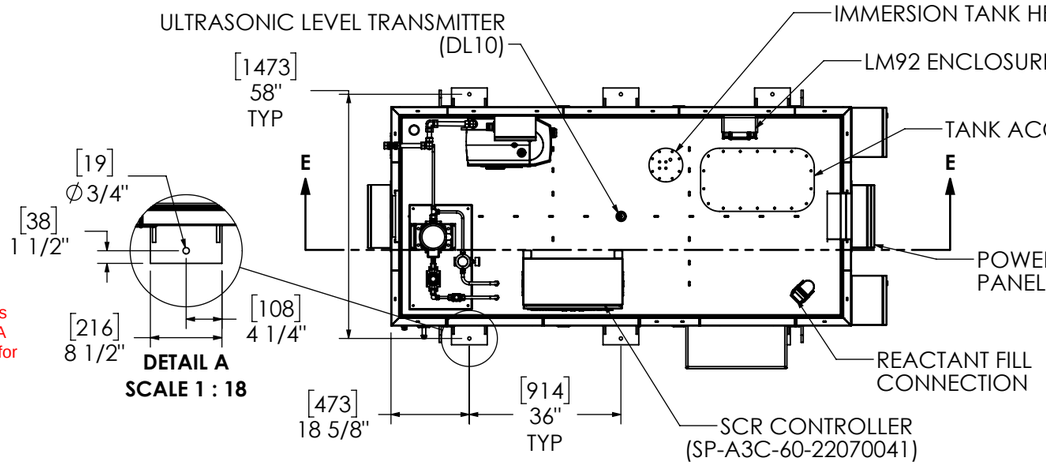




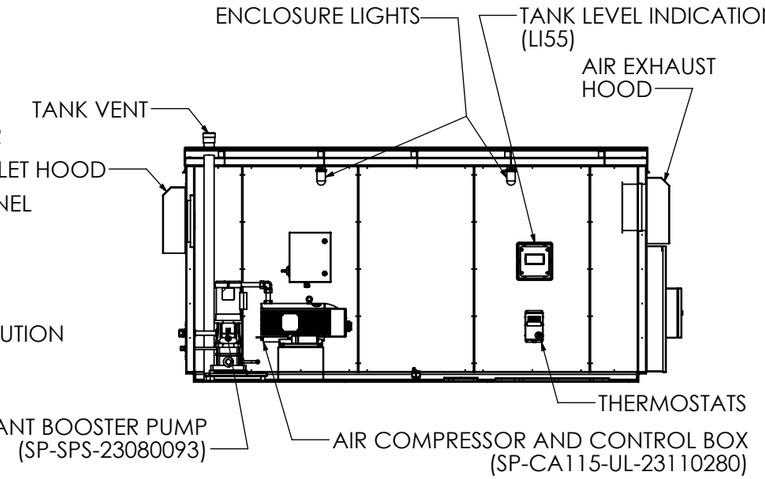
230/120 VAC LOADS		
	L1	L2
LIGHTS	3 AMP	
ELECTRIC HEATER	3.69 AMP	3.69 AMP
SCR CONTROLLER	5 AMP	5 AMP
RECEPTACLE 1*	10 AMP	
HEAT TRACE CIRCUIT	20 AMP	20 AMP
AIR COMPRESSOR	11 AMP	11 AMP
REACTANT LEVEL CONTROLLER		5 AMP
FAN AND DAMPER	2 AMP	
IMMERSION HEATER	15 AMP	15 AMP
FULL LOAD AMPERES	69.69 AMP	59.69 AMP

Confirm panel load calculations are at 208/120V and panel 70A breaker is sized appropriately for load draw. Based on calc. it looks like breaker could trip.

DETAIL A
SCALE 1 : 18



SECTION D-D



SECTION E-E

MATERIAL:
- CARBON STEEL EXTERIOR
- 2" THK ENCLOSURE INSULATION
- BASE TANK CONSTRUCTED WITH 304 STAINLESS STEEL LINER AND 2" THK INTERSTITIAL INSULATION

ELECTRICAL REQUIREMENTS:
- PANEL RATED FOR 70 AMPS MAX (SEE 220/120 VAC LOAD TABLE FOR FULL LOAD CURRENT DRAW)
- SUPPLY VOLTAGE: 230 (+/- 10%) 1Ø 60 Hz

EXTERIOR FINISH:
- TANK: TEXTURED BLACK POWDERCOAT
- ENCLOSURE: RAL7038 GRAY PAINT

NOTES:
- NOMINAL CAPACITY: 760 US GALLON
- INCLUDES THE FOLLOWING ITEMS INSTALLED IN ENCLOSURE:
  - SCR CONTROLLER
  - AIR COMPRESSOR
  - REACTANT BOOSTER PUMP
  - TANK LEVEL INDICATION SYSTEM
  - ENCLOSURE HEATER
  - TANK IMMERSION HEATER
  - ENCLOSURE COOLING FAN

PROJECT NAME: CPG MKE 03-04	**PROPRIETARY AND CONFIDENTIAL** 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.	DIMENSIONS ARE APPROXIMATE IN INCHES UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING
PROPOSAL NO.: GL-23-005046		
SALES ORDER NO.: 37199		
CUSTOMER P.O.: 0707051062		

MIRATECH

SP-RTS-700-23080124
Submittal Drawing

DRAWN	DATE	DRAWING	REV
GSR	11/15/2023	SP-RTS-700-23080124 SD	0
REVIEWED BY: MSC	DATE: 11/15/2023	SIZE: B · SCALE 1:36 · WEIGHT: 4,000 lb (DRY) · SHEET 1 OF 1	

Pre-Commissioning Checklist for SCR Equipment

Project Name: CPG MKE 03-04
Customer Name: Cummins Sales and Service
Converter Model: M3BZ-80S-70S-J-23110246
Control System: ACIS-3

Date: 11/27/2023
Project Location: Milwaukee, WI

MIRATECH	Customer	
☐	☐	Installation of converter, mixing section, control equipment and exhaust piping is complete per the supplied project drawings.
☐	☐	Installation of any heat recovery or co-generation devices is complete and is operational.
☐	☐	All wiring, including, power, load signal, run signal, and interconnects are complete per project wiring diagram.
☐	☐	All wiring and devices should be away from heat sources and accessible while the engine is in operation.
☐	☐	Isolated load signal has been verified at SCR Control Equipment
☐	☐	Run signal has been verified at SCR control equipment
☐	☐	Voltage to SCR Controller and equipment is per the ACIS-3 RTS wiring interconnect.
☐	☐	If SCR Controller is located in enclosure the enclosure is temperature controller not to exceed 122° F and is well ventilated.
☐	☐	Engine has been successfully operated and untreated emissions have been confirmed with a calibrated analyzer to be within guaranteed levels at full and minimum load conditions.
☐	☐	The genset has the ability to operate at various loads including minimum load and 100% manufactured stated full load. If 100% manufactured stated load is not possible a load bank must be provided at time of commissioning.
☐	☐	All tubing associated with the SCR system (urea supply, urea return, air injection, urea injection, and exhaust gas sample if required) are properly installed per the project piping diagram and free of debris.
☐	☐	Urea in accordance with the MIRATECH Specification is on site and has been supplied and tested by an approved vendor. Attach copy of the urea analysis.
☐	☐	Engine is available to be out of operation for 24 hours prior to entering the converter housing and for 8 hours during the catalyst loading process.
☐	☐	All equipment and labor required for handling catalyst during the catalyst loading process has been coordinated with MIRATECH Technical Services Department, will be on site, and available for use.
☐	☐	Safety alarms, annunciation, and engine shutdown sequence are programmed and tested.
☐	☐	Engine and qualified operator will be made available to MIRATECH Technical Service personnel and will be available to be locked at various loads upon request.

Customer Signature Date

MIRATECH Representative Date

Company Name

Water Quality

The water quality of urea or ammonia solutions for SCR units is critical for the overall performance. Solid and solubilized substances contained in water create particles that can clog the honeycombs or injector, reducing life and performance. The increased number of particles also increases the cleaning frequency of the system components. Furthermore, these particles are commonly composed of known catalyst poisons, which can reduce catalyst performance.

The recommended specifications to minimize catalyst clogging and poisoning from substances coming from the water are:

- Utilization of demineralized water for urea or ammonia solutions. This can be done by reverse osmosis or by utilizing ion exchange cartridges.
- Salt should be minimized because it can create solid deposits. Salt content of the water should be below 0.005 lb/gal

Caution: Water softening cartridges (Ca- and Mg- Ion exchangers) cannot be utilized. These cartridges cannot remove evaporation residues, or remove them only in part. These cartridges use Na as an exchange ion for Ca and Mg.

Urea Quality

Chemical Names: Urea, Carbonyldiamide, Carbamide
Molecular Formula: $(H_2N)_2CO$
Molecular Weight: 60.06

The urea used in the SCR injection solution should be commercial or technical grade (99.45% pure). A typical solution consists of 32.5 wt% or 40 wt% urea. This can be obtained from mixing urea granulates and water or purchased in a solution form. The urea consumption of an SCR system will vary depending on the urea concentration used. It is important to check the SCR system proposal to ensure that the correct urea concentration is used for the design of the system. As urea dissolves it absorbs heat from the solution which can make it dissolve slowly. If mixing the urea solution, hot water is recommended to decrease the dissolving time, or an immersion heater should be added to the tank.

Storage and Safety

32.5% and 40% urea solutions can begin to stratify or form precipitates when temperatures fall below 32 F. This can cause the urea concentration to be inconsistent in the tank or could result in solid deposits on the bottom of the tank. For this reason it is recommended to keep the urea solution above freezing temperatures. Because of the risks of chemical reactions, urea must be kept away from nitrates and substances that contain nitrites. They must also be transported in separate containers. Urea is not classified as a dangerous substance, but should be stored carefully because of small concentration of ammonia vapors on the surface of urea solutions.

Chemical Analysis of Commercial/Technical Grade Urea

	Value
Specific Weight (at 68 °F)	69.4 lb/ft^3
Biuret	< 0.30 wt%
Aldehyde	< 5 ppm
Insoluble	< 20 ppm
Phosphate	< 0.5 ppm
Calcium	< 0.5 ppm
Iron	< 0.5 ppm
Copper	< 0.2 ppm
Zinc	< 0.2 ppm
Chromium	< 0.2 ppm
Nickel	< 0.2 ppm
Aluminum	< 0.5 ppm
Magnesium	< 0.5 ppm
Sodium	< 0.5 ppm
Potassium	< 0.5 ppm

Limits of poisonous substances for SCR catalysts

Element	Symbol	Max concentration in fuel			Effect	
		Liquid bio-fuels[05]	Liquid fossil fuels	Gaseous fuels	SCR	Oxi/ Filter
		[mg/kg] (elementary)				
Aluminium	Al	0.5	0.5	0.5	*02*	*02*
Antimony	Sb	0.5	0.5	0.5	*02*	*02*
Arsenic	As	1	0.2	0.2	*04*	*02*
Lead	Pb	0.5	0.5	0.5	*03*	*04*
Boron	B	0.5	0.5	0.5	*02*	*02*
Bromine	Br	1	1	1	*02*	*02*
Cadmium	Cd	1	05	0.5	*02*	*04*
Calcium	Ca	12	5	5	*02*	*02*
Chlorine	Cl	1	5	5	*03*	*02*
Chromium	Cr	0.5	0.5	0.5	*02*	*02*
Iron	Fe	15	0.5	0.5	*03*	*02*
Fluorine	F	1	0.5	0.5	*03*	*02*
Iodine	J	1	1	1	*03*	*02*
Potassium	K	5	1	1	*04*	*02*
Cobalt	Co	0.5	0.5	0.5	*02*	*02*
Copper	Cu	0.5	0.5	0.5	*02*	*02*
Lithium	Li	0.5	0.5	0.5	*02*	*02*
Magnesium	Mg	12	5	5	*02*	*02*
Manganese	Mn	0.5	0.5	0.5	*02*	*02*
Molybdenum	Mo	0.5	0.5	0.5	*02*	*02*
Sodium	Na	8	5	5	*03*	*02*
Nickel	Ni	0.5	0.5	0.5	*03*	*02*
Phosphorous	P	16	5	5	*04*	*02*
Mercury	Hg	0.5	0.5	0.5	*04*	*04*
Sulfur	S	20	15'000 [06]	20	*01*	*03*
Selenium	Se	0.5	0.5	0.5	*02*	*02*
Silicon organic	Si	0.5	0.5	0.5	*03*	*03*
Silicon inorganic	Si	15	15	15	*02*	*02*
Tin	Sn	0.5	0.5	0.5	*02*	*03*
Vanadium	V	1	15'000 [07]	1	*01*	*04*
Zinc	Zn	0.5	0.5	0.5	*03*	*03*

01 *Positive effect*
02 *Lightly harmful*
03 *harmful*
04 *strongly harmful*
05 → *Limitations*
06 → *Limitations*
07 → *Limitations*

The limits of catalyst poisons in the exhaust gas can be calculated as follows ($\lambda \cong 2$):

$$\frac{\text{Limit in fuel [mg/kg]}}{30} = \text{Limit in exhaust gas [mg/kg]}$$

In the exhaust gas there are also the poisons that originate in the lube oil. According to our experience the common, approved lube oils do not harm our catalyst. Exceptions see "Guidelines to catalyst lifetime"

The reactant that is used for the SCR reaction has to be free of catalyst poisons, see also C.00214 "Reactant specifications"

Limitations:

05 Phosphorous

Fuel	Phosphorous-content	Limitations
Bio fuel	P ≤ 16 mg/kg	• SCR volume needs to be adapted (→ layout rules for SCR catalyst)

06 Sulphur

Fuel	Sulphur content	Limitations
Light fuel oil (Diesel)	S ≤ 0,1%	• No Limitations
Marine fuel oil MDO	S > 0,1%	• No precious metal oxidation catalyst (Pt, Pd)
Heavy fuel oil HFO	S ≥ 0,5%	• No Oxidation catalysts • Dust blowers for all catalyst layers
Heavy fuel oil HFO	S ≥1,5%	• Special case, requires detailed analysis

07 Vanadium

Fuel	Vanadium content	Limitations
all	V > 1 mg/kg	• No Oxidation catalysts

Application & Performance Warranty Data

Project Information

Site Location:	Milwaukee, WI
Project Name:	CPG MKE 03-04
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-80S-70S-J-23110246-R4, ACIS-3, Commissioning & Startup, FACINS-M3BZ-80S-70S-23110246)

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-80S-70S-J-23110246-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

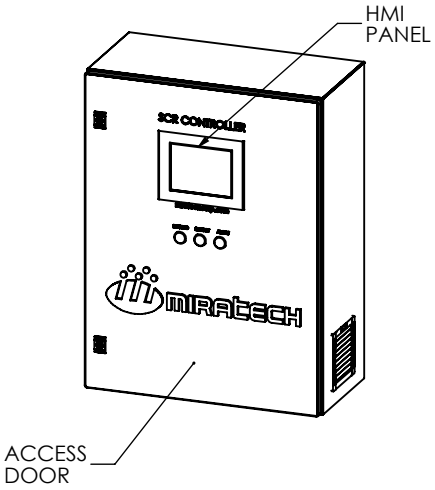
- The stated values are based on the data given by the engine manufacturer (as referenced in table above) according to the unsilenced exhaust noise, exhaust gas flow, and temperature.
- The length of the exhaust piping before and after the silencer must be free of resonance in terms of the ignition frequency 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.

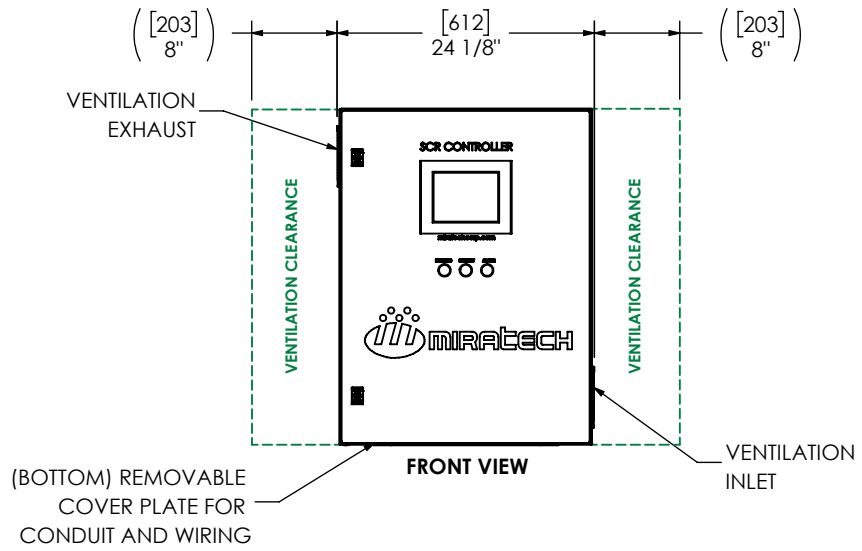
Special Notes & Conditions

1. For housings and exhaust components that are insulated, internally or externally, please refer to the negotiated Terms and Conditions of Sale to prevent voiding MIRATECH product warranty.

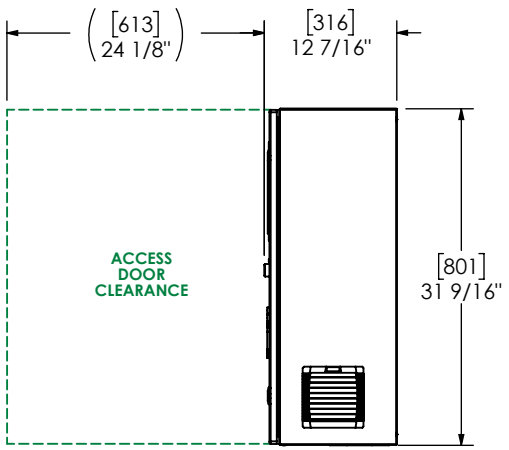
   Carbon steel is suitable for temperatures up to 900° F / 482° C continuously, when covered with external insulation or a heat shield. For continuous operation above 900° F / 482° C, where the equipment is externally insulated or has a heat shield, stainless steel should be used.

- A packed silencer installed upstream of the MIRATECH catalyst system will void MIRATECH's limited warranty.
- Any sound attenuation and emission reductions listed are based on housing with catalyst elements installed.

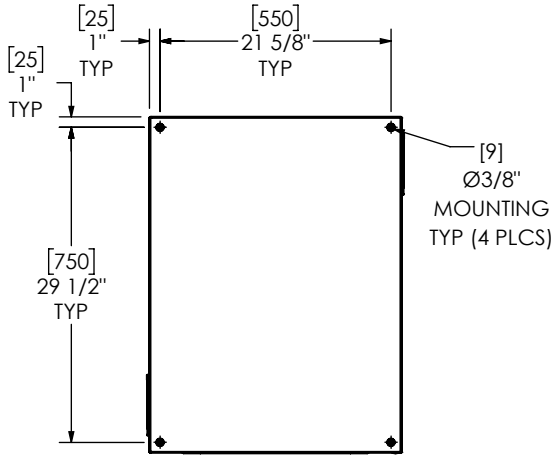




FRONT VIEW



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	**CPG MKE 03-04**
PROPOSAL NUMBER	**GL-23-005046**
SALES ORDER NO.	**37199**
CUSTOMER P.O.	**0707051062**

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DIMENSIONS ARE APPROXIMATE IN INCHES UNLESS OTHERWISE SPECIFIED

DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED
ANGLES MACH: ±2° BEND: ±3° | INCHES: ±0.125 MILLIMETERS: ±3

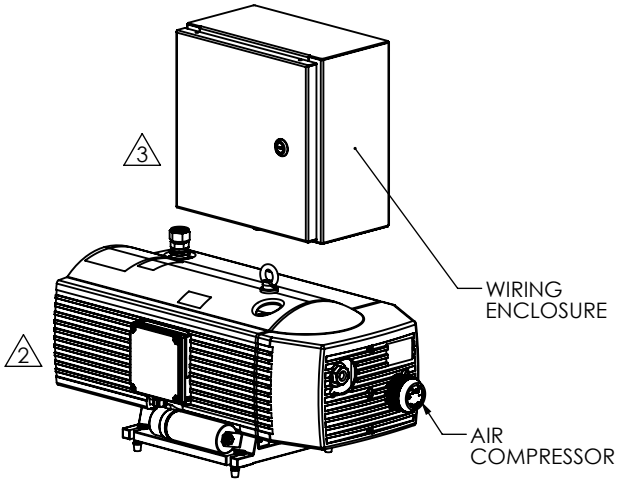
DO NOT SCALE DRAWING

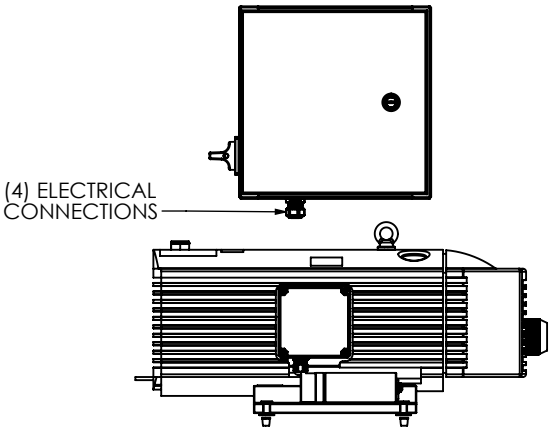
DRAWN	TES	DATE	05/18/2022
REVIEWED BY	GFS	DATE	05/18/2022

MIRATECH

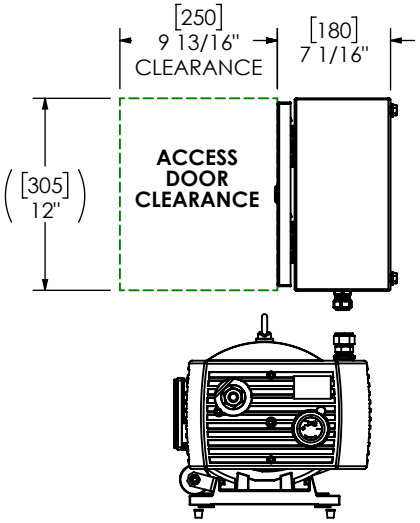
SP-A3C-60-22070041 Controller Submittal Drawing

DRAWING	SP-A3C-60-22070041 SD			REV 0
SIZE A	SCALE 1:18	WEIGHT: 76lb	SHEET 1 OF 1	

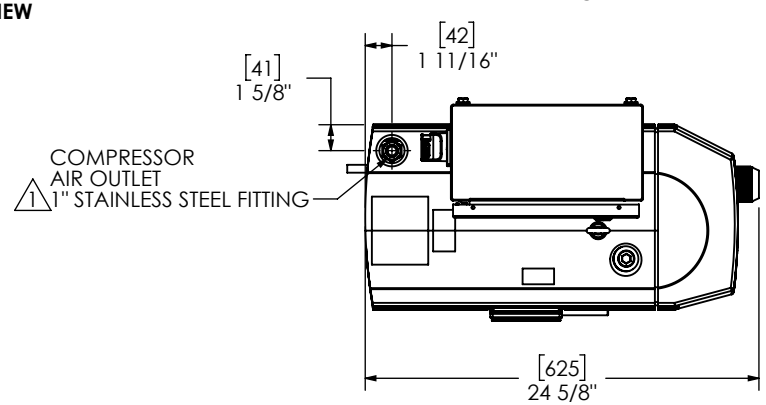




FRONT VIEW



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 - 109°F
- ALL COMPONENTS UL COMPLIANT

INSTALLATION INSTRUCTIONS:

- IF UNIT IS INSTALLED IN AN ENCLOSURE, THE ENCLOSURE MUST BE VENTILATED AND TEMPERATURE CONTROLLED TO MAINTAIN PROPER OPERATION TEMPERATURE

REV	DATE	BY	COMMENTS
1	7/28/2023	AMW	CHANGED COMPRESSOR AIR OUTLET FITTING FROM 3/4" TO 1"
2	8/10/2023	GSR	CORRECTED MODEL
3	11/27/2023	AMW	REMOVED COMPRESSOR FRAME

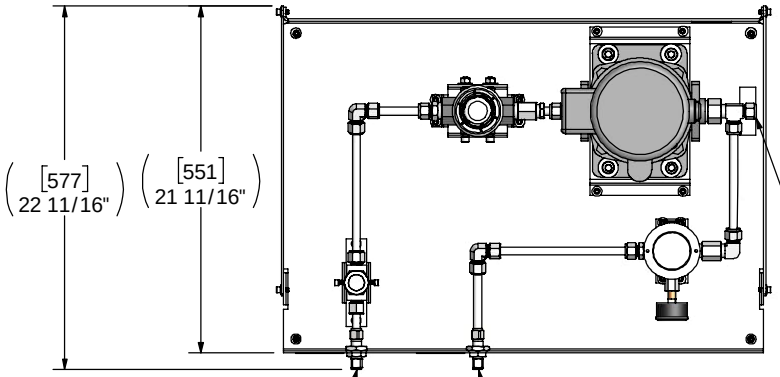
PROJECT NAME: **CPG MKE 03-04**	**PROPRIETARY AND CONFIDENTIAL**	DIMENSIONS ARE APPROXIMATE IN INCHES UNLESS OTHERWISE SPECIFIED
PROPOSAL NUMBER: **GL-23-005046**	THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF MIRATECH GROUP, LLC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF MIRATECH GROUP, LLC IS PROHIBITED.	DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED ANGLES MACH: ±2° BEND: ±3° INCHES: ±1/8 MILLIMETERS: ±3 DO NOT SCALE DRAWING
SALES ORDER NO.: **37199**		DRAWN: AMW DATE: 7/28/2023
CUSTOMER P.O.: **0707051062**		REVIEWED BY: MSC DATE: 7/28/2023

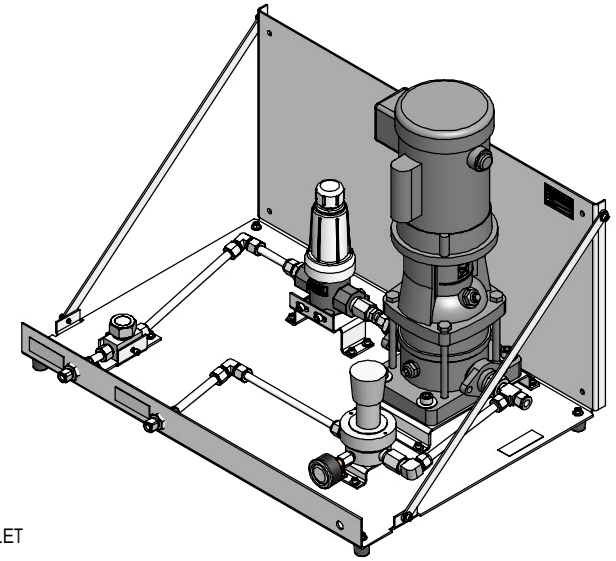
MIRATECH

SP-CA115-UL-23050045 Compressor Submittal Drawing

DRAWING	REV
SP-CA115-UL-23050045 SD	3

SIZE	SCALE	WEIGHT	SHEET
A	SCALE 1:15	WEIGHT: 461 lb	SHEET 1 OF 1

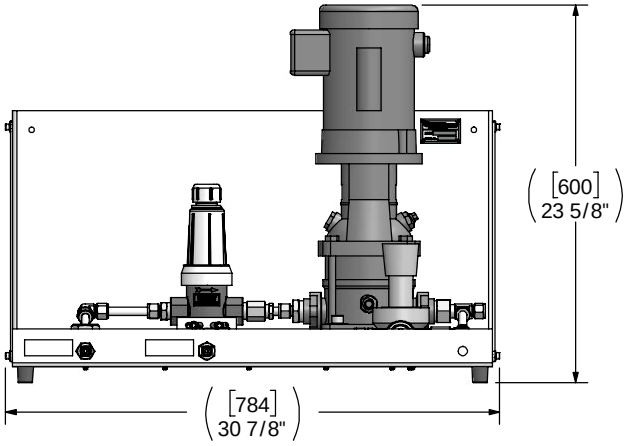


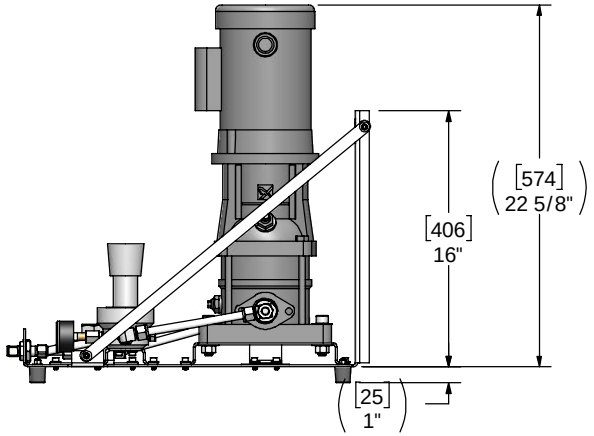


REACTANT INLET
1/2" SS FITTING

REACTANT RETURN
1/2" SS FITTING

REACTANT OUTLET
1/2" SS FITTING





NOTES:

- POWER CONSUMPTION: 690 W MAX SUPPLIED BY SCR CONTROLLER
- OPERATION TEMPERATURE: 40 °F - 130 °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	CPG MKE 03-04
PROPOSAL NUMBER	GL-23-005046
SALES ORDER NO.	37199
CUSTOMER P.O.	0707051062

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DIMENSIONS ARE APPROXIMATE IN INCHES UNLESS OTHERWISE SPECIFIED

DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED
ANGLES
MACH: ±2°
BEND: ±3°
INCHES: ±0.125
MILLIMETERS: ±3

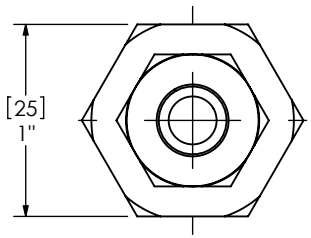
DO NOT SCALE DRAWING

DRAWN	GFS	DATE	10/10/2017
REVIEWED BY	AJM	DATE	10/11/2017

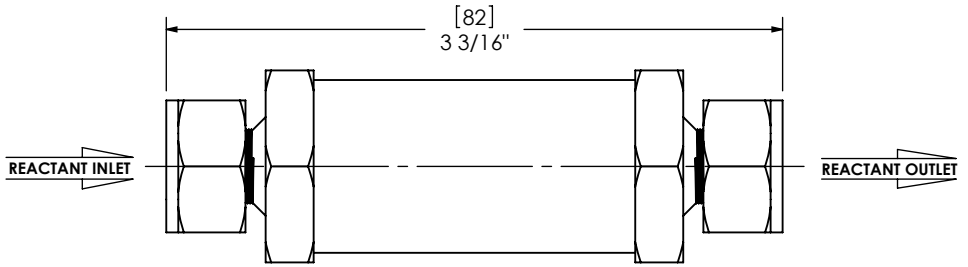
MIRATECH

SP-SPS-23080093
Submittal Drawing

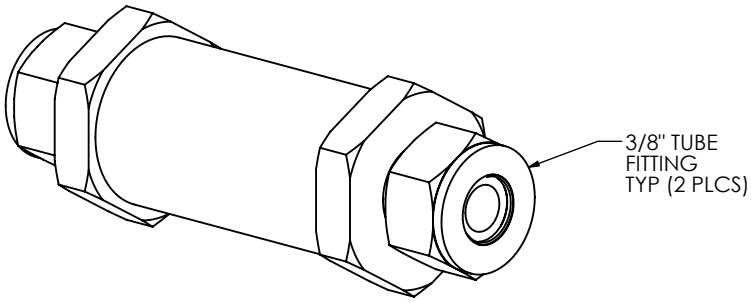
DRAWING	SP-SPS-23080093 SD_0			REV 0
SIZE A	SCALE 1:12	WEIGHT: 88 lb		SHEET 1 OF 1



FRONT VIEW



RIGHT VIEW



INSTALLATION INSTRUCTIONS:

- TO BE INSTALLED ON REACTANT LINE DIRECTLY UPSTREAM OF DOSING BOX. THIS IS FOR COMMISSIONING PURPOSES TO ASSURE NO DEBRIS FROM THE REACTANT LINES CLOG THE DOSING VALVE

PROJECT NAME	**CPG MKE 03-04**
PROPOSAL NUMBER	**GL-23-005046**
SALES ORDER NO.	**37199**
CUSTOMER P.O.	**0707051062**

PROPRIETARY AND CONFIDENTIAL

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.

DIMENSIONS ARE APPROXIMATE IN INCHES UNLESS OTHERWISE SPECIFIED

DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED
ANGLES MACH: ±2° BEND: ±3° | INCHES: ±1/8 MILLIMETERS: ±3

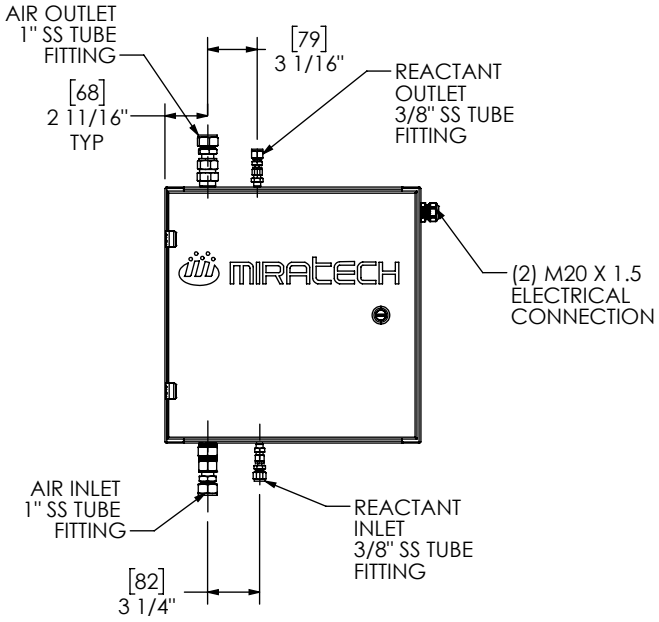
DO NOT SCALE DRAWING

DRAWN	JCU	DATE	9/25/2009
REVIEWED BY	JWS	DATE	9/25/2009

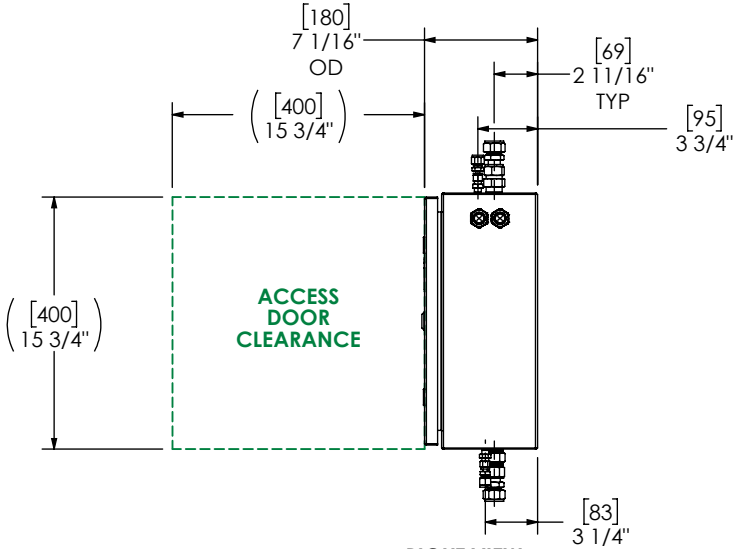
MIRATECH

FILTER115 Reactant Filter Submittal Drawing

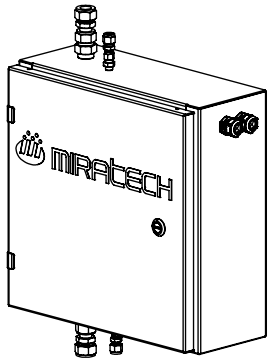
DRAWING	FILTER115 SD		REV 0
SIZE A	SCALE 1:1	WEIGHT: 1 lb	SHEET 1 OF 1

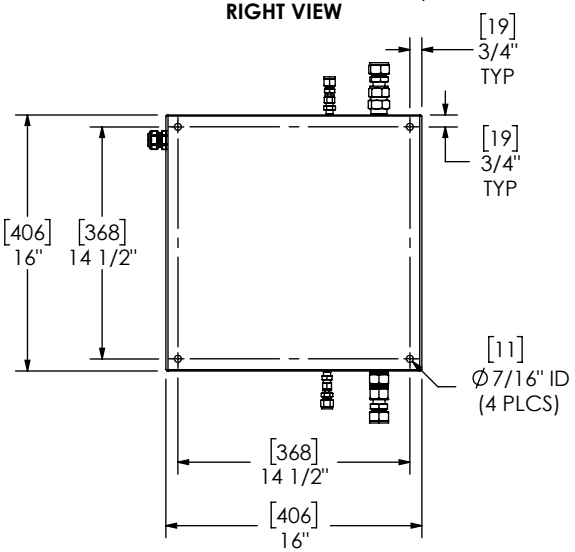


FRONT VIEW



RIGHT VIEW





REAR VIEW

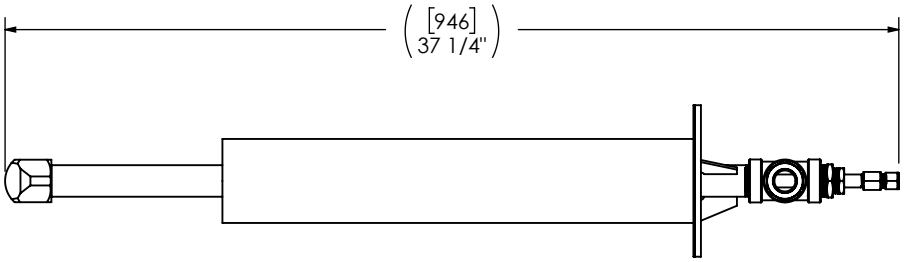
NOTES:

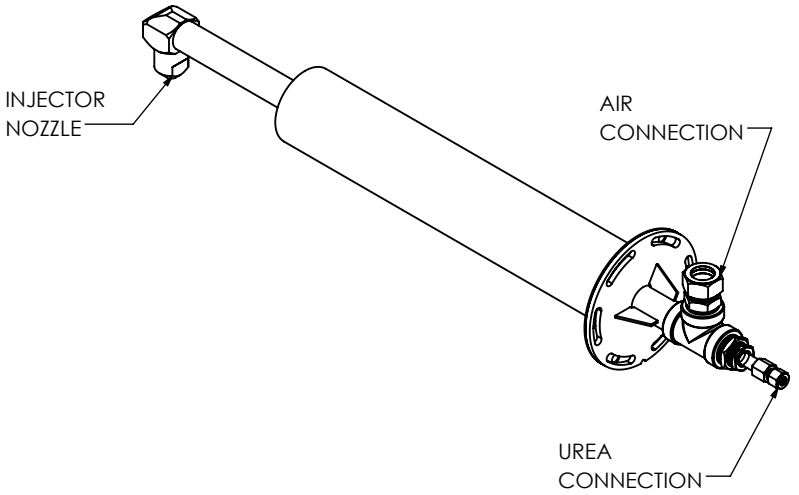
- POWER CONSUMPTION: 25.75 W MAX
- POWER: SUPPLIED FROM SCR CONTROLLER
- OPERATION TEMPERATURE: 14-122°F (-10-50°C)
- OPERATING PRESSURE:
  - REACTANT: 3 BAR (43.5 PSI)
  - AIR: 1 BAR (14.5 PSI)
- SUITABLE FOR INDOOR/OUTDOOR USE PER IP55 RATING
- OPERATING FLOW RATE:
  - REACTANT: 115 L/HR MAX (30.4 GAL/HR)
  - AIR: 800 L/MIN (28.2 CFM)

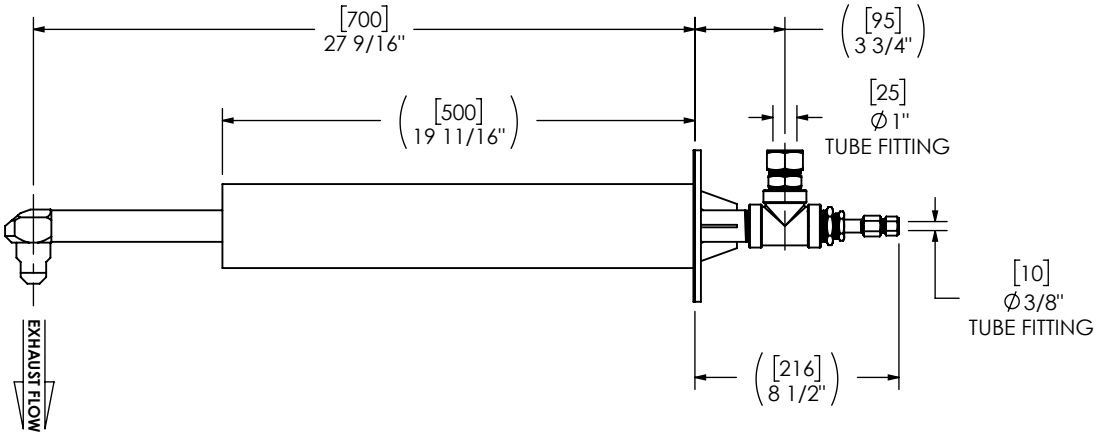
INSTALLATION INSTRUCTIONS:

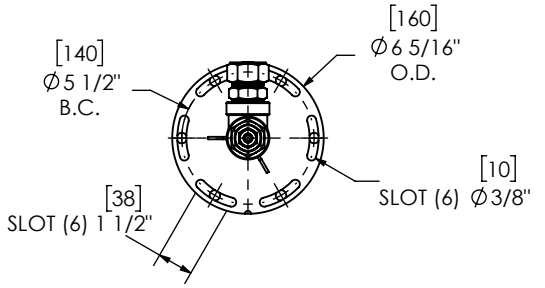
- IF UNIT IS INSTALLED IN AN ENCLOSURE, THE ENCLOSURE MUST BE VENTILATED AND TEMPERATURE CONTROLLED TO MAINTAIN PROPER OPERATION TEMPERATURE.
- UNIT TO BE MOUNTED SO THAT IT IS ACCESSIBLE WHILE ENGINE IS IN OPERATION AND TUBING IS NO MORE THAN 6.5 FEET (2 M) TO DOSING INJECTOR.
- UREA LINES SHOULD BE HEAT TRACED IF AMBIENT CONDITIONS FALL BELOW 32°F (0°C)

PROJECT NAME: **CPG MKE 03-04**	**PROPRIETARY AND CONFIDENTIAL**	DIMENSIONS ARE APPROXIMATE IN INCHES UNLESS OTHERWISE SPECIFIED	MIRATECH
PROPOSAL NUMBER: **GL-23-005046**	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-WT Dosing Box Submittal Drawing**
SALES ORDER NO.: **37199**		DO NOT SCALE DRAWING	DRAWING: SEN115-U-WT SD — REV: 0
CUSTOMER P.O.: **0707051062**		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









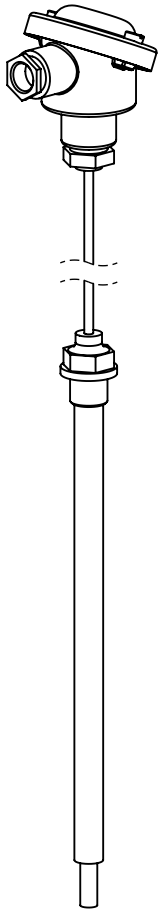
NOTES:

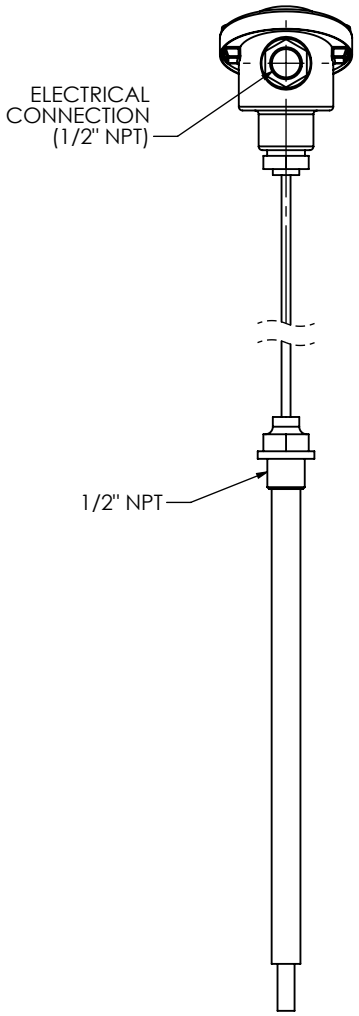
- DO NOT INSULATE INJECTOR
- DO NOT INSTALL INJECTOR PRIOR TO COMMISSIONING IN ORDER TO PRESERVE O-RING INTEGRITY

MATERIAL CONSTRUCTION:

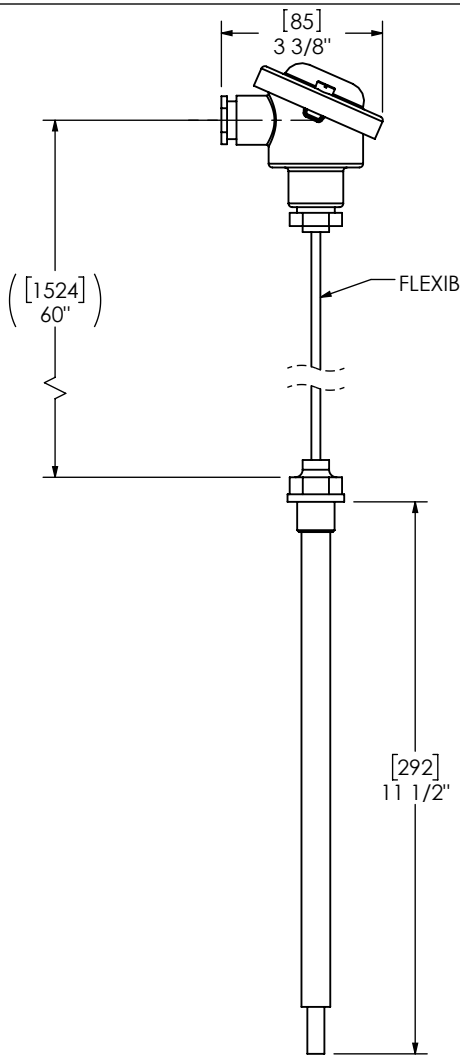
- STAINLESS STEEL

PROJECT NAME: **CPG MKE 03-04**	**PROPRIETARY AND CONFIDENTIAL**	DIMENSIONS ARE APPROXIMATE IN INCHES UNLESS OTHERWISE SPECIFIED	MIRATECH
PROPOSAL NUMBER: **GL-23-005046**	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	**DEN115-700-U** **Submittal Drawing**
SALES ORDER NO.: **37199**		DO NOT SCALE DRAWING	DRAWING: DEN115-700-U SD — REV: 0
CUSTOMER P.O.: **0707051062**		DRAWN: BHU — DATE: 04/19/2022	
		REVIEWED BY: MSC — DATE: 04/19/2022	SIZE: A — SCALE 1:8 — WEIGHT: 16 lb — SHEET 1 OF 1

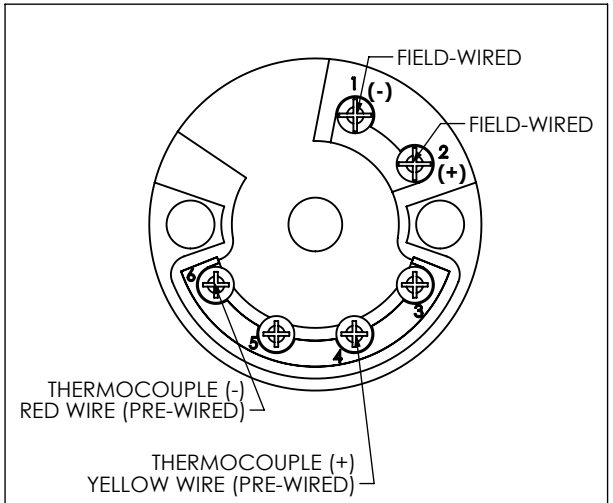




FRONT VIEW



RIGHT VIEW



TEMPERATURE TRANSMITTER CONNECTIONS

NOTES:

- OPERATING TEMPERATURE RANGE: 32°F - 1112°F
- AMBIENT TEMPERATURE RANGE: -4°F - 158°F

INSTALLATION INSTRUCTIONS:

- TEMPERATURE SENSOR AND WIRING SHOULD BE FREE OF INSULATION
- APPLY ANTI-SIEZE COMPOUND TO THREADS BEFORE INSTALLATION

PROJECT NAME: **CPG MKE 03-04**	**PROPRIETARY AND CONFIDENTIAL**	DIMENSIONS ARE APPROXIMATE IN INCHES UNLESS OTHERWISE SPECIFIED
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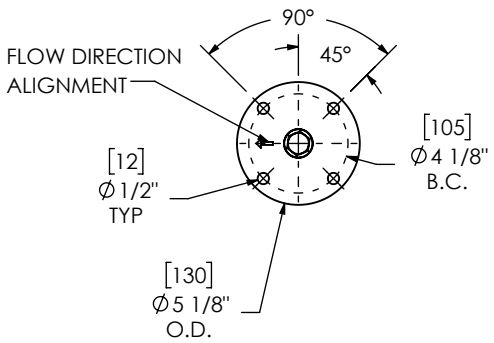
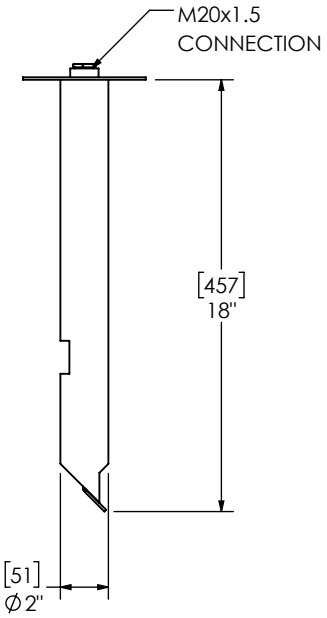
SALES ORDER NO.: **37199**		DRAWN: JSS — DATE: 2/5/2021
CUSTOMER P.O.: **0707051062**		REVIEWED BY: CAC — DATE: 2/5/2021

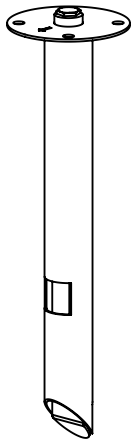
MIRATECH

TT-14-FLEX60-32-1112
Submittal Drawing

DRAWING: TT-14-FLEX60-32-1112 SD	REV: 0			
SIZE: A	SCALE 1:4	WEIGHT: 4 lb	SHEET 1 OF 1	







NOTES:

- DO NOT USE EQUIPMENT TO SUPPORT OTHER PARTS OF THE EXHAUST SYSTEM WITHOUT PROPER REINFORCEMENT

MATERIAL CONSTRUCTION:

- 304 STAINLESS STEEL

PAINT:

- NONE (MIRATECH COATING SYSTEM 4)

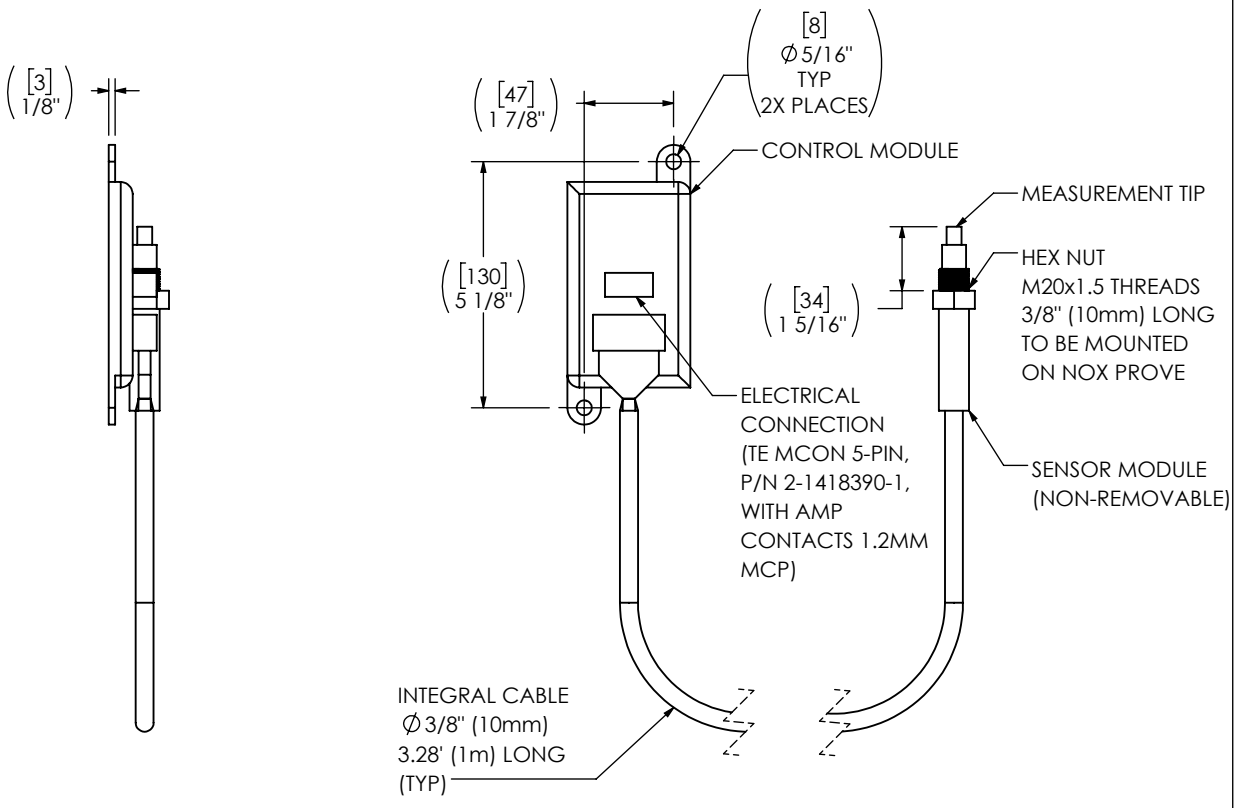
PROJECT NAME: **CPG MKE 03-04**	**PROPRIETARY AND CONFIDENTIAL**	DIMENSIONS ARE APPROXIMATE IN INCHES UNLESS OTHERWISE SPECIFIED	MIRATECH
PROPOSAL NUMBER: **GL-23-005046**	THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF MIRATECH GROUP, LLC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF MIRATECH GROUP, LLC IS PROHIBITED.	DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED ANGLES MACH: ±2° BEND: ±3° INCHES: ±1/8 MILLIMETERS: ±3	**NP-18 NOx Probe Submittal Drawing**
SALES ORDER NO.: **37199**		DO NOT SCALE DRAWING	DRAWING: NP-18 SD; REV: 0
CUSTOMER P.O.: **0707051062**		DRAWN: SAC; DATE: 2/4/2021	
		REVIEWED BY: CAC; DATE: 2/4/2021	SIZE: A; SCALE 1:8; WEIGHT: 4 lb; SHEET 1 OF 1

NOTES:

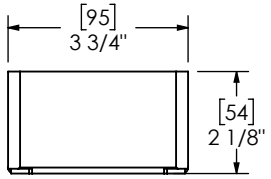
- ENSURE CONTROL MODULE IS SECURELY FASTENED AND PROTECTED FROM MECHANICAL DAMAGE; ENSURE INTEGRAL CABLE IS ROUTED SMOOTHLY WITHOUT HARD BENDS AND IS PROTECTED FROM HOT SURFACES.
- RECOMMENDED MAXIMUM ANGLE BETWEEN CABLE AND SENSOR MODULE IS ≤15°.
- RECOMMENDED MINIMUM BENDING RADIUS OF CABLE IS ≥25/32" (25MM).
- RECOMMEND 37FT-LB (50NM) OF TORQUE AT HEX NUT.
- SENSOR MODULE INTERNAL COMPONENTS CAN BE DAMAGED BY WATER; ENSURE MOUNTING POSITION PROTECTS MEASUREMENT TIP FROM WATER INTRUSION.
- OPERATING TEMPERATURES:

CONTROL MODULE	-40 TO 221°F (-40 TO 105°C)
INTEGRAL CABLE	-40 TO 392°F (-40 TO 200°C)
SENSOR MODULE	212 TO 1,472°F (100 TO 800°C)

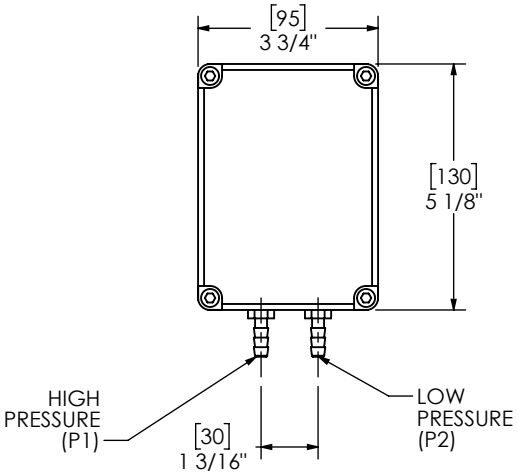
- O2 MEASUREMENTS ARE VALID FOR $1.0 \leq \Lambda \leq \infty$, WHERE Λ IS AIR-TO-FUEL RATIO.
- SUITABLE FOR INDOOR/OUTDOOR INSTALLATION. IP6K7 AND IP6K9K RATED ACCORDING TO DIN 40050-9 WITH PLUGGED CONNECTIONS.



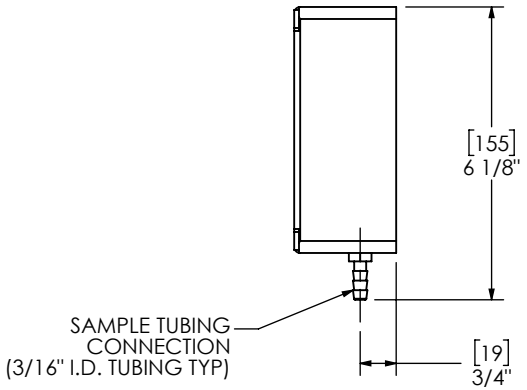
PROJECT NAME: **CPG MKE 03-04**	**PROPRIETARY AND CONFIDENTIAL**	DIMENSIONS ARE APPROXIMATE IN INCHES UNLESS OTHERWISE SPECIFIED	MIRATECH
PROPOSAL NUMBER: **GL-23-005046**	THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF MIRATECH GROUP, LLC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF MIRATECH GROUP, LLC IS PROHIBITED.	DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED: ANGLES MACH: ±2° BEND: ±3°; INCHES: ±1/8 MILLIMETERS: ±3	**NOX-24V Submittal Drawing**
SALES ORDER NO.: **37199**		DO NOT SCALE DRAWING	DRAWING: NOX-24V SD; REV: 0
CUSTOMER P.O.: **0707051062**		DRAWN: HTH; DATE: 05/24/2022	
		REVIEWED BY: GFS; DATE: 05/26/2022	SIZE: A; SCALE 1:4; WEIGHT: 1 lb; SHEET 1 OF 1



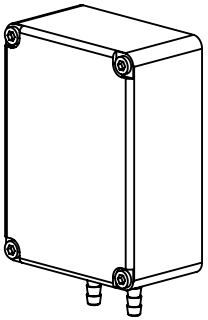
TOP VIEW

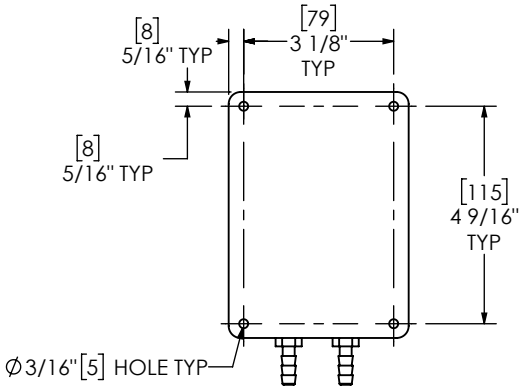


FRONT VIEW



RIGHT VIEW





BACK VIEW

NOTES:

- OPERATING TEMPERATURE RANGE: 20°F - 120°F (-6°C - 48°C)
- SUITABLE FOR OUTDOOR INSTALLATION

INSTALLATION INSTRUCTIONS:

- P1 = HIGH PRESSURE SIDE (INLET SIDE OF HOUSING)
- P2 = LOW PRESSURE SIDE (OUTLET SIDE OF HOUSING)
- SENSOR SHOULD BE INSTALLED SO TUBING SLOPES DOWN TOWARD HOUSING SO ANY CONDENSATE THAT FORMS IN THE TUBING WILL DRAIN INTO HOUSING
- SENSOR SHOULD BE INSTALLED AWAY FROM HEAT SOURCES AND FREE OF INSULATION
- ELECTRICAL CONNECTION KNOCKOUTS NOT SHOWN. UTILIZE KNOCKOUTS ON SIDE OF HOUSING

PROJECT NAME: **CPG MKE 03-04**	**PROPRIETARY AND CONFIDENTIAL**	DIMENSIONS ARE APPROXIMATE IN INCHES UNLESS OTHERWISE SPECIFIED		MIRATECH			
PROPOSAL NUMBER: **GL-23-005046**	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		**PT-0-40 Pressure Transmitter Submittal Drawing**			
SALES ORDER NO.: **37199**		DO NOT SCALE DRAWING					
CUSTOMER P.O.: **0707051062**		DRAWN: JFS	DATE: 08/28/2012	DRAWING: PT-0-40 SD			REV: 0
		REVIEWED BY: AJM	DATE: 08/28/2012	SIZE: A	SCALE 1:3	WEIGHT: 2 lb	SHEET 1 OF 1

EchoPod® DL10

Ultrasonic Liquid Level Transmitter

FLOWLINE™ LEVEL BEST

Application

The general purpose ultrasonic transmitter provides continuous level measurement up to 49.2” (1.25m) with a 4-20 mA signal output, and is configured via our free WebCal® software. This non-contact liquid level sensor is ideally suited for corrosive, sticky or waste liquids, and is selected for chemical feed, IBC or drum, skid or machine and cooling tower applications.

RoHS Compliant

FM APPROVED

CE

Features

- Continuous non-contact level measurement up to 49.2” (1.25m)
- 4-20 mA output for longer signal distances up to 1000’ (300m)
- Configuration is fast and easy via WebCal software and USB adapter
- Narrow 2” beam width and short 2” dead band optimized for small tanks
- PVDF transducer and 6P polycarbonate enclosure for corrosive liquids
- Automatic temperature compensation for accurate measurement

Success

Stormwater run-off from highways is a major source of pollution that degrades our clean water resources, negatively impacting both wildlife and people. This run-off carries high levels of lead, fuel, oil and chemicals which are commonly found on highways. State and federal agencies monitor run-off to determine its volume, content and risk to the local environment. Here, an EchoPod ultrasonic level sensor is installed over a V-Notch weir on the side of the highway. The continuous level sensor measures the volume of stormwater passing through the weir, and provides a 4-20 mA signal to the wireless telemetry system for remote data collection.

Compatible Products

LI25-1

DATALOOP™

Level Indicator

LI55

DATAVIEW™

Level Controller

LI40

PODVIEW™

Level Indicator

EchoPod® DL10

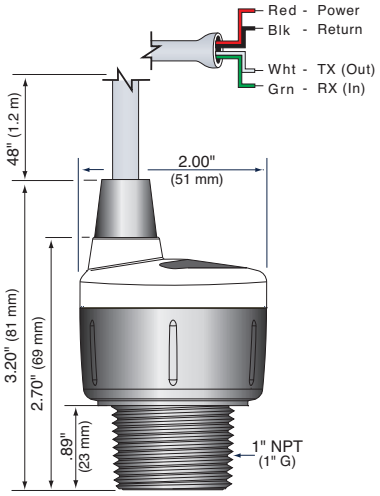
Ultrasonic Liquid Level Transmitter

FLOWLINE™ LEVEL BEST

Specifications

Range:	49.2” (1.25m)
Accuracy:	0.125” (3mm)
Resolution:	0.019” (0.5mm)
Dead band:	2” (5cm)
Beam width:	2” (5cm)
Configuration:	WebCal® PC Windows® USB 2.0
Memory:	Non-volatile
Supply voltage:	24 VDC (loop)
Consumption:	0.5W
Loop resist.:	400Ω max @ 24 VDC
Signal output:	4-20 mA, two-wire
Signal invert:	4-20 mA or 20-4 mA
Loop fail-safe:	4 mA, 20 mA, 21 mA, 22 mA or hold last
Process temp.:	F: 20° to 140° C: -7° to 60°
Temp. comp.:	Automatic
Ambient temp.:	F: -31° to 140° C: -35° to 60°
Pressure:	MWP = 30 PSI (2 bar)
Enclosure rating:	Type 6P, encapsulated, corrosion resistant & submersible
Encl. material:	Polycarbonate
Strain relief mat.:	Santoprene
Trans. material:	PVDF
Cable jacket mat:	Polyurethane
Cable type:	4-conductor, shielded
Cable length:	48” (1.2m)
Process mount:	1” NPT (1” G)
Mount gasket:	Viton®
Classification:	General purpose
Compliance:	CE, RoHS
Approvals:	cFMus

Dimensions



Configuration

LI99-1001

The level sensor is configurable via our free WebCal PC software and Fob USB adapter. The sensors are offered with and without Fobs. Fobs are universal and can be used to configure any WebCal compatible product. Download your free copy of WebCal in English or Chinese.

Fittings

For optimum performance, install the level sensor using the below recommended or direct equivalent fittings.

	P/N	DESCRIPTION
	LM52-1400	2” NPT x 1” NPT, PVC, schedule 40
	LM52-1800	2” NPT x 1” NPT, PVC, schedule 80
	LM52-1410	2” socket x 1” NPT, PVC, schedule 40
	LM52-1810	2” socket x 1” NPT, PVC, schedule 80
	LM52-1850	1” ANSI x 1” NPT, CPVC, schedule 80
	LM50-1001-1	1” NPT side mount bracket, PP

Ordering

DL10 - ☐ ☐

PROCESS MOUNT (1)

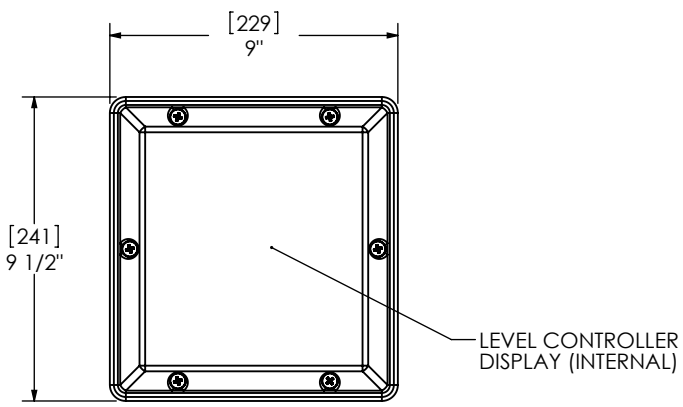
- **0** NPT (US)
- **1** G (Metric)

FOB USB ADAPTER (2)

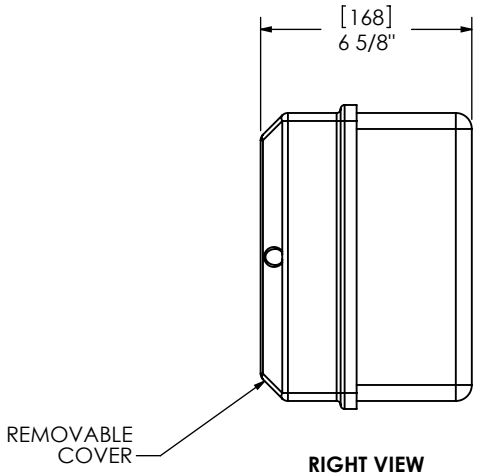
- **0** Without Fob
- **1** With Fob

NOTES

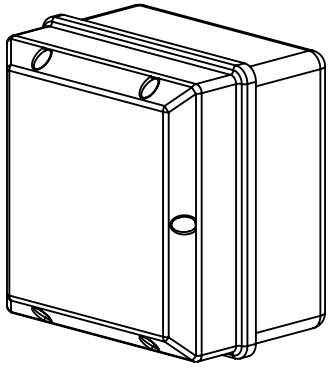
1) Install the level sensor using Flowline installation fittings or equivalents.
2) The level sensor is configured via our WebCal software and one LI99-1001 Fob USB adapter. The level sensor is offered with and without a Fob. Fobs are universal and can be used to configure any WebCal compatible product. WebCal is a free download from our website.



FRONT VIEW



RIGHT VIEW



NOTES:

- POWER CONSUMPTION: 360 W MAX
- VOLTAGE: 96-265 VAC, SINGLE Φ, 50-60 HZ
- CURRENT DRAW: 5.0 A MAX
- OPERATION TEMPERATURE: -40°F - 149°F (NON-CONDENSING)

INSTALLATION INSTRUCTIONS:

- NEMA 4X ENCLOSURE INCLUDED
- UNIT MAY BE WALL MOUNTED OUTDOORS

PROJECT NAME: **CPG MKE 03-04**	**PROPRIETARY AND CONFIDENTIAL**	DIMENSIONS ARE APPROXIMATE IN INCHES UNLESS OTHERWISE SPECIFIED	MIRATECH
PROPOSAL NUMBER: **GL-23-005046**	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	**LI55 Level Controller Submittal Drawing**
SALES ORDER NO.: **37199**		DO NOT SCALE DRAWING	DRAWING: LI55 SD; REV: 0
CUSTOMER P.O.: **0707051062**		DRAWN: JCU; DATE: 9/25/2009	
		REVIEWED BY: JWS; DATE: 9/25/2009	SIZE: A; SCALE 1:6; WEIGHT: 5 lb FULLY LOADED; SHEET 1 OF 1

P136, P203, and P234

FOR MKE09/10/11 REFERENCE

Submittal - For Record

Microsoft - MKE03 - 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

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Cooling System Data
Sound Data
Prototype Test Support
Alternator Data Sheet
IBC Certification
Warranty Statement

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Elevation Drawing
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Generator PAC SWGR (Technibus)

SWGR Drawings
Spec Sheets

EPMS Submittal

EPMS Cabinet
Point to Point Diagram Schematics
Points List
Spec Sheets

Specification CDE

August 8, 2022

Bill of Material

Feature Code	Description	Qty
DFEK	DFEK Commercial Diesel Generator Set, 500kW Standby 60Hz	1
Install-US-Stat	U.S. EPA, Stationary Emergency Application	
500DFEK	500DFEK, Diesel Genset, 60Hz, 500kW-Standby Rating	
A331-2	Duty Rating-Standby Power (ESP)	
L170-2	Emission Certification, EPA, Tier 2, NSPS CI Stationary Emergency	
L090-2	Listing-UL 2200	
C127-2	Fuel Water Separator	
H679-2	Control Mounting-Front Facing	
H704-2	PowerCommand 3.3 Controller, Paralleling Capable	
A460-2	Control Cabinet Heater, 120/240 Volt AC Compatible	
H244-2	Gauge-Exhaust Gas Temperature	
H678-2	LCD Control Display	
K631-2	Relays-Genset Status, User Configured	
KA08-2	Alarm-Audible, Engine Shutdown	
KU32-2	Relay-Alarm Shutdown	
KU67-2	Relays-Paralleling Circuit Breaker Control	
H536-2	Control Display Language-English	
KP78-2	Circuit Breaker or Entrance Box-None	
3250	Circuit Breaker or Terminal Box, Left-None	
3252	Circuit Breaker or Terminal Box Right-None	
L228-2	Cert-Seismic, IBC2000, IBC2003, IBC2006, IBC2009, IBC2011	
3251	CB or EB or TB-None	
3253	CB or EB or TB, Right-None	
0170	None-Vibration Isolators-Normal Duty	
A335-2	Exhaust Connector-ASA Flange	
D041-2	Engine Air Cleaner-Normal Duty	
E074-2	Engine Cooling-Radiator, 50C Ambient	
H389-2	Shutdown-Low Coolant Level	
H557-2	Coolant Heater-208/240/480 Volts AC, Below 40F Ambient Temperature	
R002-2	Voltage-277/480, 3 Phase, Wye, 4 Wire	
L010-2	Test Record-Strip Chart	
L023-2	Test Record-Safety Shutdowns	
L026-2	Cummins Certified Test Record	
L028-2	Genset Warranty-2 Years Base	
B252-2	Alternator-60Hz, 12 Lead, Broad Range, 125/105C	
L050-2	Literature-English	
A358-2	Packing-None	
A292-2	Alternator Heater, 120 Volt AC	
0380	Housing-None	
0400	Enclosure Paint-None	
Z555-2	Dual Electric Starting System, CCV, Fuel Filter/Water Separators, Alternator RTD and AUX101 CAN replacement	
A034E951	Vibration Isolator, Seismic-2575lbs, 1.11" Deflection, 2320lbs/in Spring Rate	6
0416-1105	Battery-Wet, 12V, 8D, 1400CCA	4

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**
ound performance data sheet:	**MSP-177**
ooling performance data sheet:	**MCP-105**
ototype test summary data sheet:	**PTS-145**
tandard 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		

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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)			

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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.

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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.

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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

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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

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Generator set specifications

Governor regulation class	ISO 8528 part 1 Class G3
Voltage regulation, no load to full load	± 0.5%
Random voltage variation	± 0.5%
Frequency regulation	Isochronous
Random frequency variation	± 0.25%
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.

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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

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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

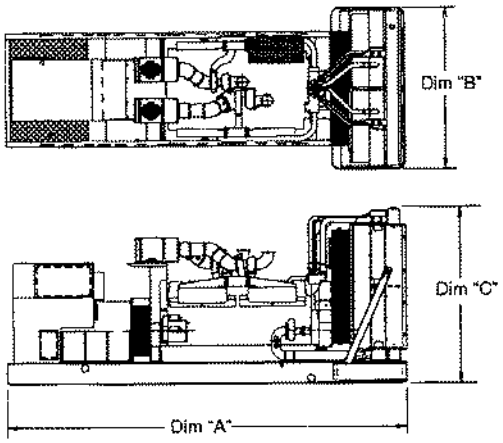
For further detail on PC 2.3 see document S-1569.
For further detail on PC 3.3 see document S-1570.

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.

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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

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Specification Sheet

PowerCommand 3.3 Generator Set Digital Integrated Control System

Bargraph Optional

Introduction

The PowerCommand® 3.3 control system is a microprocessor-based generator set monitoring, metering, and control system, which is comprised of PowerCommand® Control 3300 and the Human Machine Interface 320. PCC3300 supports multiple operation modes including:

- Standalone,
- Synchronization only,
- Isolated bus paralleling,
- Utility single generator set paralleling,
- Utility multiple generator set paralleling,
- Utility single generator set paralleling with power transfer control (automatic mains failure),
- Isolated bus paralleling with Masterless Load Demand

PowerCommand® Control 3300 is designed to meet the exacting demands of the harsh and diverse environments of today's typical power generation applications for Full Authority Electronic or Hydromechanical engine power generator sets.

Offering enhanced reliability and performance over more conventional generator set controls via the integration of all generator control functions into a single system, PCC3300 is your Power of One generator set control solution.

Benefits and Features

- 320 x 240 pixels graphical LED backlit LCD
- Multiple languages supported
- AmpSentry™ protection provides industry-leading generator overcurrent protection
- Digital Power Transfer Control (Automatic Mains Failure) provides load transfer operation in open transition, closed transition, or soft (ramping) transfer modes
- Extended Paralleling (Peak Shave/Base Load) regulates the genset real and reactive power output while paralleled to the utility. Power can be regulated at either the genset or utility bus monitoring point
- Digital frequency synchronization and voltage matching
- Isochronous Load Sharing
- Droop kW and kVAr control
- Real time clock for fault and event time stamping
- Exerciser clock and time of day start/stop initiate a test with or without load, or a Base Load or Peak Shave session
- Digital automatic voltage regulation is provided using three phase sensing and full wave FET type regulator, which is compatible with either shunt or PMG excited systems with a standard AUX103 AVR or an option for a more powerful high-current field drive capability AUX106 AVR
- Digital engine speed governing is provided on applicable platforms
- Generator set monitoring (including metering) and protection with PCC3300 measuring voltage, current, kW and kVAr offering a measurement accuracy of 1%
- Utility / AC Bus metering and protection with PCC3300 voltage, current, kW and kVAr offering a measurement accuracy of 1%
- 12 V (DC) and 24 V (DC) battery operation
- RS-485 Modbus® interface for interconnecting to customer equipment
- Warranty and service – Cummins Power Generation offers a comprehensive warranty and worldwide distributor service network
- Global regulatory certification and compliance: PCC3300 is suitable for use on gensets that are designed, manufactured, tested and certified to relevant UL, NFPA, ISO, IEC, Mil Std., UKCA, and CE standards

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PowerCommand® Generator Set Digital Control System PCC 3300

Introduction

PCC3300 is an industry-leading digital generator set control suitable for usage on a wide range of diesel and lean burn natural gas generator sets in both standalone as well as paralleling applications.

PowerCommand® is compatible with either shunt or PMG excitation, and is suitable for usage with reconnectable or non-reconnectable generators. Configuration for any frequency, voltage and power connection from 120 V (AC) to 600 V (AC) line-to-line or 601 V (AC) to 45k V (AC) with an external PT is supported. The PCC3300 derives its own power from the generator set starting batteries and functions over a voltage range of 8 V (DC) to 30 V (DC).

Features

- PCC3300 supports configurable control features via software download using InPower PC-compatible software
- 12 V (DC) and 24 V (DC) battery operation
- Digital automatic voltage regulation is provided using three phase sensing and full wave FET type regulator, which is compatible with either shunt or PMG excited systems with a standard AUX103 AVR or an option for a more powerful high-current field drive capability AUX106 AVR
- Digital engine speed governing on applicable platform is provided, which is capable of providing isochronous frequency regulation
- Full authority J1939 CANBus® prime mover communications and control is provided for platforms with an Engine Control Module (ECM)
- AmpSentry" protection provides industry-leading alternator overcurrent protection:
  - Time-based generator protection applicable to both line-to-line and line-to-neutral, that can detect an unbalanced fault condition and swiftly react appropriately. Balanced faults can also be detected by AmpSentry and appropriate acted upon.
  - Reduces the risk of Arc Flash due to thermal overload or electrical faults by inverse time protection
- Generator set monitoring offers status information for all critical prime mover and generator functions
- AC and DC digital generator set metering is provided. AC measurements are configurable for single or three phase sensing with PCC3300 measuring voltage, current, kW and kVAr offering a measurement accuracy of 1%
- Battery monitoring system continually monitors the battery output and warns of the potential occurrence of a weak battery condition
- Relay drivers for prime mover starter, fuel shutoff (FSO), glow plug/spark ignition power and switched B+ applications are provided
- Integrated generator set protection is offered to protect the prime mover and generator
- Real time clock for fault and event time stamping
- Exerciser clock and time of day start/stop initiate a test with or without load, or a Base Load or Peak Shave session
- Digital Power Transfer Control (Automatic Mains Failure) provides load transfer operation in open transition, closed transition, or soft (ramping) transfer modes
- Extended Paralleling (Peak Shave/Base Load) regulates the genset real and reactive power output while paralleled to the utility. Power can be regulated at either the genset or utility bus monitoring point
- Digital frequency synchronization and voltage matching
- Isochronous Load Sharing
- Droop kW and kVAr Control
- The synchronization check function provides adjustments for phase angle window, voltage window, frequency window and time delay
- Utility / AC Bus metering and protection with PCC3300 voltage, current, kW and kVAr offering a measurement accuracy of 1%
- Advanced serviceability is offered via InPower™, a PC-based software service tool
- PCC3300 is designed for reliable operation in harsh environments with the unit itself being a fully encapsulated module
- RS-485 ModBus interface for interconnecting to customer equipment
- Native on PCC3300: Four discrete inputs, two dry contact relay outputs and two low-side driver outputs are provided and are all configurable.
  - Optional extra PCC3300 input and output capability available via AUX101
- Warranty and service – Cummins Power Generation offers a comprehensive warranty and worldwide distributor service network
- Global regulatory certification and compliance: PCC3300 is suitable for use on gensets that are designed, manufactured, tested and certified to relevant UL, NFPA, ISO, IEC, Mil Std., UKCA and CE standards

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Base Control Functions

HMI capability

Options: Local and remote HMI320 options are available

Operator adjustments: The HMI320 includes provisions for many set up and adjustment functions.

Genset hardware data: Access to the control and software part number, genset rating in kVA and genset model number is provided from the HMI320 or InPower.

Data logs: Information concerning all of the following parameters is periodically logged and available for viewing; engine run time, controller on time, number of start attempts, total kilowatt hours, and load profile. (Control logs data indicating the operating hours at percent of rated kW load, in 5% increments. The data is presented on the operation panel based on total operating hours on the generator.)

Fault history: Provides a record of the most recent fault conditions with control date and time stamp. Up to 32 events are stored in the control non-volatile memory.

Alternator data

- Voltage (single or three phase line-to-line and line-to-neutral)
- Current (single or three phase)
- kW, kVAr, Power Factor, kVA (three phase and total)
- Frequency

For Lean Burn Natural Gas Engine applications:

- Alternator heater status
- Alternator winding temperature (per phase) as well as alternator drive end and non-drive end bearing

Utility/AC bus data

- Voltage (three phase line-to-line and line-to-neutral)
- Current (three phase and total)
- kW, kVAR, Power Factor, kVA (three phase and total)
- Frequency

AmpSentry: 3x current regulation for downstream tripping/motor inrush management. Thermal damage curve (3-phase short) or fixed timer (2 sec for 1-Phase Short or 5 sec for 2-Phase short).

Engine data

- Starting battery voltage
- Engine speed
- Engine temperature
- Engine oil pressure
- Engine oil temperature
- Intake manifold temperature
- Coolant temperature
- Comprehensive Full Authority Engine (FAE) data (where applicable)

Lean Burn Natural Gas (LBNG) application parameters include:

- Safety shutoff valve status
- Valve proving status
- Downstream gas pressure
- Gas inlet pressure
- Gas mass flow rate
- Control valve position
- Gas outlet pressure
- Manifold pressure and temperature
- Throttle position
- Compressor outlet pressure
- Turbo speed
- Compressor bypass position
- Cylinder configuration (e.g., drive end and non-drive end configurations)
- Coolant pressure 1 and 2 as well as coolant temperature 1 and 2 for both HT/LT respectively
- Exhaust port temperature (up to 18 cylinders)
- Pre-filter oil pressure
- Exhaust back pressure
- Parent ECM internal temperature and isolated battery voltage
- Speed bias
- Child ECM internal temperature and isolated battery voltage
- Knock level, spark advance, and knock count (for up to 18 cylinders)
- Auxiliary supply disconnector status
- Engine heater status
- Coolant circulating pump status
- Lube oil priming pump status
- Lube oil status
- Oil heater status
- Derate authorization status
- Start system status
- Ventilator fan status
- Ventilation louvre status
- Radiator fan status
- DC PSU status
- Start inhibit/enable status and setup

Service adjustments – The HMI320 includes provisions for adjustment and calibration of genset control functions. Adjustments are protected by a password. Functions include:

- Engine speed governor adjustments
- Voltage regulation adjustments
- Cycle cranking
- Configurable fault set up
- Configurable input and output set up
- Meter calibration
- Paralleling setup
- Display language and units of measurement

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Prime Mover Control

SAE-J1939 CAN interface to full authority ECMs (where applicable). Provides data transfer between genset and engine controller for control, metering and diagnostics.

12 V (DC) or 24 V (DC) nominal battery voltage is supported by PCC3300 for normal operation.

Temperature dependant prime mover governing dynamics: This function is supported enabling the engine to be responsive when warm and more stable when operating at lower temperature via providing control and modification over electronic governing parameters as a function of engine temperature.

Isochronous governing is provided in order to control prime mover speed within ±0.25% of nominal rated speed for any steady state load from no load to full load. During operation frequency drift should not exceed ±0.5% of nominal frequency given a 33ºC (or 60ºF) chance in ambient temperature within an eight-hour period.

Droop electronic speed is governing capability is natively offered by PCC3300 to permit droop from 0% to 10% between no load to full load.

Remote start capability is built into the PCC3300 as the unit accepts a ground signal from remote devices to automatically command the starting of the generator set as well as the reaching of rated speed, voltage and frequency or otherwise run at idle speed until prime mover temperature is adequate. The presence of a remote start signal shall cause the PCC3300 to leave sleep mode and return to normal power mode. PCC3300 supports an option for delayed start or stop.

Remote Start Integrity: In compliance with NEC2017 Start Signal Integrity standard – NFPA70 Article 700.10(D)(3), the remote start circuit from ATS to PCC3300 is continuously monitored for signal disturbance due to broken, disconnected or shorted wires via a configurable input. Loss of signal integrity results in activation of a remote start signal.

Remote and local emergency stopping capability: PCC3300 accepts ground signal from a locally or remoted mounted emergency stop switch to cause the generator set to immediately shutdown. The generator set is prevented from either running or cranking with the emergency stop switch engaged. If PCC3300 is in sleep mode, then the activation of any emergency stop switch shall return PCC3300 is normal powered state along with the activation of the corresponding shutdown and run-prevention states.

Sleep mode: PowerCommand 3.3 supports a configurable low current draw state, which is design with consideration to the needs of prime applications or others application without a battery charger (in order to minimize battery current drain).

Automatic prime mover starting: Any generator set controlled by PCC3300 is capable of automatic starting achieved via either magnetic pickup or main alternator output frequency. PCC3300 additionally supports configurable glow plug control where applicable.

Prime mover cycle cranking: PCC3300 supports configurable starting cycles and rest periods. Built in starter protection are incorporated to prevent the operator from specifying a starting sequence that may be damaging.

Configurable time delay functionality: PCC3300 supports time delayed generator set starting and stopping (for cooldown). Permissible time delays are as follows (noting a default setting is 0 seconds):

1. Start delay: 0 seconds to 300 seconds prior to starting after receiving a remote start signal.
2. Stop delay: 0 seconds to 600 seconds prior to shut down after receiving a signal to stop in normal operation modes.

Lean Burn Natural Gas application specific parameters

PCC3300 supports prime mover inhibiting in order to permit application-specific processes (i.e. Auxiliaries) to be started first.

Generator Control

PCC3300 performs both Genset voltage sensing and Genset voltage regulation as follows:

- Voltage sensing is integrated into PCC3300 via three phase line-to-line sensing that is compatible with shunt or PMG excitation systems
- Automatic voltage regulation is accomplished by using a three phase fully rectified input and has a FET output for good motor starting capability.

Major features of generator control include:

Digital output voltage regulation - Capable of regulating output voltage to within +/-1.0% for any loads between no load and full load. Voltage drift will not exceed +/-1.5% for a 40 ºC (104 ºF) change in temperature in an eight-hour period. On engine starting or sudden load acceptance, voltage is controlled to a maximum of 5% overshoot over nominal level.

The automatic voltage regulator feature can be disabled to allow the use of an external voltage regulator.

Droop voltage regulation - Control can be adjusted to droop from 0-10% from no load to full load.

Torque-matched V/Hz overload control - The voltage roll-off set point and rate of decay (i.e. the slope of the V/Hz curve) is adjustable in the control.

Fault current regulation - PowerCommand® will regulate the output current on any phase to a maximum of three times rated current under fault conditions for both single phase and three phase faults. In conjunction with a permanent magnet generator, it will provide three times rated current on all phases for motor starting and short circuit coordination purpose.

Cylinder Cut-off System (CCS): PCC 3300 supports Cylinder Cut-off System which is used to operate the engines on half bank at no load and light load conditions. CCS has below benefits on engine

performance- improved emission standards, improved fuel efficiency, reduced hydrocarbons, reduced white smoke, reduced wet stacking and higher exhaust temperature at light loads to improve turbocharger operations and catalyst performance.

Step Timing Control (STC): PCC 3300 supports STC functionality which is used to advance the engine timing of a hydro-mechanical engine during start up and light load conditions. During ADVANCED injection timing, it:

- Improves cold weather idling characteristics
- Reduces cold weather white smoke
- Improves light load fuel economy
- Reduces injector carboning

Paralleling Functions

First Start Sensor™ system – PowerCommand® provides a unique control function that positively prevents multiple gensets from simultaneously closing to an isolated bus under black start conditions. The First Start Sensor system is a communication system between the gensets that allows the gensets to work together to determine which genset is a system should be the first to close to the bus. The system includes an independent backup function, so that if the primary system is disabled the required functions are still performed.

Synchroni□ing – Control incorporates a digital synchronizing function to force the genset to match the frequency, phase and voltage of another source such as a utility grid. The synchronizer includes provisions to provide proper operation even with highly distorted bus voltage waveforms. The synchronizer can match other sources over a range of 60-110% of nominal voltage and -24 to +6 hertz. The synchronizer function is configurable for slip frequency synchronizing for applications requiring a known direction of power flow at instant of breaker closure or for applications where phase synchronization performance is otherwise inadequate.

Load sharing control – The genset control includes an integrated load sharing control system for both real (kW) and reactive (kVar) loads when the genset(s) are operating on an isolated bus. The control system determines kW load on the engine and kVar load on the alternator as a percent of genset capacity, and then regulates fuel and excitation systems to maintain system and genset at the same percent of load without impacting voltage or frequency regulation. The control can also be configured for operation in droop mode for kW or Kvar load sharing.

Load govern control– When PowerCommand® receives a signal indicating that the genset is paralleled with an infinite source such as a utility (mains) service, the genset will operate in load govern mode. In this mode the genset will synchronize and close to the bus, ramp to a pre-programmed kW and kVar load level, and then operate at that point. Control is adjustable for kW values from 0-100% of standby rating, and 0.7-1.0 power factor (lagging). Default setting is 80% of standby and 1.0 power factor. The control includes inputs to allow independent control of kW and kVar load level by a remote device while in the load govern mode. The rate of load increase and decrease is also adjustable in the control. In addition, the control can be configured for operation in kW or kVAR load govern droop.

Load demand control – The control system includes the ability to respond to an external signal to initiate load demand operation. On command, the genset will ramp to no load, open its paralleling breaker, cool down, and shut down. On removal of the command, the genset will immediately start, synchronize, connect, and ramp to its share of the total load on the system.

Sync check – The sync check function decides when permissive conditions have been met to allow breaker closure. Adjustable criteria are: phase difference from 0.1-20 deg, frequency difference from 0.001-1.0 Hz, voltage difference from 0.5-10%, and a dwell time from 0.5-5.0 sec. Internally the sync check is used to perform closed transition operations. An external sync check output is also available.

Genset and utility/AC bus source AC metering – The control provides comprehensive three phase AC metering functions for both monitored sources, including: 3-phase voltage (L-L and L-N) and current, frequency, phase rotation, individual phase and totalized values of kW, kVAR, kVA and Power Factor; totalized positive and negative kW-hours, kVAR-hours, and kVA-hours. Three wire or four wire voltage connection with direct sensing of voltages to 600V, and up to 45kV with external transformers. Current sensing is accomplished with either 5 amp or 1 CT secondaries and with up to 10,000 amp primary. Maximum power readings are 32,000kW/kVAR/kVA.

Power transfer control – provides integrated automatic power transfer functions including source availability sensing, genset start/stop and transfer pair monitoring and control. The transfer/retransfer is configurable for open transition, fast closed transition (less than 100msec interconnect time), or soft closed transition (load ramping) sequences of operation. Utility source failure will automatically start genset and transfer load, retransferring when utility source returns. Test will start gensets and transfer load if test with load is enabled. Sensors and timers include:

Under voltage sensor: 3-phase L-N or L-L under voltage sensing adjustable for pickup from 85-100% of nominal. Dropout adjustable from 75-98% of pickup. Dropout delay adjustable from 0.1-30 sec.

Over voltage sensor: 3-phase L-N or L-L over voltage sensing adjustable for pickup from 95-99% of dropout. Dropout adjustable from 105-135% of nominal. Dropout delay adjustable from 0.5-120 sec. Standard configuration is disabled and is configurable to enabled in the field using the HMI or InPower service tools.

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Over/Under frequency sensor: Center frequency adjustable from 45-65 Hz. Dropout bandwidth adjustable from 0.3-5% of center frequency beyond pickup bandwidth. Pickup bandwidth adjustable from 0.3-20% of center frequency. Field configurable to enable.

Loss of phase sensor: Detects out of range voltage phase angle relationship. Field configurable to enable.

Phase rotation sensor: Checks for valid phase rotation of source. Field configurable to enable.

Breaker tripped: If the breaker tripped input is active, the associated source will be considered as unavailable.

Timers: Control provides adjustable start delay from 0 - 300sec, stop delay from 0 - 800sec, transfer delay from 0-120sec, retransfer delay from 0-1800sec, programmed transition delay from 0-60sec, and maximum parallel time from 0-1800sec.

Negative Sequence Current Protection: PCC3300 supports this protection natively in order to determine if the generator is at any point was running subject to negative phase sequencing.

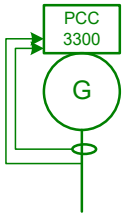
Breaker control – Utility and Genset breaker interfaces include separate relays for opening and closing breaker, as well as inputs for both 'a' and 'b' breaker position contacts and tripped status. Breaker diagnostics include Contact Failure, Fail to Close, Fail to Open, Fail to Disconnect, and Tripped. Upon breaker failure, appropriate control action is taken to maintain system integrity.

Exerciser clock –The exerciser clock (when enabled) allows the system to be operated at preset times in either test without load, test with load, or extended parallel mode. A Real Time Clock is built in. Up to 12 different programs can be set for day of week, time of day, duration, repeat interval, and mode. For example, a test with load for 1 hour every Tuesday at 2AM can be programmed. Up to 6 different exceptions can also be set up to block a program from running during a specific date and time period.

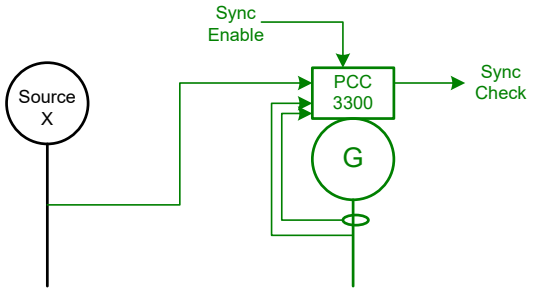
Extended paralleling – In extended paralleling mode (when enabled) the controller will start the genset and parallel to a utility source and then govern the real and reactive power output of the genset based on the desired control point. The control point for the real power (kW) can be configured for either the genset metering point ("Base Load") or the utility metering point ("Peak Shave"). The control point for the reactive power (kVAR or Power Factor) can also be independently configured for either the genset metering point or the utility metering point. This flexibility would allow base kW load from the genset while maintaining the utility power factor at a reasonable value to avoid penalties due to low power factor. The System always operates within genset ratings. The control point can be changed while the system is in operation. Set points can be adjusted via hardwired analog input or adjusted through an operator panel display or service tool.

Application types – Controller is configured to operating in one of six possible application types. These topologies are often used in combinations in larger systems, with coordination of the controllers in the system either by external device or by interlocks provided in the control. Topologies that may be selected in the control include:

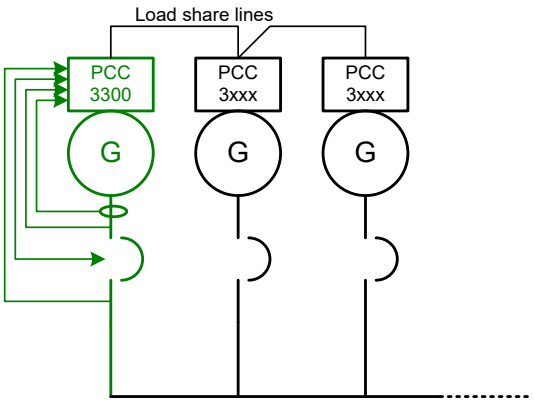
Standalone: Control provides monitoring, protection and control in a non-paralleling application.



Synchronizer only: control will synchronize the genset to other source when commanded to either via a hardwired or Modbus driven input.



Isolated Bus: allows the genset to perform a dead bus closure or synchronize to the bus and isochronously share kW and kVAR loads with other gensets.



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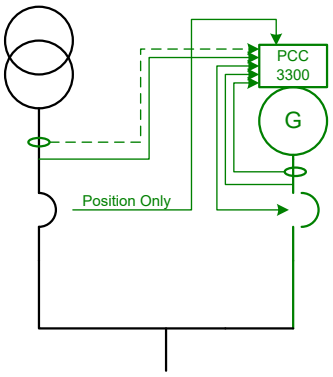
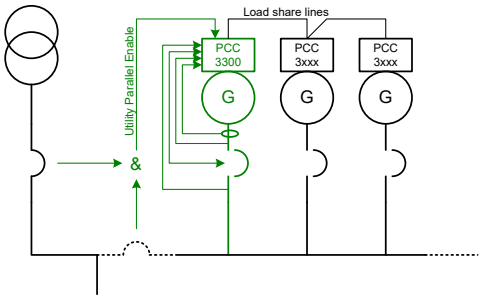
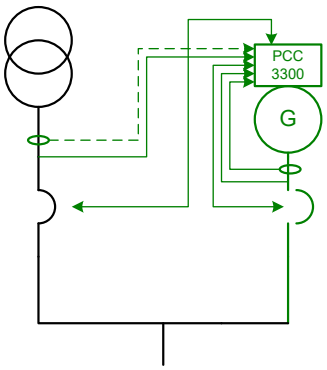
Utility Single: Control monitors one genset and utility. The control will automatically start and provide power to a load if the utility fails. The control will also resynchronize the genset back to the utility and provides extended paralleling capabilities.



Utility Multiple: Supports all functionality of Isolated Bus and provides extended paralleling to the utility. Extended paralleling load set points follow a constant setting; dynamically follow an analog input, Modbus register or HMI.

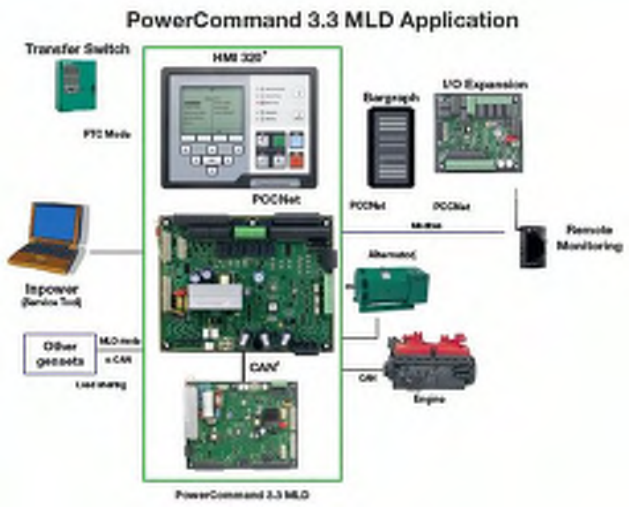


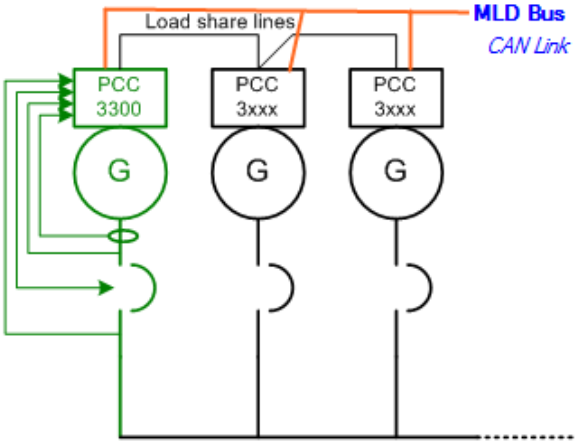
Power Transfer Control: Control operates a single genset/single utility transfer pair in open transition, fast closed transition, or soft closed transition. Extended paralleling functionality also provides base load and peak shave options.



Masterless Load Demand (Optional Feature):

PowerCommand® 3.3 with Masterless Load Demand (MLD) technology enables generator sets to start/stop automatically based on load demand. Masterless Load Demand-capable generators are equipped with an additional s-CAN network connection that allows sharing of information amongst paralleled generator sets. MLD has been designed for hassle-free installation, commissioning and operation. MLD functionality. Integrated on-board system logic provides the MLD topology control without the need for any additional system.





PCC3300 External Voltage and Frequency Biasing Inputs

PCC3300 supports externally driven voltage and frequency biasing capability in order to permit external paralleling (if intending to use this feature please contact your local distributor for further information).

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Protective Functions

On operation of a protective function the control will indicate a fault by illuminating the appropriate status LED on the HMI, as well as display the fault code and fault description on the LCD. The nature of the fault and time of occurrence are logged in the control. The service manual and InPower service tool provide service keys and procedures based on the service codes provided. Protective functions include:

Battle short mode

When enabled and the *battle short* switch is active, the control will allow some shutdown faults to be bypassed. If a bypassed shutdown fault occurs, the fault code and description will still be annunciated, but the genset will not shutdown. This will be followed by a *fail to shutdown* fault. Emergency stop shutdowns and others that are critical for proper operation (or are handled by the engine ECM) are not bypassed. Please refer to the Control Application Guide or Manual for list of these faults.

Derate

The Derate function reduces output power of the genset in response to a fault condition. If a Derate command occurs while operating on an isolated bus, the control will issue commands to reduce the load on the genset via contact closures or Modbus. If a Derate command occurs while in utility parallel mode, the control will actively reduce power by lowering the base load kW to the derated target kW.

Configurable alarm and status inputs

The control accepts up to four alarm or status inputs (configurable contact closed to ground or open) to indicate a configurable (customer-specified) condition.

The control is programmable for warning, derate, shutdown, shutdown with cooldown or status indication and for labeling the input.

Emergency stop

Annunciated whenever either emergency stop signal is received from external switch.

General prime mover protection

Low and high battery voltage warning - Indicates status of battery charging system (failure) by continuously monitoring battery voltage.

Weak battery warning - The control system will test the battery each time the genset is signaled to start and indicate a warning if the battery indicates impending failure.

Low coolant level warning – Can be set up to be a warning or shutdown.

Low coolant temperature warning – Indicates that engine temperature may not be high enough for a 10 second start or proper load acceptance.

Fail to start (overcrank) shutdown - The control system will indicate a fault if the genset fails to start by the completion of the engine crack sequence.

Fail to crank shutdown - Control has signaled starter to crank engine but engine does not rotate.

Cranking lockout - The control will not allow the starter to attempt to engage or to crank the engine when the engine is rotating.

Fault simulation –The control in conjunction with InPower software, will accept commands to allow a technician to verify the proper operation of the control and its interface by simulating failure modes or by forcing the control to operate outside of its normal operating ranges. InPower also provides a complete list of faults and settings for the protective functions provided by the controller.

For Lean Burn Natural Gas Engine applications:

Off load running (protection) – This feature protects the engine in the event the genset is being called to go off load for too long.

Hydro Mechanical fuel system engine protection:

Overspeed shutdown – Default setting is 115% of nominal

Low lube oil pressure warning/shutdown – Level is preset (configurable with InPower or HMI) to match the capabilities of the engine used. Control includes time delays to prevent nuisance alarms.

High lube oil temperature warning/shutdown – Level is preset (configurable with InPower or HMI) to match the capabilities of the engine used. Control includes time delays to prevent nuisance alarms.

High engine temperature warning/shutdown – Level is preset (configurable with InPower or HMI) to match the capabilities of the engine used. Control includes time delays to prevent nuisance alarms.

Low coolant temperature warning – Indicates that engine temperature may not be high enough for a 10 second start or proper load acceptance.

High intake manifold temperature shutdown – Level is preset (configurable with InPower or HMI) to match the capabilities of the engine used. Control includes time delays to prevent nuisance alarms.

Full authority electronic engine protection:

Engine fault detection is handled inside the engine ECM. Fault information is communicated via the SAE-J1939 data link for annunciation in the HMI.

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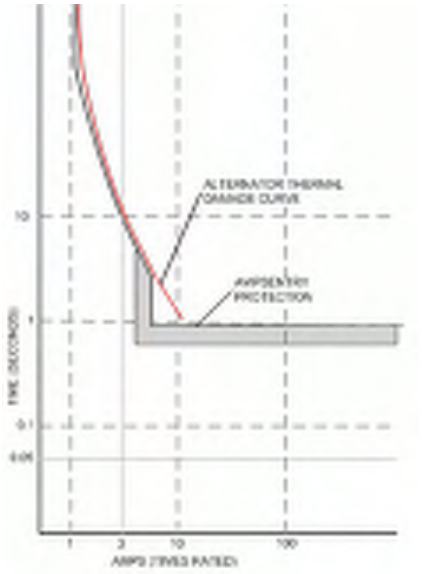
Alternator Protection

AmpSentry protective relay - A comprehensive monitoring and control system integral to the PowerCommand® Control System that guards the electrical integrity of the alternator and power system by providing protection against a wide array of fault conditions in the genset or in the load. It also provides single and three phase fault current regulation (3x Current) so that downstream protective devices have the maximum current available to quickly clear fault conditions without subjecting the alternator to potentially catastrophic failure conditions. Thermal damage curve (3 phase short) or fixed timer (2sec for 1P short, 5sec for 2P short). See document R1053 for a full-size time over current curve. The control does not included protection required for interconnection to a utility (mains) service.



AmpSentry Maintenance Mode (AMM) - Instantaneous tripping, if AmpSentry Maintenance mode is active (50mS response to turn off AVR excitation/shutdown genset) for arc flash reduction when personnel are near genset.

High AC voltage shutdown (59) - Output voltage on any phase exceeds preset values. Time to trip is inversely proportional to amount above threshold. Values adjustable from 105-125% of nominal voltage, with time delay adjustable from 0.1-10 seconds. Default value is 110% for 10 seconds.

Low AC voltage shutdown (27) - Voltage on any phase has dropped below a preset value. Adjustable over a range of 50-95% of reference voltage, time delay 2-20 seconds. Default value is 85% for 10 seconds. Function tracks reference voltage. Control does not nuisance trip when voltage varies due to the control directing voltage to drop, such as during a V/Hz roll-off or synchronizing.

Under frequency shutdown (81 u) - Genset output frequency cannot be maintained. Settings are adjustable from 2-10 Hz below reference governor set point, for a 5-20 second time delay. Default: 6 Hz, 10 seconds. Under frequency protection is disabled when excitation is switched off, such as when engine is operating in idle speed mode.

Over frequency shutdown/warning (81o) - Genset is operating at a potentially damaging frequency level. Settings are adjustable from 2-10 Hz above nominal governor set point for a 1-20 second time delay. Default: 6 Hz, 20 seconds, disabled.

Overcurrent warning/shutdown (51) - Implementation of the thermal damage curve with instantaneous trip level calculated based on current transformer ratio and application power rating.

Loss of sensing voltage shutdown - Shutdown of genset will occur on loss of voltage sensing inputs to the control.

Field overload shutdown - Monitors field voltage to shutdown genset when a field overload condition occurs.

Over load (kW) warning - Provides a warning indication when engine is operating at a load level over a set point. Adjustment range: 80-140% of application rated kW, 0-120 second delay. Defaults: 105%, 60 seconds.

Reverse power shutdown (32) - Adjustment range: 5-20% of standby kW rating, delay 1-15 seconds. Default: 10%, 3 seconds.

Reverse Var shutdown (40) - Shutdown level is adjustable: 15-50% of rated Var output, delay 10-60 seconds. Default: 20%, 10 seconds.

Short circuit protection - Output current on any phase is more than 175% of rating and approaching the thermal damage point of the alternator. Control includes algorithms to protect alternator from repeated over current conditions over a short period of time.

Negative sequence overcurrent warning (46) – Control protects the generator from damage due to excessive imbalances in the three phase load currents and/or power factors.

Custom overcurrent warning/shutdown (51) – Control provides the ability to have a custom time overcurrent protection curve in addition to the AmpSentry protective relay function.

Ground fault overcurrent (51G) – Control detects a ground fault either by an external ground fault relay via a contact input or the control can measure the ground current from an external current transformer. Associated time delays and thresholds are adjustable via InPower or HMI.

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Paralleling Protection

Breaker fail to close Warning: When the control signals a circuit breaker to close, it will monitor the breaker auxiliary contacts and verify that the breaker has closed. If the control does not sense a breaker closure within an adjustable time period after the close signal, the fail to close warning will be initiated.

Breaker fail to open warning: The control system monitors the operation of breakers that have been signaled to open. If the breaker does not open within and adjustable time delay, a Breaker Fail to Open warning is initiated.

Breaker position contact warning: The controller will monitor both 'a' and 'b' position contacts from the breaker. If the contacts disagree as to the breaker position, the breaker position contact warning will be initiated.

Breaker tripped warning: The control accepts inputs to monitor breaker trip / bell alarm contact and will initiate a breaker tripped warning if it should activate.

Fail to disconnect warning: In the controller is unable to open either breaker, a fail to disconnect warning is initiated. Typically, this would be mapped to a configurable output, allowing an external device to trip a breaker.

Fail to synchronize warning: Indicates that the genset could not be brought to synchronization with the bus. Configurable for adjustable time delay of 10 -900 seconds, 120 default.

Phase sequence sensing warning: Verifies that the genset phase sequence matches the bus prior to allowing the paralleling breaker to close.

Maximum parallel time warning (power transfer control mode only): During closed transition load transfers, control independently monitors paralleled time. If time is exceeded, warning is initiated and genset is disconnected.

Bus or genset PT input calibration warning: The control system monitors the sensed voltage from the bus and genset output voltage potential transformers. When the paralleling breaker is closed, it will indicate a warning condition if the read values are different.

Field Control Interface

Input signals to the PowerCommand® control include:

- Coolant level (where applicable)
- Fuel level (where applicable)
- Remote emergency stop
- Remote fault reset
- Remote start
- Rupture basin
- Start type signal
- Battle short
- Load demand stop
- Synchronize enable
- Genset circuit breaker inhibit
- Utility circuit breaker inhibit
- Single mode verify
- Transfer inhibit – prevent transfer to utility (in power transfer control mode)
- Retransfer inhibit – prevent retransfer to genset (in power transfer control mode)
- kW and kVAR load setpoints

Configurable inputs - Control includes (4) input signals from customer discrete devices that are configurable for warning, shutdown or status indication, as well as message displayed

Input signals for Lean Burn Natural Gas Engine applications:

- Gearbox oil pressure/temperature protection
- Fire fault
- Earth fault support as a discrete input via an appropriate secondary detection device
- Differential fault
- DC power supply fault
- Genset Interface Box (GIB) isolator open fault
- Start inhibit/enable (x3)
- Radiator fan trip
- Ventilator fan trip
- Ventilation louvers closed
- Start system trip
- Alternator heater trip
- Alternator heater status
- Alternator winding temperature (PT100 RTDx3)
- Alternator drive end bearing temperature (PT100 RTD)
- Alternator non-drive end bearing temperature (PT100 RTD)

Output signals from the PowerCommand® control include:

- Load dump signal: Operates when the genset is in an overload condition.
- Delayed off signal: Time delay-based output which will continue to remain active after the control has removed the run command. Adjustment range: 0 - 120 seconds. Default: 0 seconds.

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- Configurable relay outputs: Control includes (4) relay output contacts (3 A, 30VDC). These outputs can be configured to activate on any control warning or shutdown fault as well as ready to load, not in auto, common alarm, common warning and common shutdown.
- Ready to load (genset running) signal: Operates when the genset has reached 90% of rated speed and voltage and latches until genset is switched to off or idle mode.
- Paralleling circuit breaker relays outputs: Control includes (4) relay output contacts (3.5A, 30 VDC) for opening and closing of the genset and utility breakers.

Output Signals for Lean Burn Natural Gas Engine applications:

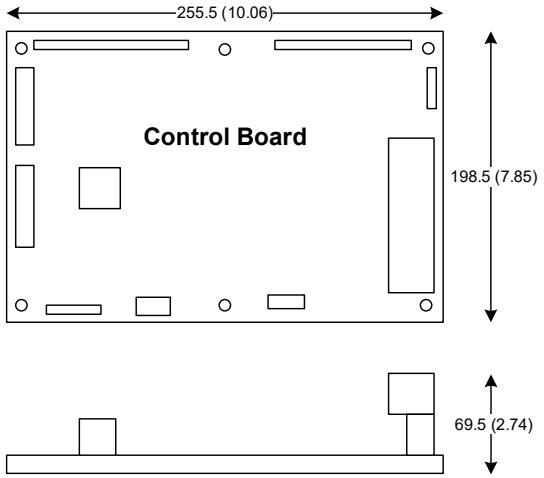
- Start inhibit/enable event
- Emergency stop event
- Ventilator fan run control
- Louvre control
- Radiator fan control
- Alternator heater control
- Engine at idle speed event

Communications connections include:

- PC tool interface: This RS-485 communication port allows the control to communicate with a personal computer running InPower software.
- Modbus RS-485 port: Allows the control to communicate with external devices such as PLCs using Modbus protocol.

  Note - An RS-232 or USB to RS-485 converter is required for communication between PC and control.
- Networking: This RS-485 communication port allows connection from the control to the other Cummins Power Generation products.

Mechanical Drawing



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PowerCommand® Human Machine Interface HMI320

Description

This control system includes an intuitive operator interface panel that allows for complete genset control as well as system metering, fault annunciation, configuration and diagnostics. The interface includes five genset status LED lamps with both internationally accepted symbols and English text to comply with customer's needs. The interface also includes an LED backlit LCD display with tactile feel soft-switches for easy operation and screen navigation. It is configurable for units of measurement and has adjustable screen contrast and brightness.

The *run/off/auto* switch function is integrated into the interface panel.

All data on the control can be viewed by scrolling through screens with the navigation keys. The control displays the current active fault and a time-ordered history of the five previous faults.

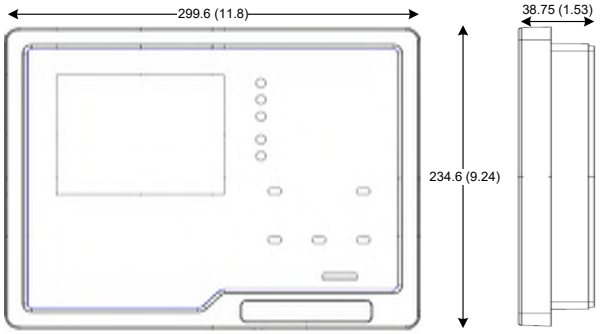
Features:

- LED indicating lamps
  - genset running
  - remote start
  - not in auto
  - shutdown
  - warning
  - auto
  - manual and stop
  - Circuit breaker open (if equipped)
  - Circuit breaker closed (if equipped)
- 320 x 240 pixels graphic LED backlight LCD.
- Four tactile feel membrane switches for LCD defined operation. The functions of these switches are defined dynamically on the LCD.
- Seven tactile feel membrane switches dedicated screen navigation buttons for up, down, left, right, ok, home and cancel.
- Six tactile feel membrane switches dedicated to control for auto, stop, manual, manual start, fault reset and lamp test/panel lamps.
- Two tactile feel membrane switches dedicated to control of circuit breaker (where applicable).
- Allows for complete genset control setup.
- Certifications: Suitable for use on gensets that are designed, manufactured, tested and certified to relevant UL, NFPA, ISO, IEC, Mil Std., UKCA and CE standards.
- Languages supported: English, Spanish, French, German, Italian, Greek, Portuguese, Finnish, Norwegian, Danish, Russian (Cyrillic), Chinese, Hungarian, Japanese, Polish, Korean, Romanian, Brazilian Portuguese, Turkish, Dutch, and Czech

Communications connections include:

- PC tool interface - This RS-485 communication port allows the HMI to communicate with a personal computer running InPower.
- This RS-485 communication port allows the HMI to communicate with the main control board.

Mechanical Drawing



HMI

Dimensions: mm (inches)

Software

InPower (beyond 6.5 version) is a PC-based software service tool that is designed to directly communicate to PowerCommand® gensets and transfer switches, to facilitate service and monitoring of these products.

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Environment

The control is designed for proper operation without recalibration in ambient temperatures from -40 ºC (-40 ºF) to +70º C (158 ºF), and for storage from -55 ºC (-67 ºF) to +80 ºC (176 ºF). Control will operate with humidity up to 95%, non-condensing.

The HMI is designed for proper operation in ambient temperatures from -20 ºC (-4 ºF) to +70 ºC (158 ºF), and for storage from -30 ºC (-22 ºF) to +80 ºC (176 ºF).

The control board is fully encapsulated to provide superior resistance to dust and moisture. Display panel has a single membrane surface, which is impervious to effects of dust, moisture, oil and exhaust fumes. This panel uses a sealed membrane to provide long reliable service life in harsh environments.

The control system is specifically designed and tested for resistance to RFI/EMI and to resist effects of vibration to provide a long reliable life when mounted on a genset. The control includes transient voltage surge suppression to provide compliance to referenced standards.

Certifications

PowerCommand® meets or exceeds the requirements of the following codes and standards:

- NFPA 110 for level 1 and 2 systems.
- ISO 8528-4:2005 compliance, controls and switchgear (second edition)
- CE marking: The CE marking is only valid when equipment is used in a fixed installation application. Material compliance declaration is available upon request.
- UKCA marking- The UKCA marking is only valid when equipment is used in a fixed installation application. Material compliance declaration is available upon request.
- EN 50081-1,2 residential/light industrial emissions or industrial emissions.
- EN 50082-1,2 residential/light industrial or industrial susceptibility.
- ISO 7637-2, level 2; DC supply surge voltage test.
- Mil Std 202C, Method 101 and ASTM B117: Salt fog test.
- UL 6200 recognized, suitable for use on UL 2200 Listed generator sets.
- CSA C282-M1999 compliance
- CSA 22.2 No. 14 M91 industrial controls.
- PowerCommand® control systems and generator sets are designed and manufactured in ISO 9001 certified facilities.
- ROHS (Restriction of Hazardous substance) complaint both for HMI 320 & PCC3300v2.

Reference Documents

Please refer to the following reference documents available in the PowerSuite library:

- PowerCommand™ 3.3. Application Guide
- T-037: PowerCommand Control Application Manual (ANSI Protective Functions)
- T-040: PowerCommand 3.3 Paralleling Application Guide

Please refer to the following reference documents available on Cummins Quickserve:

- Service Manuals for PC3.3 (non-MLD) and PC3.3 (MLD)
- Modbus Register Mapping

Warranty

All components and subsystems are covered by an express limited one-year warranty. Other optional and extended factory warranties and local distributor maintenance agreements are available.

PCCNet COMPATIBLE

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VMC GROUP
THE POWER OF TOGETHER™

CERTIFICATE OF COMPLIANCE
SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Certification No.

VMA-50957-01C (Revision 12)

Expiration Date: 6/30/2026

Certification Parameters:

The nonstructural products (mechanical and/or electrical components) listed on this certificate are CERTIFIED[1] FOR SEISMIC APPLICATIONS in accordance with the following building code[2] releases.

IBC 2015, 2012, 2009, 2006

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

Cummins Power Generation, Inc.; Diesel Gensets

DSGAA-E, DSHAD, DQDAA-C, DQHAA-B, DFEJ-K; 100kW - 500kW

The above referenced equipment is **APPROVED** for seismic application when properly installed[3], used as intended, and contains a Seismic Certification Label referencing this Certificate of Compliance[4]. As limited by the tabulated values, below grade, grade, and roof-level installations, installations in essential facilities, for life safety applications, and/or of equipment containing hazardous contents are permitted and included in this certification with an Equipment Importance Factor assigned as I_p=1.5. The equipment is qualified by successful seismic shake table testing at the nationally recognized University of California Berkeley Pacific Earthquake Engineering Research Center under the review of the ISO Accredited Product Certification Agency, the VMC Group.

Certified Seismic Design Levels			
Certified **IBC**	**Importance $I_p \leq 1.5$** Soil Classes A-E Risk Categories I-IV Design Categories A-F	z/h ≤ 1.0	z/h = 0.0
		$S_{DS} \leq 0.647$ g	$S_{DS} \leq 1.940$ g

Certified Seismic Installation Methods[8]	
External Isolation Mounting From Unit Base To Fuel Tank	External Isolation Mounting From Unit Base To Rigid Structure
Rigid Mounting From Unit Base To Fuel Tank	Rigid Mounting From Unit Base To Rigid Structure

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CERTIFICATE OF COMPLIANCE
SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Certified Product Table:

Series	Model	Max Rating [kW]	Length [in]	Width [in]	Height [in]	S_{DS} @ z/h=0	S_{DS} @ z/h=1	Tank Range [gal]	Enclosure[1]	Mounting Configurations
DFEx (QSX15)	J, K	450, 500	366	86	128	1.94	0.64	270-2525	F183, F200-F205	Rigid Mounting From Unit Base To Rigid Structure / Fuel Tank External Isolation Mounting From Unit Base to Rigid Structure/Fuel Tank
DQDAx (QSL9-G7)	A, B, C	250, 275, 300	266	90	134	2.48	2.00	270-2050		
DQHAx (QSM11)	A, B	275, 300	226	80	128	2.28	2.28	270-1700		
DSHAx (QSL9-G2)	D	230	143	42	110		2.00	282-1296	F172-173, F182, F216-217	
DSGAx (QSB7)	A, B, C, D, E	100, 125, 150, 175, 200	184	44	114	2.48		309-1140	F173, F182, F216-217, F232-233	Rigid Mounting From Unit Base To Rigid Structure / Fuel Tank

[1]Note: The F201, F202, F204, & F205 are certified in the tested mineral wool foam configuration, as well as the analyzed PU foam configuration highlighted in the FEA section of Certification Report VMA-50957-01

Group	Type	S_{DS} (z/h=0)	S_{DS} (z/h=1)	A_{Flex-H}	A_{Rig-H}	A_{Flex-V}	A_{Rig-V}	Rigid Mounting F_p/W_p	Isolated Mounting F_p/W_p
Seismic	AC156	1.940	0.647	1.94	0.776	1.293	0.518	0.873	1.455

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

IBC CERTIFIED VMC GROUP

VMA-50957-01C (Revision 12)
Issue Date: Thursday, March 2, 2017
Revision Date: Tuesday, May 2, 2023
Expiration Date: Tuesday, June 30, 2026

CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Notes & Comments:

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

2. The following building codes are addressed under this certification:
   IBC 2015 referencing ASCE7-10 and ICC-ES AC-156
   IBC 2012 referencing ASCE7-10 and ICC-ES AC-156
   IBC 2009 referencing ASCE7-05 and ICC-ES AC-156
   IBC 2006 referencing ASCE7-05 and ICC-ES AC-156

3. Refer to the manufacturer supplied installation drawings for anchor requirements and mounting considerations for seismic applications. Required anchor locations, size, style, and load capacities (tension and shear) may be specified on the installation drawings or specified by a 3rd party. Mounting requirement details such as anchor brand, type, embedment depth, edge spacing, anchor-to-anchor spacing, concrete strength, special inspection, wall design, and attachment to non-building structures must be outlined and approved by the Engineer of Record for the project or building. Structural walls, structural floors, and housekeeping pads must also be seismically designed and approved by the project or building Structural Engineer of Record to withstand the seismic anchor loads as defined on the installation drawings. The installing contractor is responsible for ensuring the proper installation of all anchors and mounting hardware.

4. For this certificate and certification to remain valid, this certificate must correspond to the "Seismic Certification Label" found affixed to the unit by the factory. The label ensures the manufacturer built the unit in conformance to the IBC seismic design criteria set forth by the Certified Seismic Qualification Agency, the VMC Group, and meets the seismic design levels claimed by this certificate.

5. Mechanical, Electrical, and Plumbing connections to the equipment must be flexibly attached as to not transfer load through the connection. The structural integrity of any conduit, cable trays, piping, ductwork and/or flexible connections is the responsibility of others. This certification makes no statements of compliance in regards to NEMA, IP, UL, CSA, or other relevant standards after a seismic event. For compliance to other relevant standards, please contact the manufacturer.

6. This certificate applies to units manufactured at:
   Cummins Power Generation, Inc., 1400 73rd Ave NE, Minneapolis, MN 55432

7. This certification follows the VMC Group's ISO-17065 Scheme.

8. The certified seismic installation methods states are a summary for all series this certificate covers, for more detailed information on the certified seismic installation methods, see the certified product tables.

John P. Giuliano, PE
President, VMC Group

VMA-50957-01C (Revision 12)
Issue Date: Thursday, March 2, 2017
Revision Date: Tuesday, May 2, 2023
Expiration Date: Tuesday, June 30, 2026

Specification Sheet

Battery and Accessories

Battery Specifications

Battery Part Number	Group Size	CCA	Reserve Capacity	Battery	Voltage	Length	Width	Height	Ship Weight lbs	Quarts Electrolyte
0416-0579	24	420	70	Dry	12	10.2	6.6	8.9	20	6.0
0416-0579-01	24	420	70	Wet	12	10.2	6.6	8.9	36	6.0
0416-1330	24XL	810	146	Wet	12	10.3	9.0	6.6	43	5.9
0416-1051	26	530	80	Wet	12	8.2	6.8	8.1	31	3.7
0416-1040	31	800	160	Dry	12	13.0	6.8	9.4	65	4.2
0416-0796	31	725	150	Wet	12	12.7	6.0	9.3	62	4.2
0416-0980	31	1000	185	Wet	12	13.0	6.8	9.5	59	4.2
A045P632	34	850	NA	Wet	12	10.3	6.6	8.0	NA	NA
0416-1291	34	800	100	Sealed	12	10.0	6.9	7.9	38	4.0
A030Y976	4D	1050	290	Wet	12	20.7	8.7	10.0	100	NA
0416-0439	8D	1400	430	Dry	12	20.8	10.7	9.5	110	16.0
0416-1264	8D	730	420	Dry	12	20.7	10.8	9.5	110	16.0
0416-1105	8D	1400	430	Wet	12	20.8	10.8	9.5	125	16.0
A062X621	24	800	135	Wet	12	10.1	6.8	8.7	42	N/A
A062X662	34	800	120	Wet	12	10.2	6.9	7.9	38	N/A

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SENS®

MicroGenius®

Genset Battery Chargers

12 & 24 Volts, 6 to 60 Amps

Small. Powerful. Rugged.

Hardened switchmode powertrain - delivers first-class abuse resistance and energy efficiency
Patented charging algorithms - recharge faster and more safely; cut risk of sudden battery failure
UL Listed for emergency generators - from 6 to 60 amp output
Tested to high vibration levels - survive harsh genset duty
Standard J-1939 and Modbus communications - facilitate genset and building integration
Small, lightweight packages - enable installation in smaller spaces

c UL US LISTED CE IBC BC

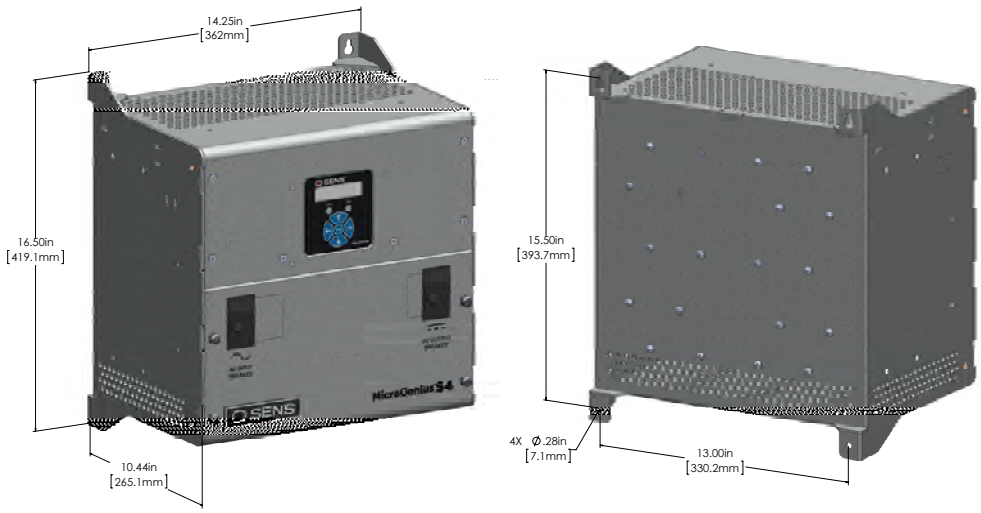
SENS® STORED ENERGY SYSTEMS

MicroGenius S4

32 lbs (14.5 kg) maximum

Choose S4 for:
- DC current >30A
- Circuit breakers
- Added surge suppression
- Internal redundancy
- 2 or more battery banks

19 or 23 inch rack mount brackets optional



Specifications for MicroGenius S4: 15A to 60A Output

		15A	30A	45A	60A
AC input	VAC, Hz	90-265[1] VAC, 47-63 Hz			
	Protection	Supplementary overcurrent protection fuse, transient protected to EN 61000-4-5 level 4. Optional AC circuit breaker. Optional AC input surge protector with indicator.			
	Power factor & efficiency	PF >.95 typical; efficiency to 93%; meets CEC Title 20 Appliance Efficiency Regulations			
DC output	Volts, amps	12V/24V nom., 15A/15A	12V/24V nom., 30A/30A	12V/24V nom., 45A/45A	12V/24V nom., 60A/60A
	Charging modes	Multi-stage, including float, boost and two additional HELIX voltages in flooded lead-acid battery program			
	Current limit	Factory set at 100% of rating. Field adjustable with keypad or from PC.[2]			
	Charging characteristic	Constant voltage, current limited; patented Dynamic Boost control and HELIX (when FLA battery is selected)			
	Line & load regulation	±0.5%			
	Output ripple	< 30 mVrms with or without battery. Delivers fast-responding, stable, well-filtered DC without battery.			
	Battery temp. compensation	Standard. Optional remote battery temperature probe.[3]			
	Output protection	Current limit, supplementary overcurrent protection fuse, transient protected. Optional DC circuit breaker. Optional DC output surge protector with indicator.			
	Dead battery charge	Starts into, and recharges zero volt battery without user intervention			
	Parallel operation	Two or more chargers operate with all modes synchronized for increased current or fault tolerance[4]			
Adjustment & Controls	Charge mode control	Fully automatic patented Dynamic Boost system. Manual boost & battery commissioning available from keypad.			
	Adjustments	12 or 24-volt; battery type program; fine voltage setting; alarm setpoints; alarm relay mapping			
	Battery type programs	Flooded lead-acid, AGM or Ni-Cd for engine starting; VRLA for reserve power; ultracapacitor			
	Field voltage adjustment	2 methods: from front panel keypad or from PC[2]			
Status display	LEDs	Two multi-color front panel status LEDs			
	Metering & status display	Voltmeter accurate to +2%; ammeter to +5%. 20-character display of status & alarm messages.			
Alarms	Alarms	Factory set, field reconfigurable. Alarm functions announced on the J-1939 and Modbus ports and on the LCD include summary, AC fail, charger fail, high DC volts, low DC volts, low cranking volts, overvoltage shutdown, reverse polarity battery, incompatible battery, invalid settings, I/O bus inactive, thermal fold back, no temperature probe, current limiting, ground fault and low current. Any alarm is assignable to Form C contacts.			
	Alarms: Form C contacts	Five Form C contacts, each rated 30V, 2A resistive, assignable. Standard configuration includes summary, AC fail, charger fail, high DC volts, low DC volts and low cranking volts.			
Networking	J-1939 communications	CAN 2.0 extended ID on RJ-45 port			
	Modbus communications	Modbus RS-485 on RJ-45 port; Modbus TCP/IP (optional) on RJ-45 port			
	SENSbus	Proprietary bus for connection of paralleled chargers and SENS accessories			
Environmental	Operating temperature	-40C to +70C; full spec from -40C to +40C (convection cooled)[5]			
	Humidity	5% to 95%, non-condensing			
	Ingress protection	IP 20; NEMA 1. Optional drip shield for IP 22/NEMA 3R rating.[6]			
	Vibration & shock resistance	Vib: Swept Sine (EN60068-2-6): 4G, 18-500 Hz, 3 axes. Random: 20-500Hz, .01G²/Hz. Shock: EN 60068-2-27 (15G)			
	Electrical transient	ANSI/IEEE C62.41 & EN 61000-4-12 on power terminals			
Abuse protection	Reverse polarity	Charger self-protects without output protective device clearing. Indication via LED & LCD.			
	Wrong voltage battery	Charger-battery voltage mismatch shuts down charger. Indication via LED & LCD.			
	Overvoltage shutdown	Selective; shutdown only operates if charger causes the overvoltage condition			
	Overtemperature protection	Gradual output power reduction if heatsink temperature becomes excessive			
Regulatory compliance	North America	C-UL Listed for US & Canada: UL 1236 categories BBGQ, BBHH, BBJY and QWIR, CSA 22.2, No. 107.2. Certified to UL 1236 supplements SB (marine), SC (fire pump) and SE (emergency generator).			
		NFPA-70, NFPA-110			
		FCC Part 15, Class A			
		Seismic: Rigid & non-structure wall mount; max S_{DS} of 2.5G. IBC 2000-2015, Calif. BC 2007-2016			
		American Bureau of Shipping, type approved			
	European Union (CE)	EMC: 2014/30/EU (EN 61000-6-2 & EN 61000-6-4)			
		LVD: 2014/35/EU (EN 60335-1 & EN 60335-2-29)			
		RoHS 2: 2011/65/EU (EN 50581)			
Construction	Housing/configuration	Aluminum with powder coated finish. Rack mount brackets for 19 and 23 inch rack optional.			
	Connections	AC & DC terminal blocks: 14 AWG to 2/0. AC & DC breakers, <50A (optional): 14 to 2 AWG. AC & DC breakers, ≥50A (optional): 12 AWG to 2/0. J-1939 and Modbus: RJ-45. Form C alarms: 28 to 16 AWG			

1 When set for 24-volt output, full output available above 170 VAC input, output power reduced by approximately 20% for operation between 100 VAC and 170 VAC input (e.g. 24A for charger rated 30A) 2 Requires optional computer to charger adapter SENS p/n 209254 plus free SENS software available at www.sens-usa.com 3 Remote battery temp sensor is optional. Order SENS p/n 209481 4 Requires standard RJ-45 network cable to connect paralleling bus. Order SENS p/n 208118-72 (72-inch length) or 208118-180 (180-inch length) 5 At 65 deg. C and above the LCD display may be unreadable and display life will be reduced 6 Drip shield is optional. Order SENS p/n 209287.

SENS®
STORED ENERGY SYSTEMS

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

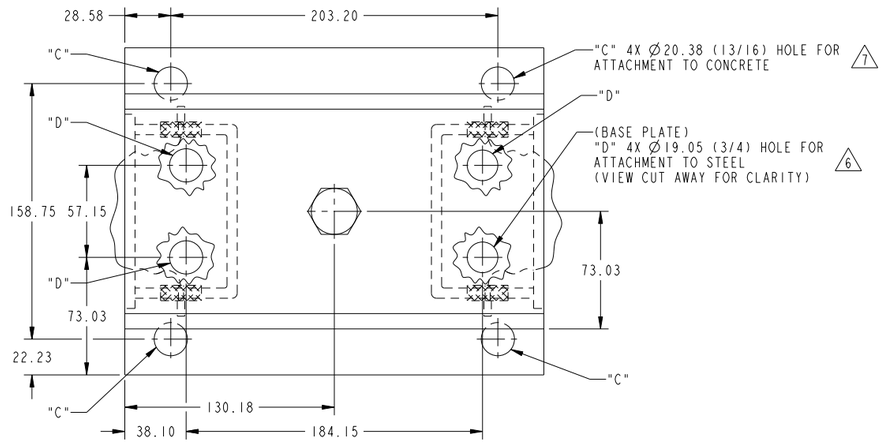
Harmonic analysis:

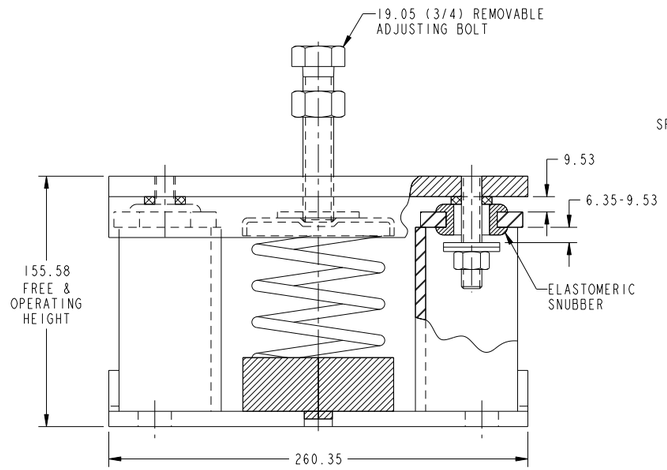
(per MIL-STD-705B, method 601.4)

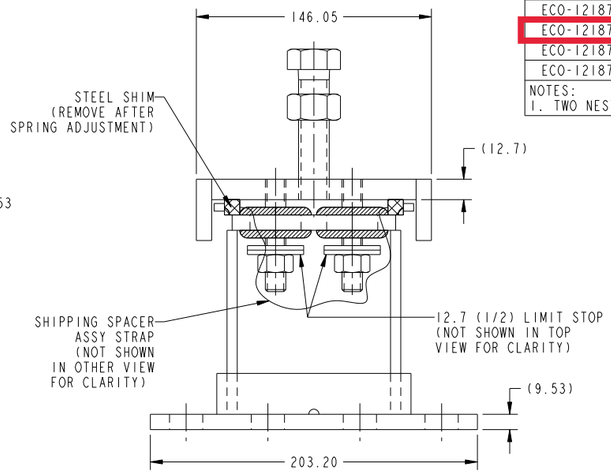
	Line to Line		Line to Neutral	
Harmonic	No load	Full load	No load	Full load
3	0.1	0.1	0.1	0.1
5	0.3	1.2	0.3	1.1
7	0.4	1.1	0.4	1.0
9	0.0	0.0	0.0	0.0
11	0.7	0.9	0.6	0.8
13	0.2	0.3	0.1	0.2
15	0.0	0.0	0.0	0.0

Pro/ENGINEER

REL NO	LTR	NO	REVISION	DRN	CKD	APVD	DATE
ECO-121874	D	1	ADD NOTE 6	SBC	ZYM	Z_MOGES	03JAN12
		2	ADD NOTE 7	SBC	ZYM	Z_MOGES	03JAN12
		3	ADD "C" & "D" TO TOP VIEW	SBC	ZYM	Z_MOGES	03JAN12
		4	UPDATE "CONTROLLED ITEM" STAMP	SBC	ZYM	Z_MOGES	03JAN12







NOTES:

1. THIS PART IS MANUFACTURER SOURCE CONTROLLED.
2. EST. WEIGHT: 65 lbs (29.5 kg).
3. STANDARD ISOLATOR FINISH: CASTING AND WELDMENTS- ONE COAT BLACK PAINT, SPRINGS- POWDER COATED, HARDWARE- ZINC ELECTROPLATE.
4. STATIC LOAD RATINGS ON SHEET 2 OF 2 ARE FOR GUIDANCE ONLY. VALUES ARE BASED ON TESTS OR CALCULATIONS WITH BASE PLATES BOLTED TO STEEL. FOR ATTACHMENT TO CONCRETE, CONSULT FACTORY.
5. MODEL MSSH-IE SEISMIC ISOLATORS FOR NOMINAL 1 INCH DEFLECTION.

6 ISOLATOR BASE PLATE MUST BE ANCHORED TO STEEL EITHER BY WELDING OR WITH MIN (4) 3/4 DIA A325 BOLTS USING HOLES "D" OR AS DIRECTED BY THE VMC GROUP.

7 INDICATED "C" HOLES (13/16 DIA, 4X MIN) ARE FOR MOUNTING TO CONCRETE BASE.

TABULATION

CURRENT ER NO	PART NO	VENDOR PART NO	VENDOR MODEL NO	RATED LOAD (POUNDS)	RATED DEFLECTION (IN)	SPRING RATE (LB/IN)	COLOR CODE
ECO-121874	A034E930	MSSH-IE-195	MSSH-IE	195	1.95	100	DK BLUE
ECO-121874	A034E937	MSSH-IE-400	MSSH-IE	400	1.32	303	BLACK
ECO-121874	A034E940	MSSH-IE-530N	MSSH-IE	530	1.17	453	BLACK/DK BLUE
ECO-121874	A034E941	MSSH-IE-650	MSSH-IE	650	1.05	619	RED
ECO-121874	A034E942	MSSH-IE-825N	MSSH-IE	825	1.07	771	RED/DK BLUE
ECO-121874	A034E943	MSSH-IE-1000	MSSH-IE	1000	1.00	1000	TAN
ECO-121874	A034E944	MSSH-IE-1200N	MSSH-IE	1200	1.04	1154	TAN/DK BLUE
ECO-121874	A034E945	MSSH-IE-1400	MSSH-IE	1400	1.00	1400	PINK
ECO-121874	A034E946	MSSH-IE-1700N	MSSH-IE	1700	1.10	1545	PINK/DK BLUE
ECO-121874	A034E948	MSSH-IE-2000	MSSH-IE	2000	1.11	1802	WHITE
ECO-121874	A034E951	MSSH-IE-2575N	MSSH-IE	2575	1.11	2320	WHITE/DK PURPLE
ECO-121874	A030W097	MSSH-IE-2990N	MSSH-IE	2990	1.11	2694	WHITE/DK GREEN
ECO-121874	A034E953	MSSH-IE-3250N	MSSH-IE	3250	1.04	3125	WHITE/GRAY

NOTES:
1. TWO NESTED SPRINGS YIELD THIS LOAD. THE COLOR CODE IS FOR OUTER SPRING/INNER SPRING

-THIS IS A CONTROLLED ITEM-
PER CPG PROCEDURE FRE-1002

TO MAINTAIN COMPLIANCE WITH REQUIREMENTS OF THE CODES, STANDARDS, OR AGENCIES LISTED BELOW

☐ CSA ☐ UL ☐ CE ☐ RVIA ☐ ABYC
☒ IBC ☐ OTHER ☐ OTHER

CHANGES, DEVIATIONS, OR SUBSTITUTIONS OF MATERIAL, DESIGN, OR PROCESS MUST BE APPROVED BY THE FOLLOWING CONTROLLED ITEM APPROVER

RESPONSIBLE C/A ROLE STATIONARY GENSET
RESPONSIBLE C/A ROLE
RESPONSIBLE C/A ROLE

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS

DIM		HOLE	
X	± 1	0.00- 4.99	+0.15/-0.08
.X	± 0.8	5.00- 9.99	+0.20/-0.10
.XX	± 0.38	10.00-17.49	+0.25/-0.13
		17.50-24.99	+0.30/-0.13

ANG TOL: ± 1.0°

SCALE: 11/32

SIM TO A030S170

DO NOT SCALE PRINT

- CONFIDENTIAL -
PROPERTY OF CUMMINS POWER GENERATION GROUP

DRN J. GIANNINI
CKD K_RABADI
APVD K_RABADI
DATE 03MAR10

FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING SEE ASME Y14.5M-1994

FIRST USED ON DQFAA

CUMMINS POWER GENERATION

ISOLATOR

SITE CODE PGF

DWG SIZE D A030W098

SHEET 1 OF 2

DWG REV D

Drawing Name: A030W098 Revision: D
Part Name: A030W097 Revision: D
Sheet 1 of 3

Pro/ENGINEER

REL NO	LTR	NO	REVISION	DRN	CKD	APVD	DATE
ECO-121874	D	--	----	SBC	ZYM	Z_MOGES	03JAN12

INSTALLATION AND ADJUSTMENT INSTRUCTIONS

1. ISOLATORS ARE SHIPPED FULLY ASSEMBLED AND ARE TO BE SPACED AND LOCATED IN ACCORDANCE WITH INSTALLATION DRAWINGS OR AS OTHERWISE RECOMMENDED.
2. LOCATE ISOLATORS ON A LEVEL FLOOR OR SUB-BASE, ENSURING THAT ALL ISOLATOR CENTERLINES MATCH THE EQUIPMENT MOUNTING HOLES. SHIM OR GROUT AS REQUIRED TO LEVEL ALL ISOLATOR BASE PLATES. A 1/4" MAXIMUM DIFFERENCE IN ELEVATION CAN BE TOLERATED.
3. ANCHOR ALL ISOLATORS TO THE FLOOR OR SUB-BASE AS RECOMMENDED.
4. GENTLY PLACE MACHINE OR EQUIPMENT ONTO TOP PLATE OF ISOLATOR BOLT EQUIPMENT OR SUB BASE SECURELY TO ISOLATOR USING MINIMUM ASTM A325 (SAE GR. 5) HIGH STRENGTH BOLTS. BOLTS SHOULD NOT PROTRUDE MORE THAN 1/8" BELOW THE TOP PLATE.
5. THE EQUIPMENT WEIGHT WILL CAUSE THE SPRING AND THUS THE TOP PLATE TO DESCEND AND REST ON THE UPPER BUMPER PADS.
6. BACK-OFF ON THE TWO (2) SIDE LIMIT STOP LOCKNUTS, SO THAT THEY DO NOT HAMPER THE ADJUSTMENT PROCESS.
7. ADJUST EACH AND EVERY ISOLATOR IN SEQUENCE, ONE FULL CLOCKWISE TURN AT A TIME. REPEAT THIS PROCEDURE UNTIL THE 1/4" OPERATING CLEARANCE IS OBTAINED. NOTE: BE SURE LIMIT STOP NUTS CONTINUE TO SHOW CLEARANCE.
8. CHECK EQUIPMENT LEVEL AND FINE ADJUST ISOLATORS AS NECESSARY TO OBTAIN EQUIPMENT LEVEL.
9. ADJUST ALL LIMIT STOP NUTS TO OBTAIN A 1/4" MAXIMUM CLEARANCE.
10. ADJUSTMENT IS COMPLETE.

RATED LOAD CURVES

1. TO USE THE RATED LOAD CURVES:
   A. CALCULATE VERTICAL AND HORIZONTAL FORCES ACTING ON MOUNTINGS, INCLUDING TRANSLATIONS AND OVERTURNING MOMENTS.
   B. THE INTERSECTION OF THE HORIZONTAL LOAD AND VERTICAL LOAD MUST FALL WITHIN THE CURVE FOR THE SPECIFIED PART.
2. THE RATED LOAD CURVES ASSUME ONE OF THE FOLLOWING METHODS OF TIE-DOWN AT EACH BOLT LOCATION:
   A. FOUR (4) 3/4" DIA. HILTI "KWIK-BOLT II" WEDGE ANCHORS, WITH MINIMUM 4 3/4" EMBEDMENT INTO 3000 PSI CONCRETE. MINIMUM EDGE DISTANCE IS 9 3/4". (NOTE: OTHER BRANDS OF ANCHOR BOLTS MAY BE USED, PROVIDED THEY ARE OF EQUAL STRENGTH AND HAVE A CURRENT ICBO REPORT).
      TO ACHIEVE RATED LOAD, "SPECIAL INSPECTION" IS REQUIRED ON ALL CONCRETE ANCHOR INSTALLATIONS, AS DESCRIBED BELOW:
      a) 50% OR ALTERNATE BOLTS IN A GROUP SHALL BE TENSION TESTED TO 6200 LBS TENSION.
      b) TESTING SHOULD OCCUR 24 HOURS MINIMUM AFTER INSTALLATION OF ANCHORS.
      c) IF ANY ANCHOR FAILS TESTING, TEST ALL ANCHORS UNTIL TWENTY (20) CONSECUTIVE ANCHORS PASS, THEN RESUME THE INITIAL TESTING FREQUENCY.
   B. FOUR (4) 3/4" DIA. BOLTS PER ASTM A307 OR BETTER.
3. THE SUPPORT STRUCTURE (BY OTHERS) IS THE RESPONSIBILITY OF THE ARCHITECT OR ENGINEER OF RECORD AND SHALL BE DESIGNED TO ADEQUATELY SUPPORT THE WEIGHTS AND FORCES SHOWN.

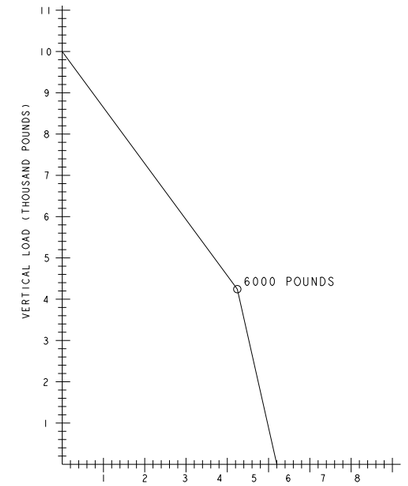


FIGURE 1
SEISMIC RATINGS
(ATTACHMENT TO CONCRETE)

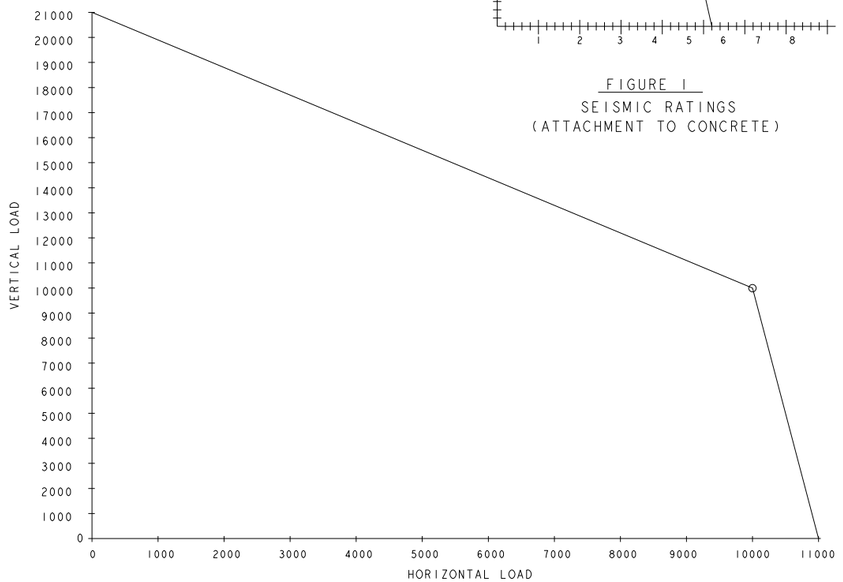


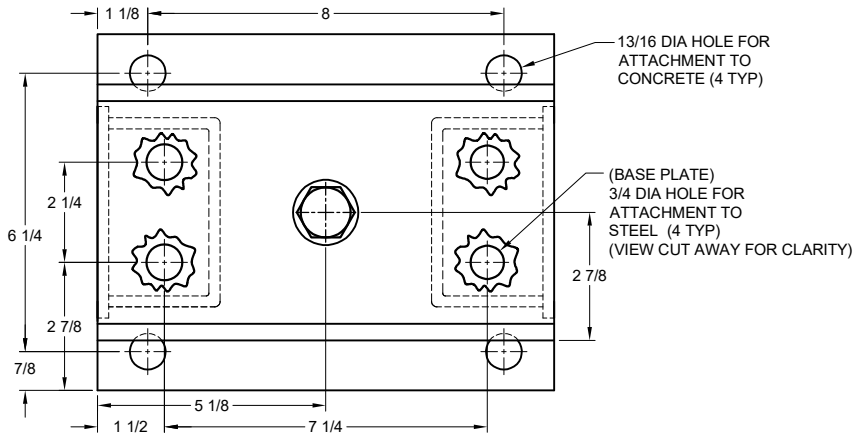
FIGURE 2
SEISMIC RATINGS
(ATTACHMENT TO STEEL)

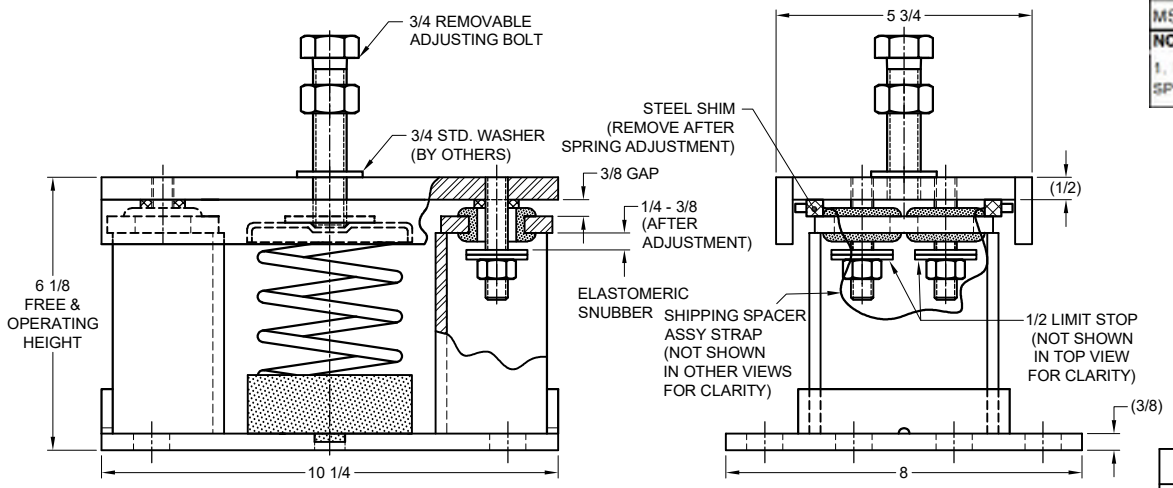
UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS	SIM TO A030S170	DRN J. GIANNINI		CUMMINS POWER GENERATION	
DIM: X ± 1, .X ± 0.8, .XX ± 0.38 — HOLE: 0.00-4.99 +0.15/-0.08; 5.00-9.99 +0.20/-0.10; 10.00-17.49 +0.25/-0.13; 17.50-24.99 +0.30/-0.13	DO NOT SCALE PRINT	CKD K_RABADI		ISOLATOR	
ANG TOL: ± 1.0° — SCALE: 1:32	- CONFIDENTIAL - PROPERTY OF CUMMINS POWER GENERATION GROUP	APVD K_RABADI	SITE CODE		
	FOR INTERPRETATION OF DIMENSIONING AND TOLERANCING, SEE ASME Y14.5M-1994	DATE 03MAR10	PGF	SIZE D — A030W098	SHEET 2 OF 2 — REV D
	FIRST USED ON DQFAA				

Drawing Name: A030W098 Revision: D
Part Name: A030W097 Revision: D
Sheet 2 of 3

172R–102904	REV.:7	11/30/21

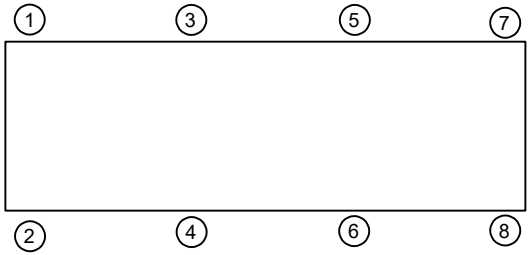
REV.	DESCRIPTION	DATE	BY





MODEL MSSH-1E SEISMICALLY RESTRAINED VIBRATION ISOLATOR FOR 1" DEFLECTION				
SEISMIC MOUNT SIZE	RATED LOAD (LBS)	RATED DEFLECTION	SPRING RATE	SPRING COLOR CODE
MSSH-1E-195	195	1.95	100	DK BLUE
MSSH-1E-400	400	1.32	303	BLACK
MSSH-1E-530N[1]	530	1.17	453	BLACK/ DK BLUE
MSSH-1E-650	650	1.05	619	RED
MSSH-1E-825N[1]	825	1.07	771	RED/ DK BLUE
MSSH-1E-1000	1000	1.00	1000	TAN
MSSH-1E-1200N[1]	1200	1.04	1154	TAN/ DK BLUE
MSSH-1E-1400	1400	1.00	1400	PINK
MSSH-1E-1700N[1]	1700	1.10	1550	PINK/DK. BLUE
MSSH-1E-2000	2000	1.11	1800	WHITE
MSSH-1E-2575N[1]	2575	1.11	2313	WHITE/ DK. PURPLE
MSSH-1E-2990N[1]	2990	1.11	2682	WHITE/DK. GREEN
MSSH-1E-3250N[1]	3250	1.04	3125	WHITE/ GRAY

NOTES:
1. TWO NESTED SPRINGS YIELD THIS LOAD. THE COLOR CODE INDICATED IS FOR OUTER SPRING/ INNER SPRING.



ISOLATOR SELECTIONS	
LOC 1:	LOC 2:
LOC 3:	LOC 4:
LOC 5:	LOC 6:
LOC 7:	LOC 8:
CUSTOMER EQP'T. TAG:	

NOTE: MATERIAL SHOWN IS FOR (1) SET.

NOTES:
1. ALL DIMENSIONS ARE IN INCHES, INTERPRET PER ANSI Y14.
2. STANDARD FINISH: HOUSING - POWDER COAT (COLOR:BLACK), SPRING - POWDER COAT (COLOR: SEE TABLE), HARDWARE ZINC-ELECTROPLATE.
3. EQUIPMENT MUST BE BOLTED OR WELDED TO THE TOP AND BOTTOM PLATE TO MEET ALLOWABLE SEISMIC RATINGS.
4. ALL SPRINGS ARE DESIGNED FOR 50% OVERLOAD CAPACITY.
5. REFER TO SHEET 2 OF 2 FOR INSTALLATION INSTRUCTIONS.
6. RATED DEFLECTIONS ARE WITHIN 25% OF NOMINAL. HIGHER DEFLECTIONS ARE ALLOWED IF THEY MEET SPECIFICATIONS.

OTHER MATERIALS, COMPOUNDS, OR FINISHES WITH EQUAL OR SUPERIOR PROPERTIES MAY BE SUBSTITUTED AS THEY BECOME AVAILABLE.

CERTIFIED FOR:

JOB NAME: _____

CUSTOMER : _____

CUSTOMER P.O.: _____

SALES ORDER: _____

MODEL MSSH-1E 195-3250 LBS. VIBRATION ISOLATOR WITH INTEGRAL SEISMIC RESTRAINT AND EXTERNAL ADJUSTMENT 1 INCH DEFLECTION

VMC GROUP
THE POWER OF TOGETHER
Bloomingdale, NJ 07403
Houston, TX 77041

SCALE : NONE

SHEET: 1 OF 2

DRAWING NO.:

REVISION

Member VISCMA

PROPRIETARY: EXCEPT AS OTHERWISE AGREED IN WRITING, THE INFORMATION AND DESIGN DISCLOSED HEREIN ARE THE PROPERTY OF THE VMC GROUP AND MUST NOT BE COPIED OR DISTRIBUTED WHO BY THE USE HEREOF ACKNOWLEDGE THE VMC GROUP'S OWNERSHIP AND AGREE TO MAINTAIN THIS INFORMATION AND DESIGN IN STRICT CONFIDENCE.

REV.	DESCRIPTION	DATE	BY

1. READ INSTRUCTIONS IN THEIR ENTIRETY BEFORE BEGINNING INSTALLATION.

2. ISOLATORS ARE SHIPPED FULLY ASSEMBLED AND ARE TO BE POSITIONED IN ACCORDANCE WITH THE SUBMITTAL DRAWINGS OR AS OTHERWISE RECOMMENDED.

3. SET ISOLATORS ON FLOOR, HOUSEKEEPING PAD, OR SUB-BASE, ENSURING THAT ALL ISOLATOR CENTERLINES MATCH THE EQUIPMENT MOUNTING HOLES. THE VMC GROUP RECOMMENDS THAT THE ISOLATOR BASE PLATES ("B") BE INSTALLED ON A LEVEL SURFACE. SHIM OR GROUT AS REQUIRED, LEVELING ALL ISOLATOR BASE PLATES AT THE SAME ELEVATION (1/4-INCH MAXIMUM DIFFERENCE CAN BE TOLERATED).

4. ANCHOR ALL ISOLATORS TO THE FLOOR, HOUSEKEEPING PAD, OR SUB-BASE USING THRU HOLES ("C") FOR CONCRETE OR ("D") FOR STEEL AS REQUIRED. USE ANCHORS MEETING THE DESIGN REQUIREMENTS SPECIFIED ON SHEET 1 OF 2. WELDING TO STEEL IS PERMITTED PROVIDING THE WELD ACHIEVES THE REQUIRED STRENGTH.

5. ISOLATORS ARE SHIPPED TO THE JOBSITE WITH (4) REMOVABLE SPACER SHIMS ("E") BETWEEN THE TOP PLATE AND THE HOUSING. THESE SHIMS **MUST** BE IN PLACE WHEN THE EQUIPMENT IS POSITIONED OVER THE ISOLATORS.

6. WITH ALL SHIMS ("E") IN PLACE, REMOVE ADJUSTING BOLT "G", AND SET ASIDE. KEEP THE NUT "H" SCREWED ONTO THE ADJUSTING BOLT. PLACE THE MACHINE OR EQUIPMENT ONTO TOP PLATE "A", ALIGNING THE EQUIPMENT MOUNTING HOLE WITH THE TAPPED HOLE IN THE TOP PLATE.INSTALL WASHER "I" AND REATTACH THEADJUSTING BOLT BY BOLTING THROUGH THE EQUIPMENT MOUNTING HOLE INTO THE TAPPED HOLE OF THE (**Cont.**)

6. (Cont.)
ISOLATOR. TURN THE ADJUSTING BOLT UNTIL IT STARTS TO COMPRESS THE SPRING. LEAVE NUT "H" AT THE TOP OF THE ADJUSTING BOLT, LEAVING ROOM FOR ADJUSTING THE ISOLATOR PER STEP 9.

7. THE ADJUSTMENT PROCESS CAN ONLY BEGIN AFTER THE EQUIPMENT OR MACHINE IS AT ITS FULL OPERATING WEIGHT.

8. BACK OFF EACH OF THE (2) OR (4) LIMIT STOP LOCKNUTS ("F") PER ISOLATOR 1/4- TO 3/8-INCH.

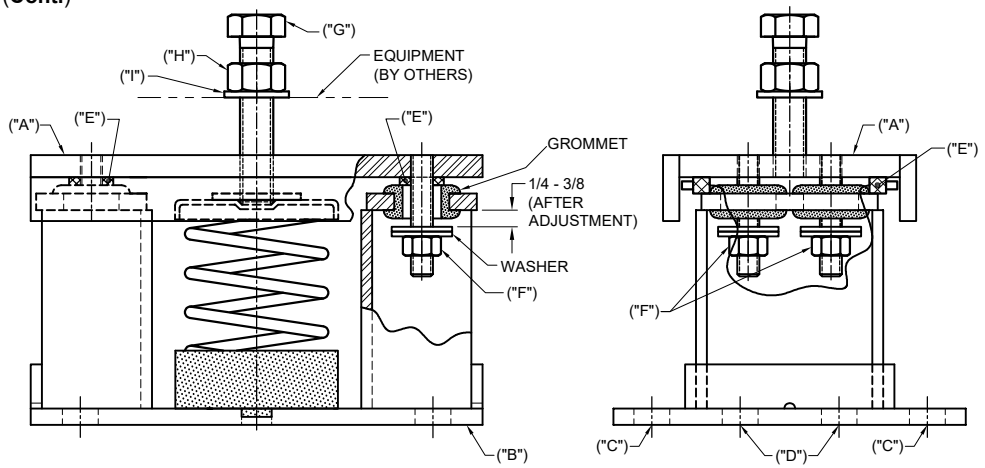
9. ADJUST EACH ISOLATOR IN SEQUENCE BY TURNING ADJUSTING BOLT(S) "G" ONE FULL CLOCKWISE TURN AT A TIME. REPEAT THIS PROCEDURE ON ALL ISOLATORS, ONE AT A TIME. CHECK THE LIMIT STOP LOCKNUTS ("F") PERIODICALLY TO ENSURE THAT CLEARANCE BETWEEN THE WASHER AND RUBBER GROMMET IS MAINTAINED. STOP ADJUSTMENT OF AN ISOLATOR ONLY WHEN THE TOP PLATE ("A") HAS RISEN JUST ABOVE THE SHIM ("E").

10. REMOVE ALL SPACER SHIMS ("E").

11. FINE ADJUST ISOLATORS TO LEVEL EQUIPMENT.

12. ADJUST ALL LIMIT STOP LOCKNUTS ("F") PER ISOLATOR TO OBTAIN 3/8-INCH GAP. THE LIMIT STOP NUTS MUST BE KEPT AT THIS 3/8-INCH GAP TO ENSURE UNIFORM BOLT LOADING DURING UPLIFT (AS IN THE CASE WHEN A COOLING TOWER IS DRAINED).

13. INSTALLATION IS COMPLETE.



OTHER MATERIALS, COMPOUNDS, OR FINISHES WITH EQUAL OR SUPERIOR PROPERTIES MAY BE SUBSTITUTED AS THEY BECOME AVAILABLE.

CERTIFIED FOR:

JOB NAME: _____

CUSTOMER : _____

CUSTOMER P.O.: _____

SALES ORDER: _____

MODEL MSSH-1E 195-3250 LBS. VIBRATION ISOLATOR WITH INTEGRAL SEISMIC RESTRAINT AND EXTERNAL ADJUSTMENT 1 INCH DEFLECTION

VMC GROUP
THE POWER OF TOGETHER®
Bloomingdale, NJ 07403
Houston, TX 77041

SCALE : NONE

SHEET: 2 OF 2

DRAWING NO.:

REVISION

Member VISCMA

PROPRIETARY: EXCEPT AS OTHERWISE AGREED IN WRITING, THE INFORMATION AND DESIGN DISCLOSED HEREIN ARE THE PROPERTY OF THE VMC GROUP AND MUST NOT BE COPIED OR DISTRIBUTE WHO BY THE USE HEREOF ACKNOWLEDGE THE VMC GROUP'S OWNERSHIP AND AGREE TO MAINTAIN THIS INFORMATION AND DESIGN IN STRICT CONFIDENCE.

Cooling system data
500DFEK 60Hz

40 Degree C ambient radiator cooling system

Duty		Rating (kW)	Max cooling @ air flow static restriction, unhoused (inches water/mm water)						Housed in free air, no air discharge restriction			
			0.0/0.0	0.25/6.4	0.5/12.7	0.75/19.1	1.0/25.4		F183	F200	F201	F202
			Maximum allowable ambient temperature, degree C									
60 Hz	Standby	500	43	43	43	43	40	43	43	43	43	
	Prime	455	43	43	43	43	39	N/A	N/A	N/A	N/A	
50 Hz	Standby	440	43	43	43	43	43	N/A	N/A	N/A	N/A	
	Prime	400	43	43	43	43	43	N/A	N/A	N/A	N/A	

50 Degree C ambient radiator cooling system

Duty		Rating (kW)	Max cooling @ air flow static restriction, unhoused (inches water/mm water)					Housed in free air, no air discharge restriction			
			0.0/0.0	0.25/6.4	0.5/12.7	0.75/19.1	1.0/25.4	F183	F200	F201	F202
			Maximum allowable ambient temperature, degree C								
60 Hz	Standby	500	53	52	52	46	40	55	54	54	53
	Prime	455	53	52	52	43	39	N/A	N/A	N/A	N/A
50 Hz	Standby	440	55	55	55	55	54	N/A	N/A	N/A	N/A
	Prime	400	55	55	55	55	53	N/A	N/A	N/A	N/A

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.

Alternator Data Sheet
Frame Size: HC5E

Characteristics		1-bearing weight		2-bearing weight	
Weights:	Stator assembly:	1592 lb	722 kg	1592 lb	722 kg
	Rotor assembly:	1360 lb	617 kg	1296 lb	588 kg
	Complete assembly:	3402 lb	1543 kg	3384 lb	1535 kg
Maximum speed:		2250 rpm			
Excitation current:	Full load:	2.6 Amps			
	No load:	0.6 Amps			
Insulation system:	Class H throughout				

3 Ø Ratings (0.8 power factor)			60 H□ (winding no)					
			190/380 (311)	208/416 (311)	220/440 (311)	240/480 (311)	240 Delta (311)	347/600 (17)
150° C rise ratings	@40C	kW	525	575	600	640	575	616
		kVA	656	719	750	800	719	770
125° C rise ratings	@40C	kW	498	545	570	600	545	580
		kVA	623	681	713	750	681	725
105° C rise ratings	@40C	kW	456	500	520	540	500	526
		kVA	570	625	650	675	625	658
80° C rise ratings	@40C	kW	400	440	456	475	440	456
		kVA	500	550	570	594	550	570

3 Ø Reactances (per unit ± 10%)	190/380 (311)	208/416 (311)	220/440 (311)	240/480 (311)	240 Delta (311)	347/600 (17)
(Based on full load at 125° C rise rating)						
Synchronous	3.87	3.53	3.30	2.92	3.53	2.98
Transient	0.19	0.17	0.16	0.14	0.17	0.14
Subtransient	0.13	0.12	0.11	0.10	0.12	0.10
Negative sequence	0.25	0.23	0.22	0.19	0.23	0.19
Zero sequence	0.11	0.10	0.09	0.08	0.10	0.08

3 Ø Motor Starting (90% sustained voltage)	190/380 (311)	208/416 (311)	220/440 (311)	240/480 (311)	240 Delta (311)	347/600 (17)
Maximum kVA	2208	2208	2208	2208	2208	2208

Time Constants (sec)	190/380 (311)	208/416 (311)	220/440 (311)	240/480 (311)	240 Delta (311)	347/600 (17)
Transient	0.08	0.08	0.08	0.08	0.08	0.08
Subtransient	0.012	0.012	0.012	0.012	0.012	0.012
Open circuit	2.5	2.5	2.5	2.5	2.5	2.5
DC	0.019	0.019	0.019	0.019	0.019	0.019

Windings (@22° C)		190/380 (311)	208/416 (311)	220/440 (311)	240/480 (311)	240 Delta (311)	347/600 (17)
Stator resistance	(Ohms L-L)	0.0086	0.0086	0.0086	0.0086	0.0086	0.0136
Rotor resistance	(Ohms)	1.96	1.96	1.96	1.96	1.96	1.96
Number of leads		12	12	12	12	12	12

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2024 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: RCEXL015.AAJ-045

Effective Date: 07/28/2023

Expiration Date: 12/31/2024

Byron J. Bunker, Division Director
Compliance Division

Issue Date: 07/28/2023

Revision Date: N/A

Model Year: 2024
Manufacturer Type: Original Engine Manufacturer
Engine Family: RCEXL015.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.

Enclosure Section
Tier2 UL142

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.

PROJECT:

PREPARED FOR: CUMMINS PACIFIC
PROJECT MNGR:

SPECIFICATION NOTES:

1. REVIEWED SPEC:2
   6_05_01_Electrical OFCI General Requirements_M10.docx

TANK NOTES:

1. 2,520 TOTAL GALLON CAPACITY.
2. 2,100 USABLE GALLON UL142 SUB BASE TANK.
3. PRIME & PAINT BLACK.
4. CUSTOMER TO VERIFY STUB UP, MOUNTING HOLES & FITTING LOCATIONS.
5. DRY CONTACT FLOAT LEVEL SWITCHES.
6. CONTAINMENT BASIN LEAK DETECTION.
7. MORRISON VENTS REQUIRED.

UL FILE:	46187
CLASS:	EVFT
TOTAL TANK CAPACITY:	2,520 gallons
USABLE CAPACITY:	2,100 gallons
SECONDARY CONTAINMENT:	307 gallons
RUN TIME @ FULL LOAD:	83.57 hours
RUN TIME @75% LOAD:	62.44 hours
GALLONS PER IN. OF DEPTH:	251.55 gallons
TANK WEIGHT (DRY):	11,700 lbs

ENCLOSURE NOTES:

1. 3" 14 GA GALVANNEAL WALL PANELS.
2. UL2200, IBC, & SEISMIC CERTIFICATION.
3. S.S. DOOR HARDWARE & HINGES.
4. ENCLOSURE DOORS W/ KASON STYLE HANDLE.
5. ENCLOSURE EXTERIOR POWDER PAINT COLOR:
   CUSTOMER TO SPECIFY
6. 75DBA @ 50' FREE FIELD.
7. 14" ROOF MOUNTED EXHAUST FANS.
8. 120 MPH WIND LOAD.
9. SHIPPING COVERS FOR FIXED INTAKE LOUVERS.
10. ROOF MOUNTED EQUIPMENT TO SHIP LOOSE.

EXHAUST NOTES:

1. EK TO SUPPLY EXTERNALLY MOUNTED 304 S.S. SILENCER, EXHAUST PIPES & RAINCAP.
2. SILENCER CONDENSATE DRAIN W/ BALL VALVE. (SCH 40 PIPE)
3. EXHAUST SYSTEM SKID MOUNTED FOR SHIPPING & MOUNTING.
4. TAILPIPE & RAIN CAP TO SHIP LOOSE.

ELECTRICAL NOTES:

1. 480V 3ϕ 70A PANEL BOARD (BOLT-IN BREAKERS).
2. 30KVA TRANSFORMER (FLOOR MOUNTED).
3. 120/208V 3ϕ 100A PANEL BOARD (BOLT-IN BREAKERS).
4. (4X) LED STRIP LIGHT (VAPOR TIGHT) ON (2X) 3-WAY SWITCHES W/ (2X) GFCI RECEPTACLES.
5. (2X) EMERGENCY LIGHTING W/ BATTERY BACKUP.
6. EK TO INSTALL, WIRE, & TERMINATE CUMMINS SUPPLIED BATTERY CHARGER.
7. ENCLOSURE SPACE HEATERS.
8. 120V INTAKE DAMPERS.
9. 120V 14" ROOF MOUNTED EXHAUST FAN.
10. (4X) EXTERNAL LED LIGHTS W/ PHOTOCELL.
11. EXTERNAL E-STOP STATION.
12. 24VDC HIGH ALARM PANEL (90/70 RESET).
13. 24VDC AMBER, GREEN, & RED BEACON/ALARM. (INSTALLATION BRACKET ON EACH SIDE OF ENCLOSURE.)

GENSET NOTES:

GENSET: QSX15-G9 500KW

COMBUSTION AIR:	1,470 cfm
RADIATOR COOLING AIR:	25,000 cfm
RADIATOR OA WIDTH:	52.45 in
RADIATOR OA HEIGHT:	49.67 in
RADIATOR CORE WIDTH:	49.22 in
RADIATOR CORE HEIGHT:	46.07 in
EXHAUST TEMP:	901 °F
EXHAUST FLOW:	3,625 cfm

GENSET DRAWING:
ds47014182_Sht_1.dxf
ds47014182_Sht_2.dxf
ds47014182_Sht_3.dxf
ds47014182_Sht_4.dxf

ISOLATOR DRAWING:
DFEK.pdf

SHIP LOOSE ITEMS:

1. EXHAUST SKID.

SHEET INDEX:

1	TITLE SHEET
2	TANK TOP VIEW
3	TANK FRONT VIEW
4	ENCLOSURE END VIEWS
5	ENCLOSURE RIGHT ELEVATION
6	ENCLOSURE LEFT ELEVATION
7	ENCLOSURE TOP VIEW
8	ENCLOSURE ROOF VIEW
9	SHIPPING DETAILS
10	ELECTRICAL DIAGRAM
11	SUGGESTED PAD LAYOUT
12	DETAIL PAGE 1
13	DETAIL PAGE 2
14	DETAIL PAGE 3
15	RIGGING

JOB NAME: MICROSOFT ADMIN BUILDING 500KW
PART NUMBER: SAE-G2-ULSB-1235 (WALK-IN)
APPROVAL SIGNATURE:
DATE:

GENERATOR: QSX15-G9 500KW

DRAWN BY: SLL	SCALE: NTS

QUOTE: 17473-REV A

REV DATE: 12-12-2023

JOB NUMBER: 29125	REV: C

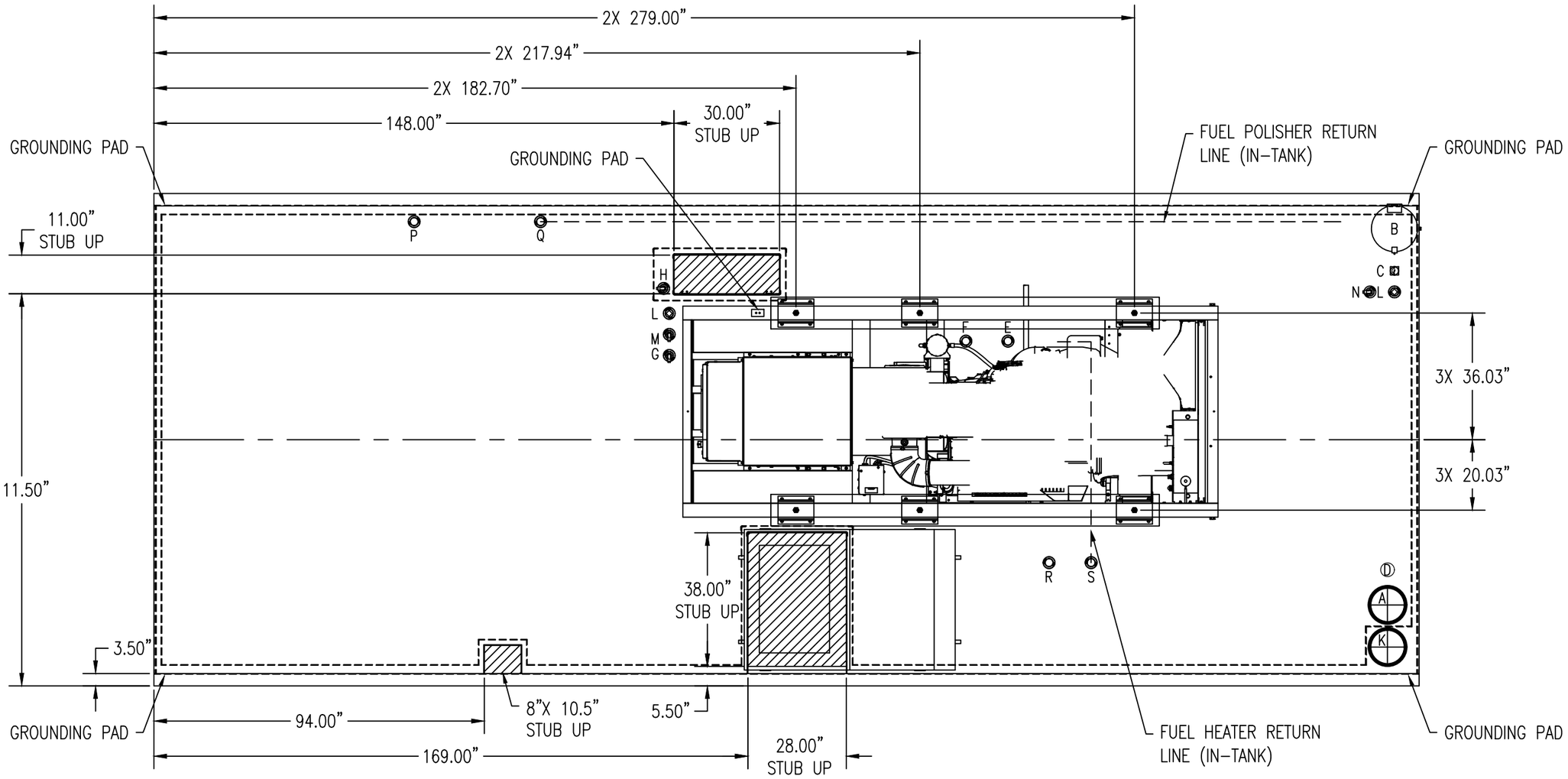
SHEET: 1 OF 15

FUEL TANK FITTINGS

ITEM #	PART #	QTY	LABEL'S	DESCRIPTION
Ⓐ	8" NPT	1	EMERGENCY VENT	8" NPT PRIMARY EMERGENCY VENT – MORRISON
Ⓑ	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 SIGHT FUEL LEVEL GAUGE
Ⓓ	2" NPT	1	VENT	2" NPT MUSHROOM VENT
Ⓔ	2" NPT	1	ENGINE FUEL RETURN	1/2" PIPE W/ DOUBLE TAP
Ⓕ	2" NPT	1	ENGINE FUEL SUPPLY	1/2" PIPE W/ DOUBLE TAP & CHECK VALVE
Ⓖ	2" NPT	1	ENGINE CONTROL FLOAT CLUSTER	2" NPT ENGINE CONTROL FLOAT CLUSTER (95% & 50%)
Ⓗ	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 15)
Ⓚ	8" NPT	1	EMERGENCY VENT	8" NPT SECONDARY EMERGENCY VENT – MORRISON
Ⓛ	2" NPT	2	EXTRA FITTING	2" NPT EXTRA FITTINGS
Ⓜ	2" NPT	1	ENGINE CONTROL FLOAT CLUSTER	2" NPT ENGINE CONTROL FLOAT CLUSTER (90%)
Ⓝ	2" NPT	1	HIGH ALARM BOX FLOAT CLUSTER	2" NPT FUEL ALARM CLUSTER (90% & 70% RESET)
Ⓟ	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



TANK TOP VIEW

MICROSOFT ADMIN BUILDING 500KW

SAE-G2-ULSB-1235 (WALK-IN)

JOB NAME:

PART NUMBER:

APPROVAL SIGNATURE:

DATE:

GENERATOR: QSX15-G9 500KW

DRAWN BY: SLL

SCALE: NTS

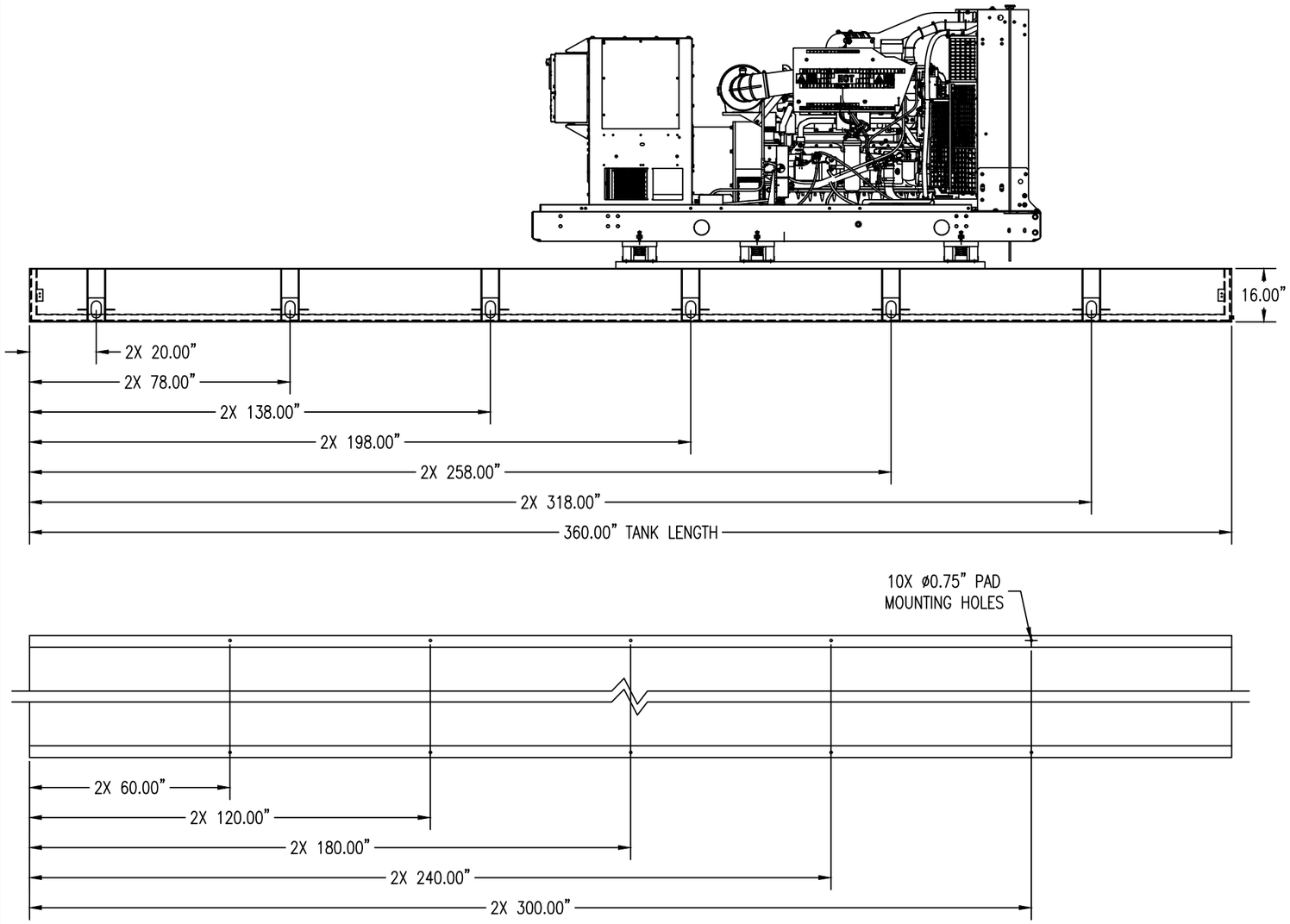
QUOTE: 17473-REV A

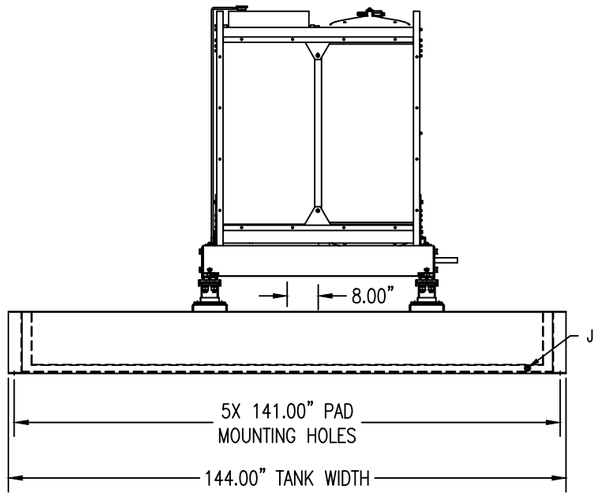
REV DATE: 12-12-2023

JOB NUMBER: 29125

REV: C

SHEET: 2 OF 15





TANK FRONT VIEW

EK

JOB NAME: MICROSOFT ADMIN BUILDING 500KW

PART NUMBER: SAE-G2-ULSB-1235 (WALK-IN)

APPROVAL SIGNATURE:

DATE:

GENERATOR: QSX15-G9 500KW

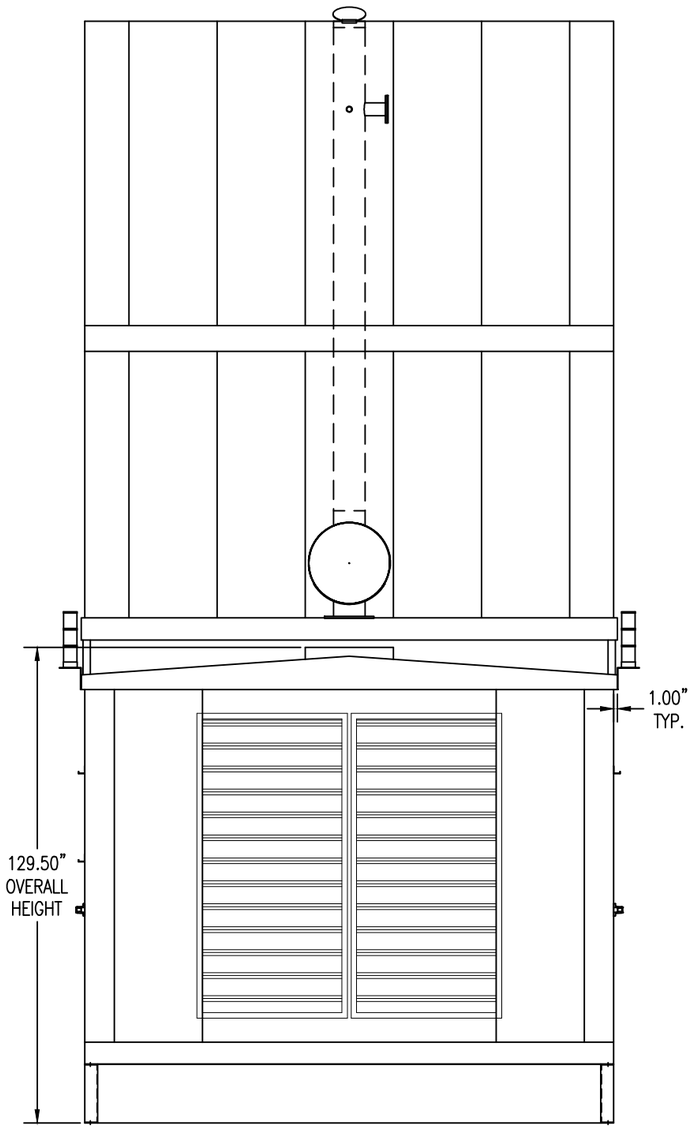
DRAWN BY:	SCALE:
SLL	NTS

QUOTE: 17473-REV A

REV DATE: 12-12-2023

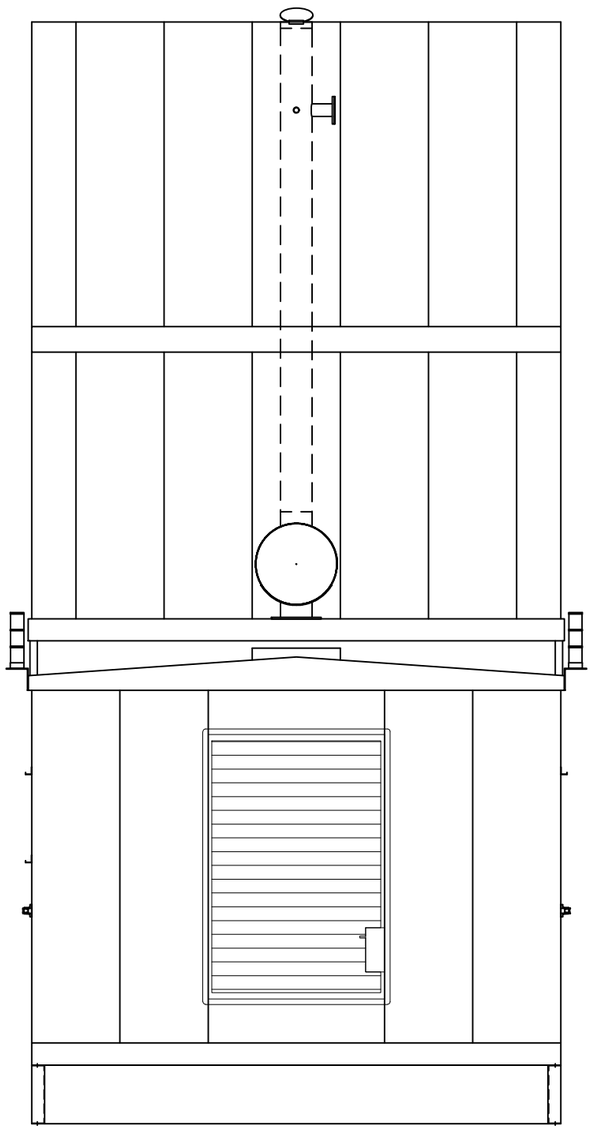
JOB NUMBER:	REV:
29125	C

SHEET: 3 OF 15



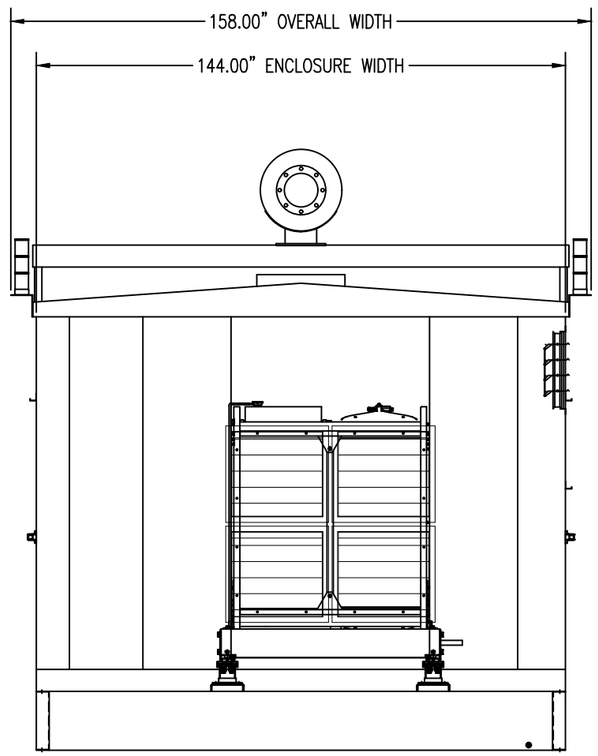
FIXED INTAKE LOUVERS

SECTION A
Scale: N.T.S.
A
SHT 5



120V MOTORIZED INTAKE DAMPERS
SPRING OPEN/ MOTOR CLOSE
(PLENUM REMOVED FOR CLARITY)

SECTION B
Scale: N.T.S.
B
SHT 5



GRAVITY DISCHARGE DAMPERS
(PLENUM REMOVED FOR CLARITY)

SECTION C
Scale: N.T.S.
C
SHT 5

ENCLOSURE END VIEWS

EK

JOB NAME: MICROSOFT ADMIN BUILDING 500KW

PART NUMBER: SAE-G2-ULSB-1235 (WALK-IN)

DATE:

APPROVAL SIGNATURE:

GENERATOR: QSX15-G9 500KW

DRAWN BY: SLL

SCALE: NTS

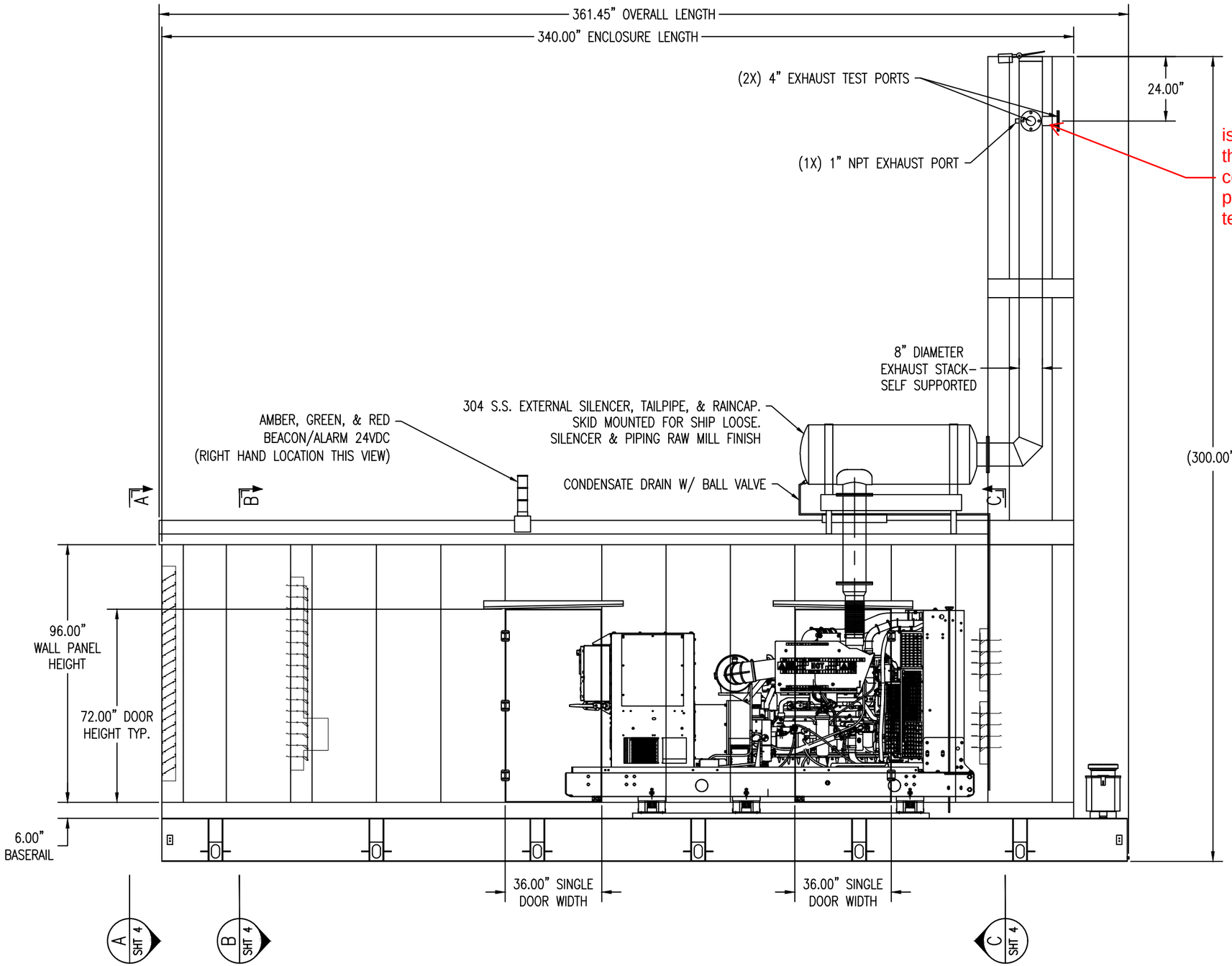
QUOTE: 17473-REV A

REV DATE: 12-12-2023

JOB NUMBER: 29125

REV: C

SHEET: 4 OF 15



RIGHT SIDE ELEVATION

MICROSOFT ADMIN BUILDING 500KW

SAE-G2-ULSB-1235 (WALK-IN)

JOB NAME:

PART NUMBER:

APPROVAL SIGNATURE:

DATE:

GENERATOR: QSX15-G9 500KW

DRAWN BY: SLL

SCALE: NTS

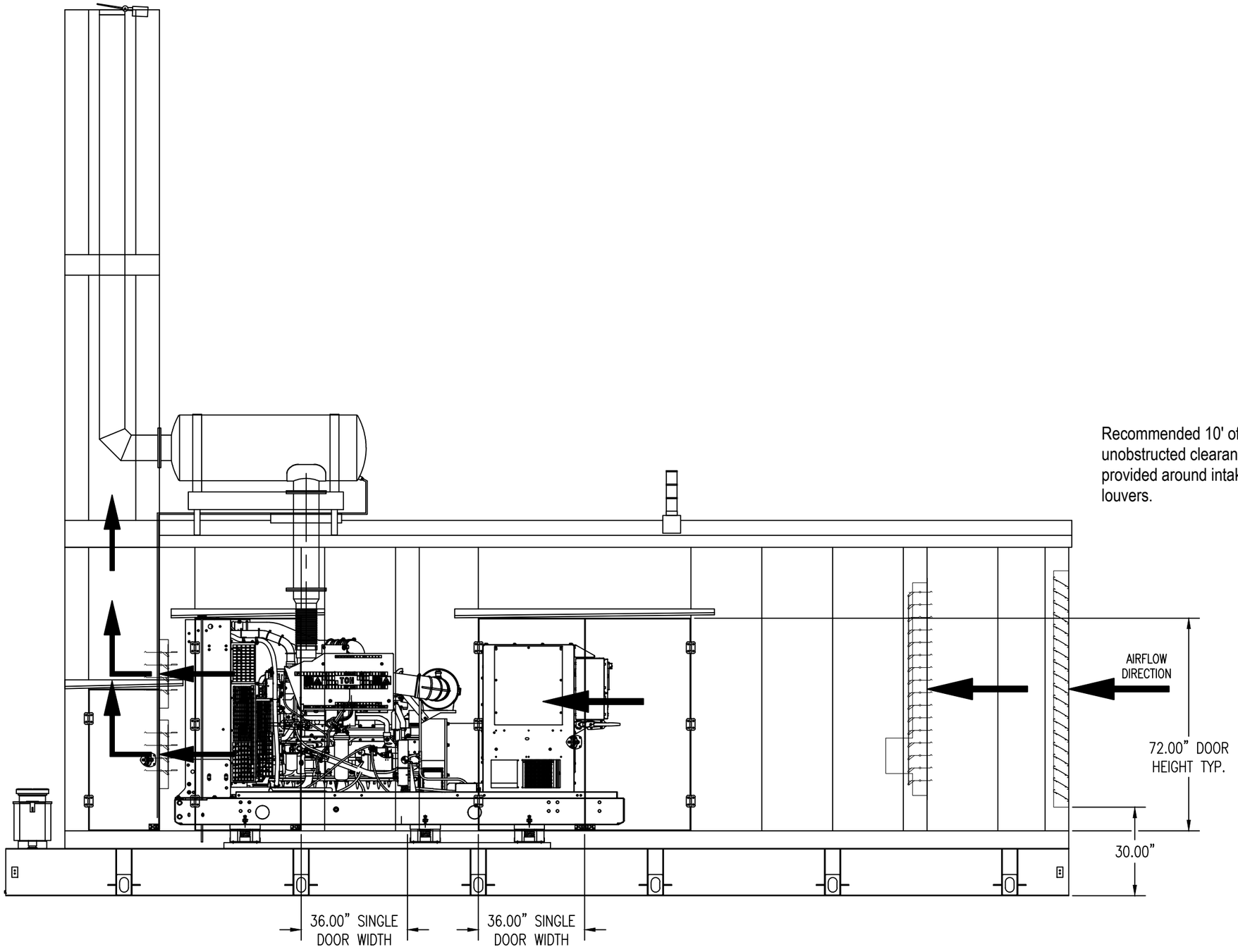
QUOTE: 17473-REV A

REV DATE: 12-12-2023

JOB NUMBER: 29125

REV: C

SHEET: 5 OF 15



Recommended 10' of unobstructed clearance is provided around intake louvers.

LEFT SIDE ELEVATION

MICROSOFT ADMIN BUILDING 500KW

SAE-G2-ULSB-1235 (WALK-IN)

JOB NAME:

PART NUMBER:

APPROVAL SIGNATURE:

DATE:

GENERATOR: QSX15-G9 500KW

DRAWN BY: SLL

SCALE: NTS

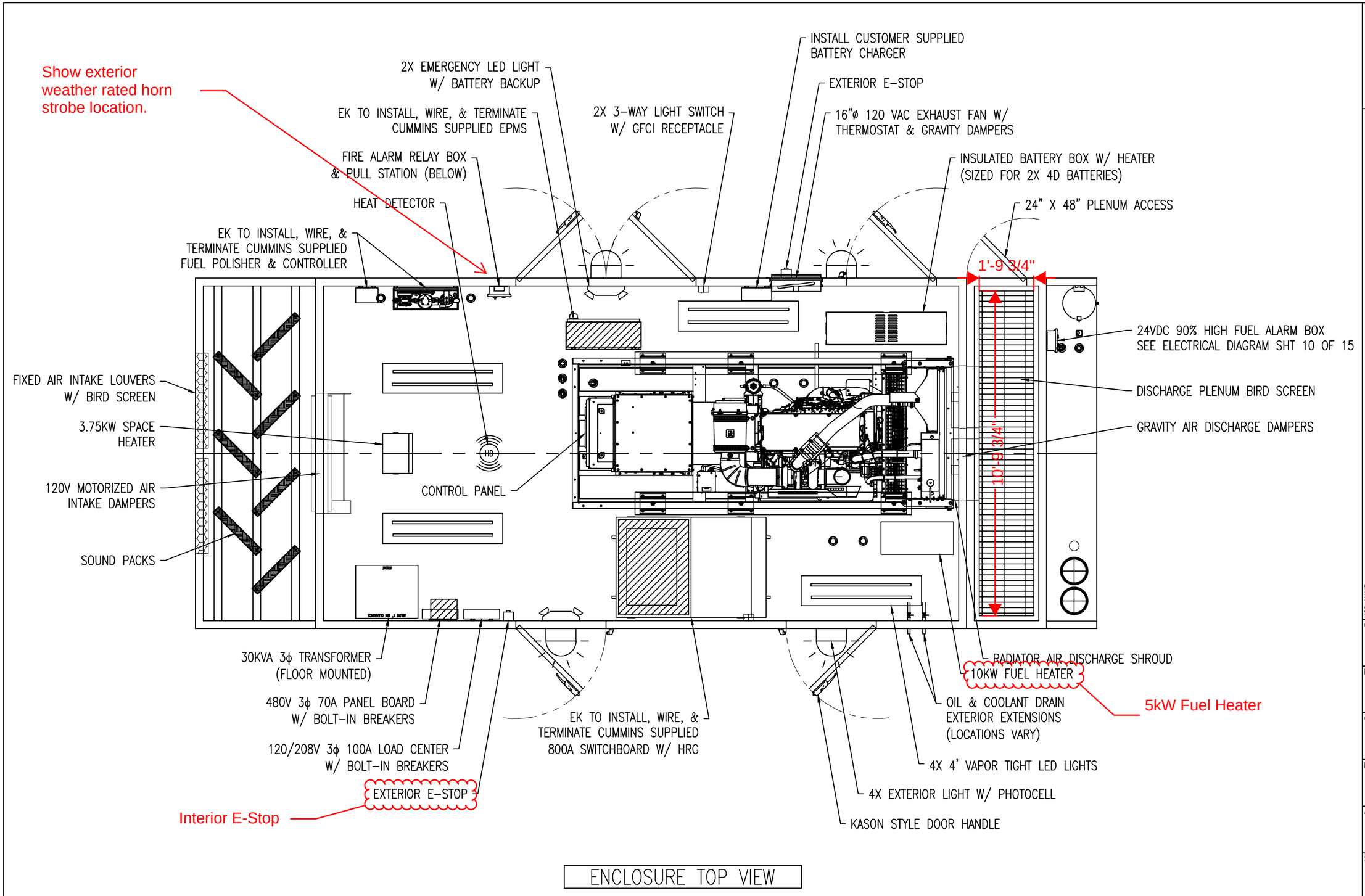
QUOTE: 17473-REV A

REV DATE: 12-12-2023

JOB NUMBER: 29125

REV: C

SHEET: 6 OF 15



ENCLOSURE TOP VIEW

EK

JOB NAME: MICROSOFT ADMIN BUILDING 500KW

PART NUMBER: SAE-G2-ULSB-1235 (WALK-IN)

APPROVAL SIGNATURE:

DATE:

GENERATOR: QSX15-G9 500KW

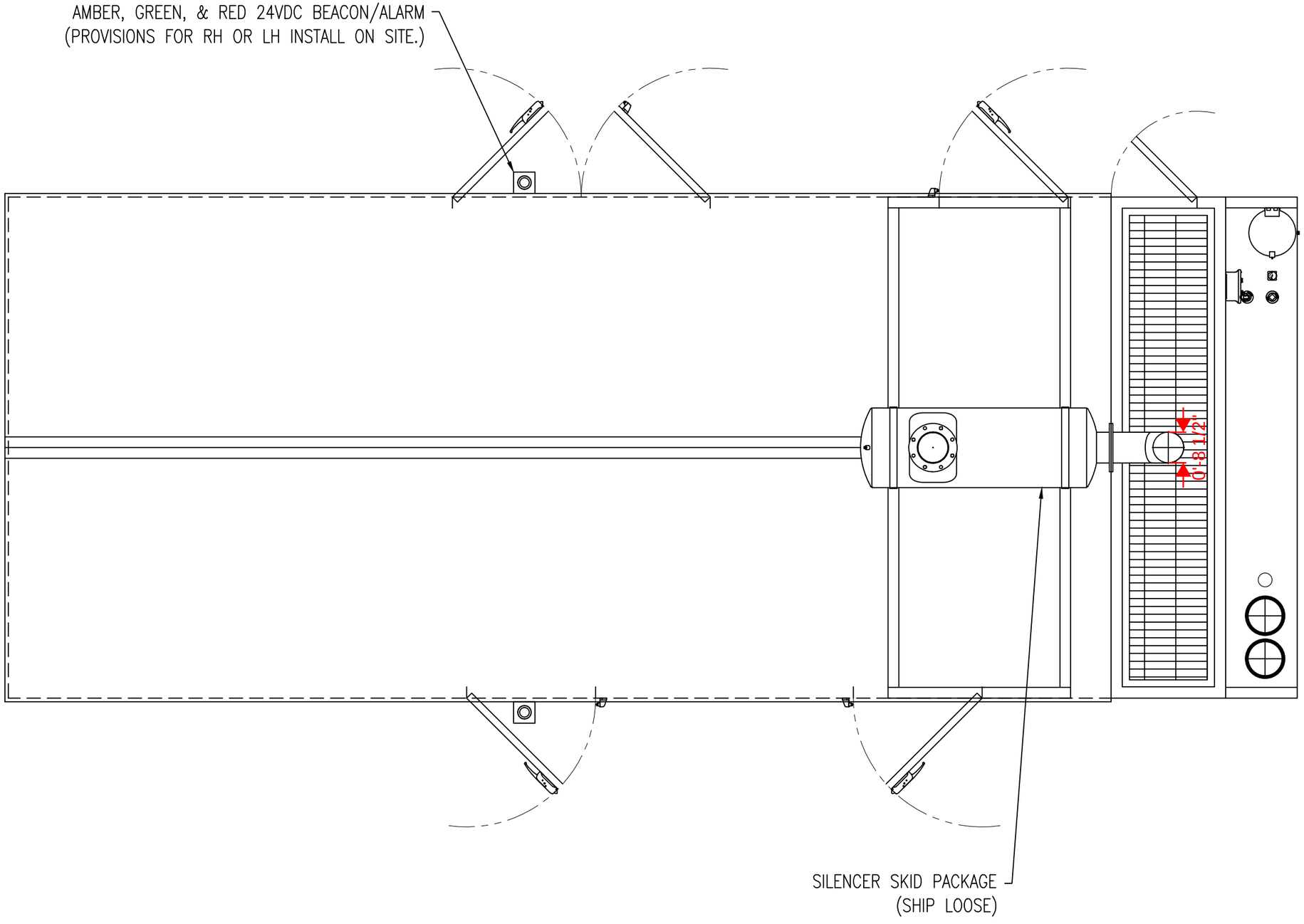
DRAWN BY:	SCALE:
SLL	NTS

QUOTE: 17473-REV A

REV DATE: 12-12-2023

JOB NUMBER:	REV:
29125	C

SHEET: 7 OF 15



ENCLOSURE TOP VIEW

MICROSOFT ADMIN BUILDING 500KW

SAE-G2-ULSB-1235 (WALK-IN)

JOB NAME:

PART NUMBER:

APPROVAL SIGNATURE:

DATE:

GENERATOR: QSX15-G9 500KW

DRAWN BY: SLL

SCALE: NTS

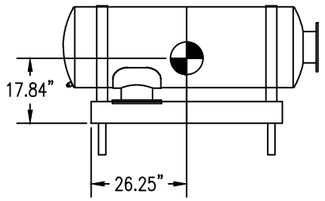
QUOTE: 17473-REV A

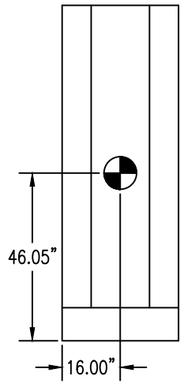
REV DATE: 12-12-2023

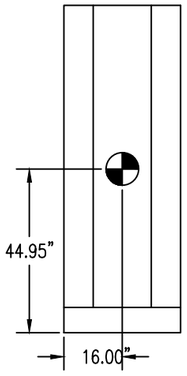
JOB NUMBER: 29125

REV: C

SHEET: 8 OF 15

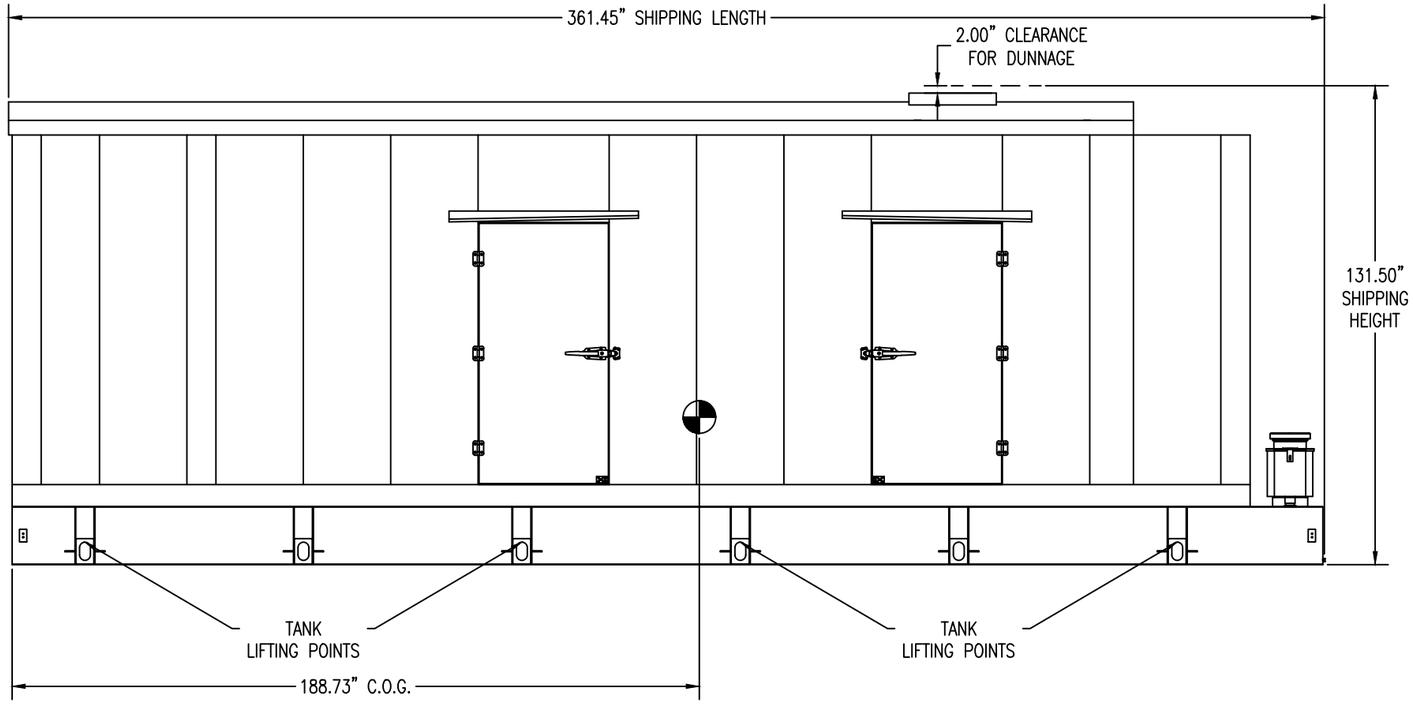


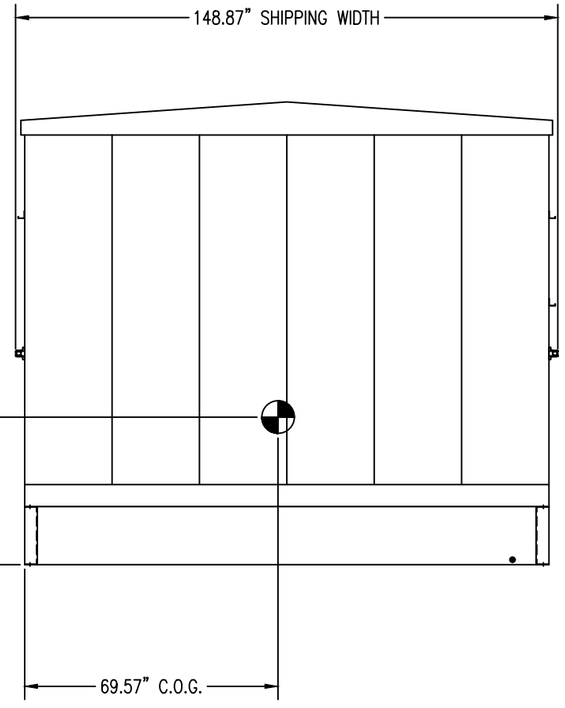




ESTIMATED WEIGHTS:

TANK (DRY):	11,700 lbs.
GENSET (DRY):	9,535 lbs.
ENCLOSURE:	9,300 lbs.
EXHAUST:	514 lbs.





PLANNED SHIPPING CONFIGURATION

JOB NAME: MICROSOFT ADMIN BUILDING 500KW
PART NUMBER: SAE-G2-ULSB-1235 (WALK-IN)
APPROVAL SIGNATURE:
DATE:

GENERATOR: QSX15-G9 500KW

DRAWN BY:	SCALE:
SLL	NTS

QUOTE: 17473-REV A

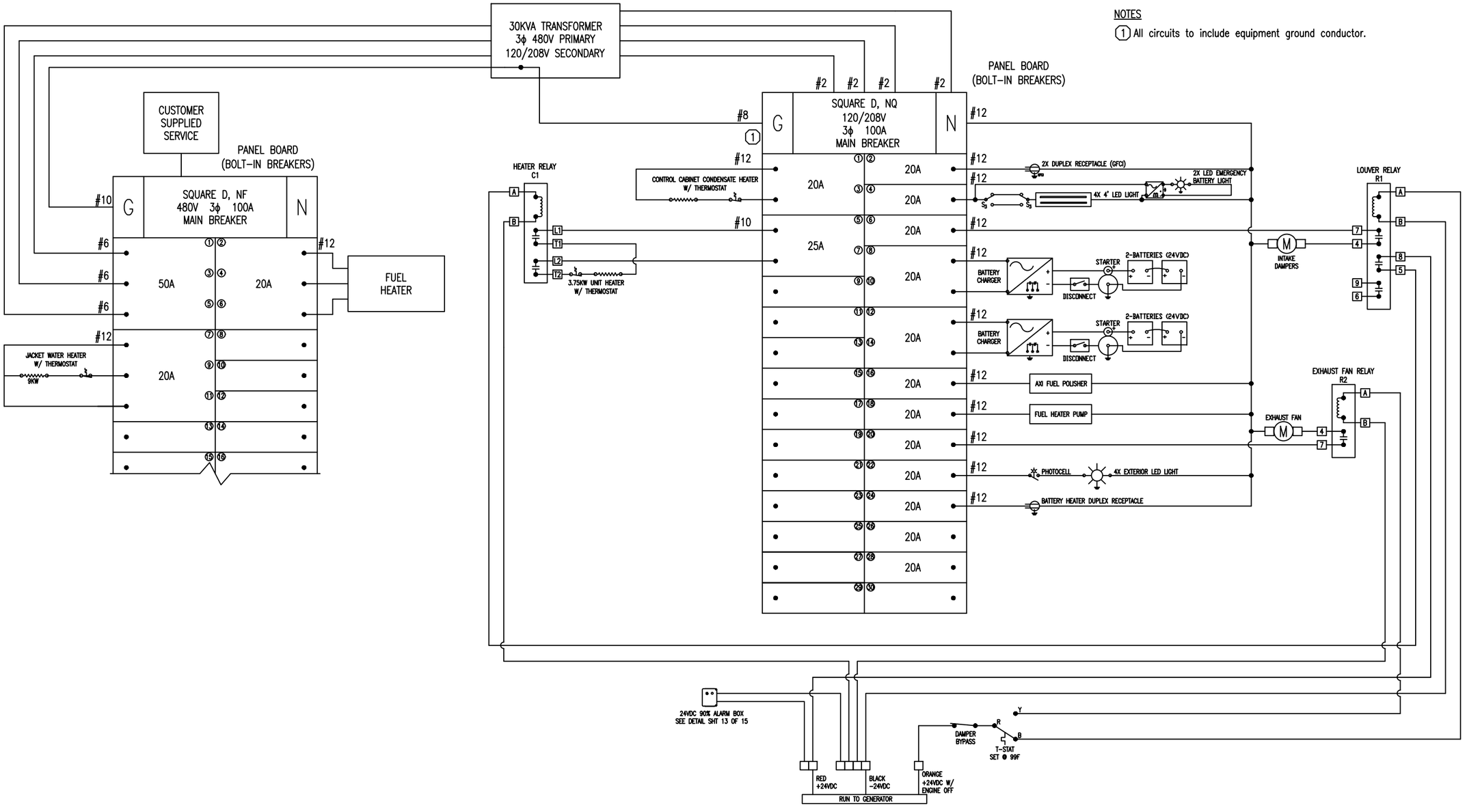
REV DATE: 12-12-2023

JOB NUMBER:	REV:
29125	C

SHEET: 9 OF 15

NOTES

(1) All circuits to include equipment ground conductor.



ELECTRICAL DIAGRAM

JOB NAME: MICROSOFT ADMIN BUILDING 500KW

PART NUMBER: SAE-G2-ULSB-1235 (WALK-IN)

APPROVAL SIGNATURE:

DATE:

GENERATOR: QSX15-G9 500KW

DRAWN BY: SLL

SCALE: NTS

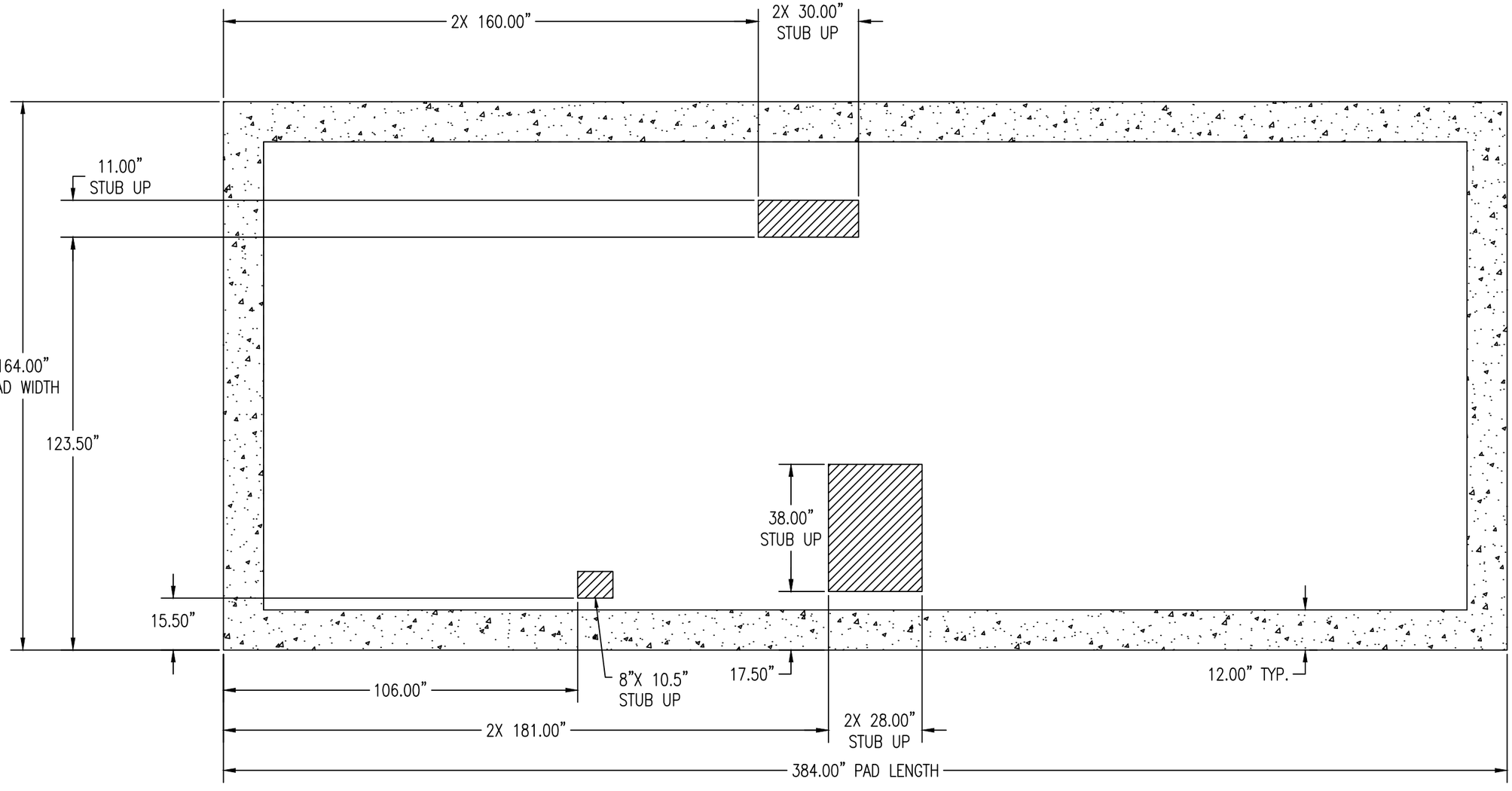
QUOTE: 17473-REV A

REV DATE: 12-12-2023

JOB NUMBER: 29125

REV: C

SHEET: 10 OF 15



SUGGESTED PAD LAYOUT

JOB NAME: MICROSOFT ADMIN BUILDING 500KW

PART NUMBER: SAE-G2-ULSB-1235 (WALK-IN)

DATE:

APPROVAL SIGNATURE:

GENERATOR: QSX15-G9 500KW

DRAWN BY: SLL

SCALE: NTS

QUOTE: 17473-REV A

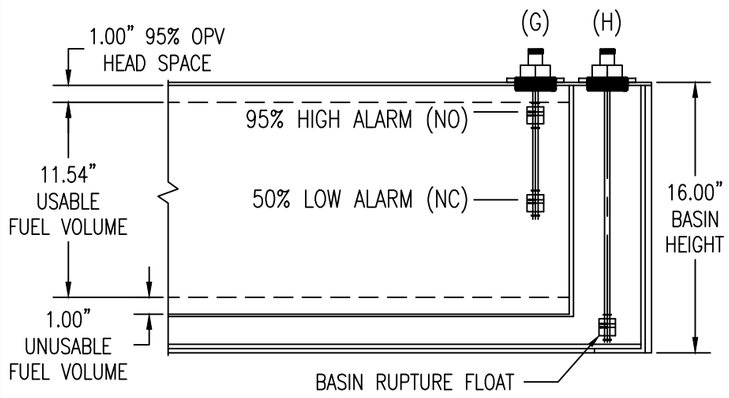
REV DATE: 12-12-2023

JOB NUMBER: 29125

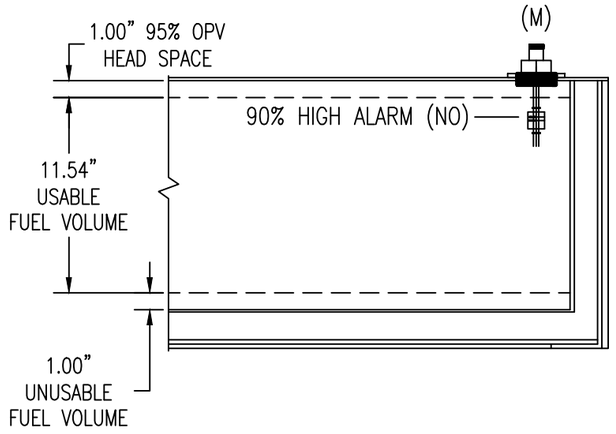
REV: C

SHEET: 11 OF 15

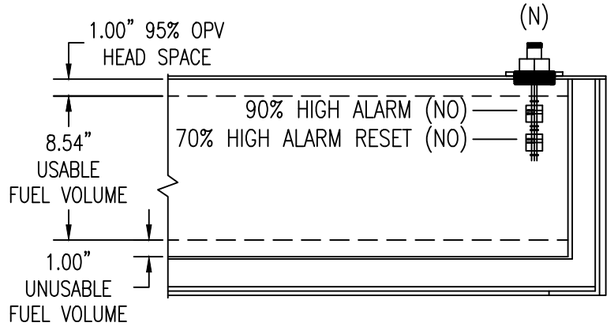
ENGINE CONTROL FLOAT DETAILS (NTS)



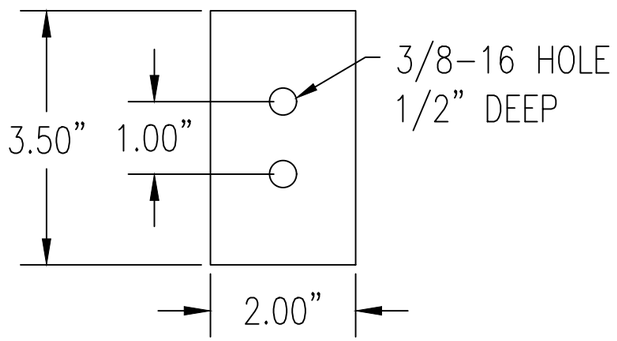
ENGINE CONTROL FLOAT DETAILS (NTS)



HIGH ALARM BOX FLOAT DETAILS (NTS)

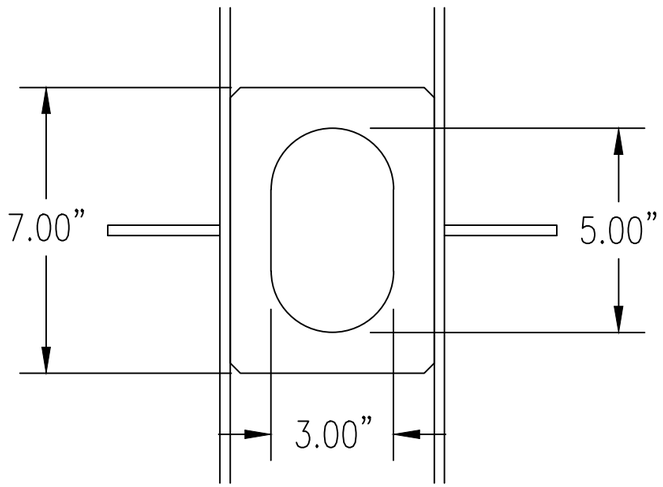


GROUNDING PAD DETAILS (NTS)



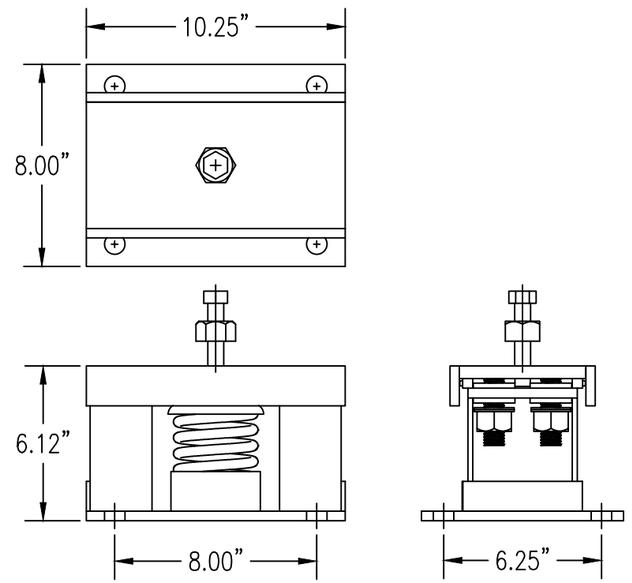
316 STAINLESS STEEL

BASIN LIFTING LUG DETAILS (NTS)



LIFTING LUG CAPACITY: 16,200 LBS

ISOLATOR DETAILS (NTS)



JOB NAME: MICROSOFT ADMIN BUILDING 500KW

PART NUMBER: SAE-G2-ULSB-1235 (WALK-IN)

APPROVAL SIGNATURE:

DATE:

GENERATOR: QSX15-G9 500KW

DRAWN BY:	SCALE:
SLL	NTS

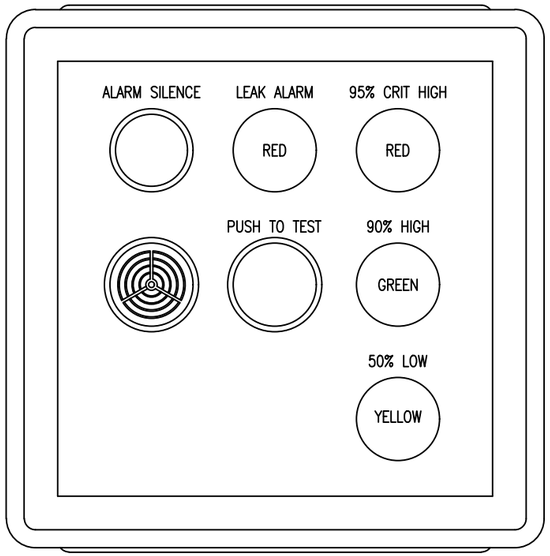
QUOTE: 17473-REV A

REV DATE: 12-12-2023

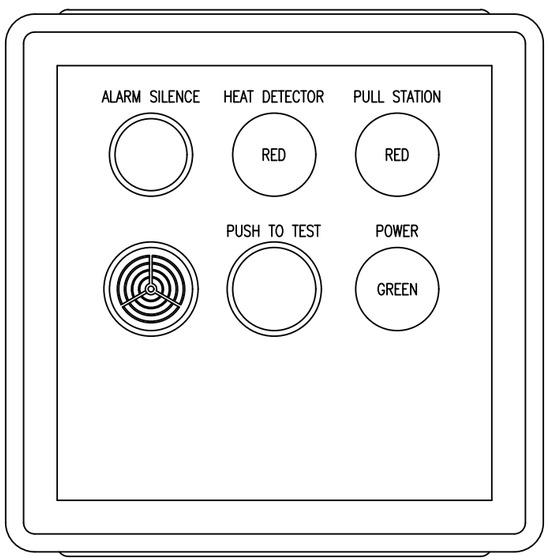
JOB NUMBER:	REV:
29125	C

SHEET: 12 OF 15

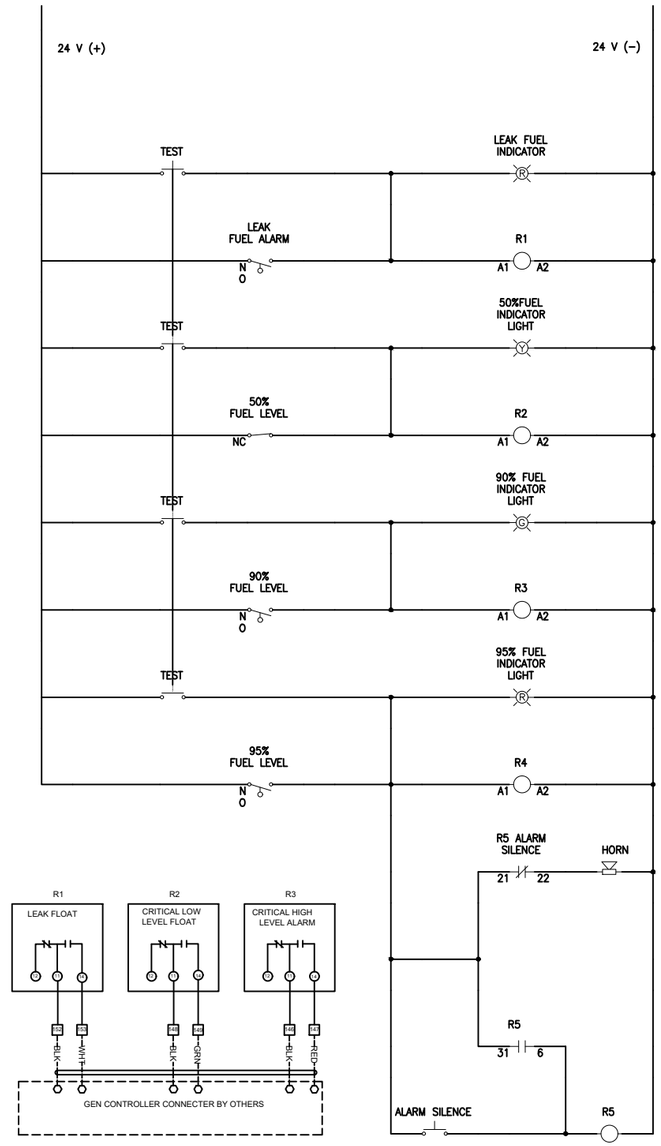
HIGH FUEL ALARM BOX DETAILS
24 VDC / 90%CH, 90%H, 50%L & LEAK (NTS)



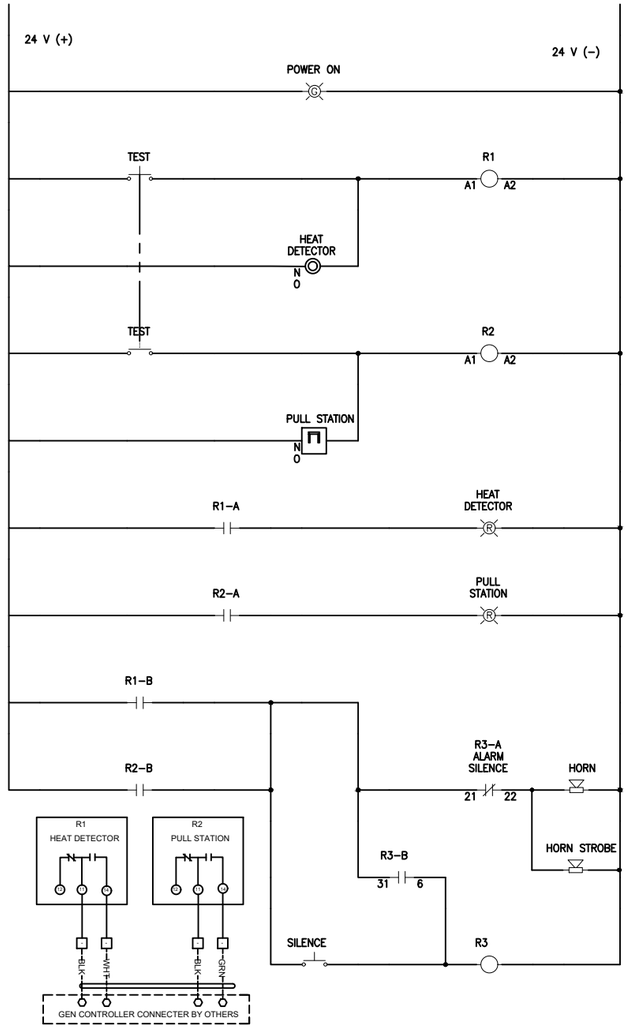
FIRE ALARM BOX DETAILS
24 VDC / HEAT DETECTOR & PULL STATION (NTS)



HIGH FUEL ALARM BOX SCHEMATIC
24VDC/95% C.HIGH, 90% HIGH, 50% C.LOW, & LEAK ALARM
(NTS)



FIRE ALARM BOX SCHEMATIC
24VDC HEAT DETECTOR & PULL STATION
(NTS)



JOB NAME: MICROSOFT ADMIN BUILDING 500KW

PART NUMBER: SAE-G2-ULSB-1235 (WALK-IN)

APPROVAL SIGNATURE:

DATE:

GENERATOR: QSX15-G9 500KW

DRAWN BY:	SCALE:
SLL	NTS

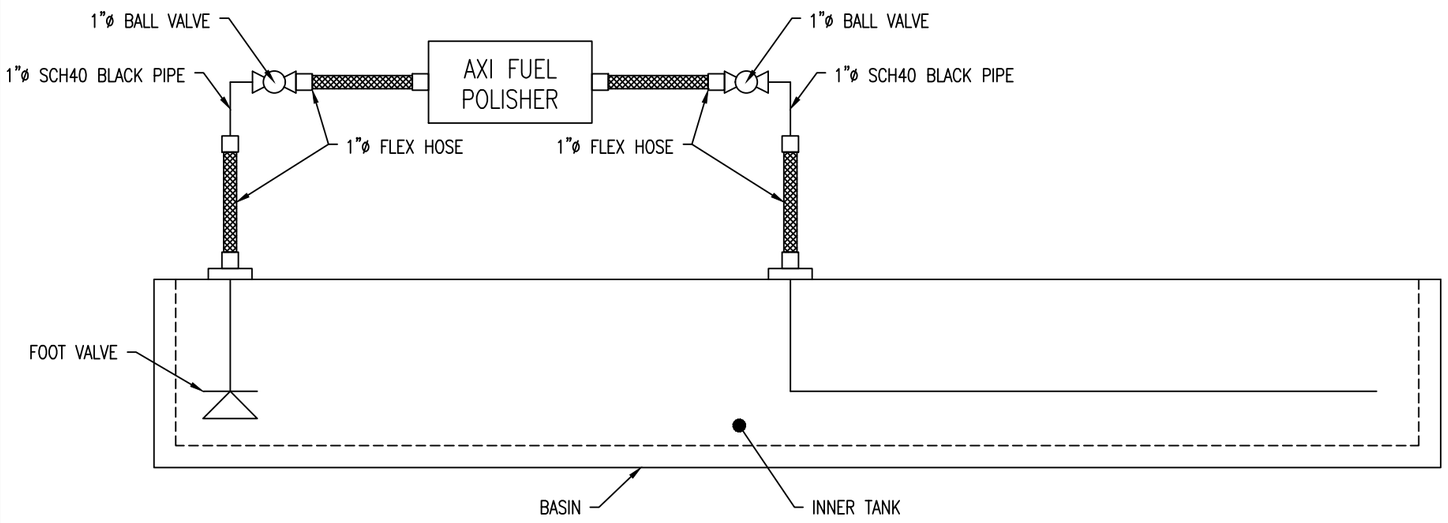
QUOTE: 17473-REV A

REV DATE: 12-12-2023

JOB NUMBER:	REV:
29125	C

SHEET: 13 OF 15

FUEL POLISHER LINE DIAGRAM
TYPICAL INSTALLATION
(NTS)



MICROSOFT ADMIN BUILDING 500KW

JOB NAME:

SAE-G2-ULSB-1235 (WALK-IN)

PART NUMBER:

DATE:

APPROVAL SIGNATURE:

GENERATOR: QSX15-G9 500KW

DRAWN BY: SLL

SCALE: NTS

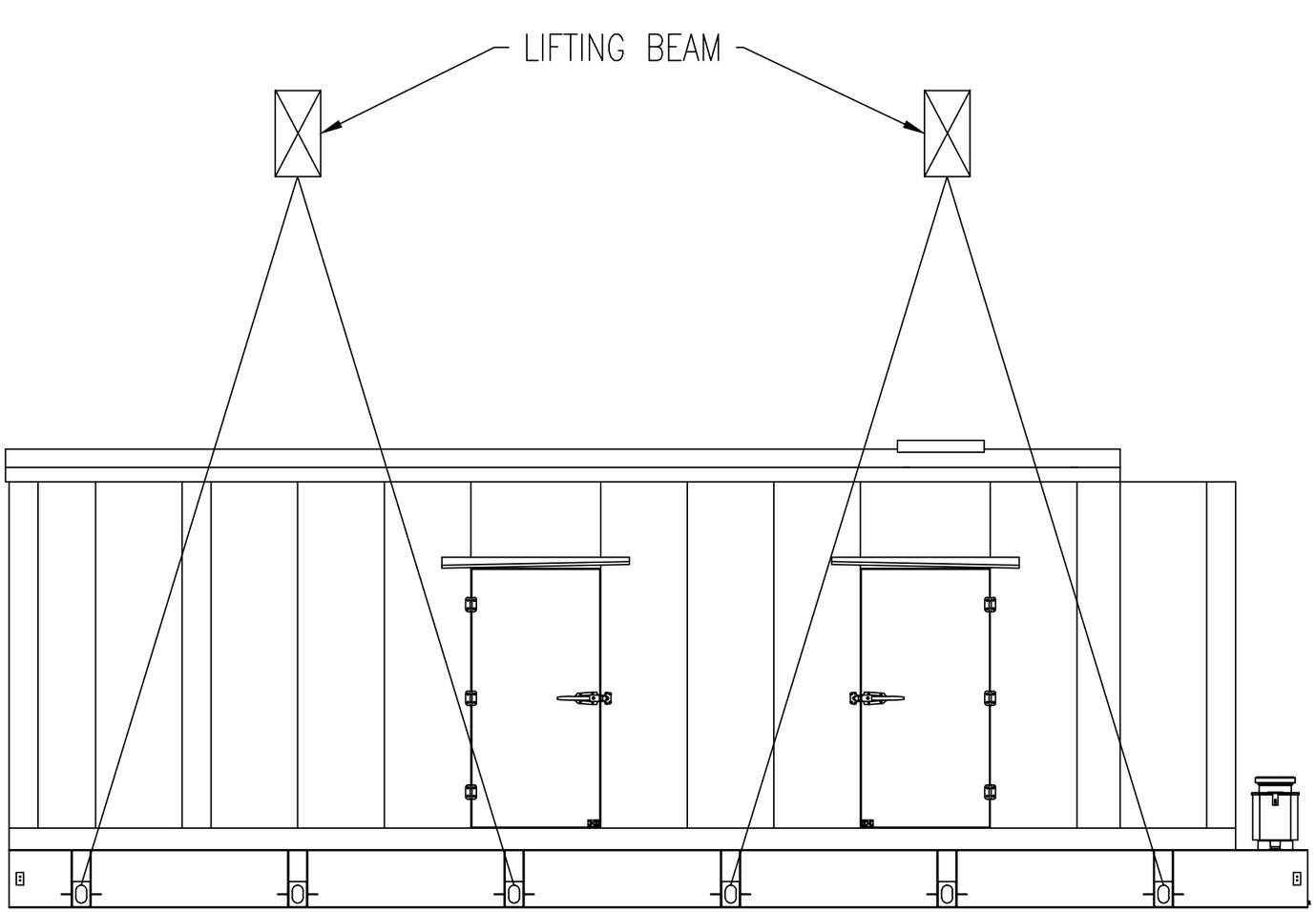
QUOTE: 17473-REV A

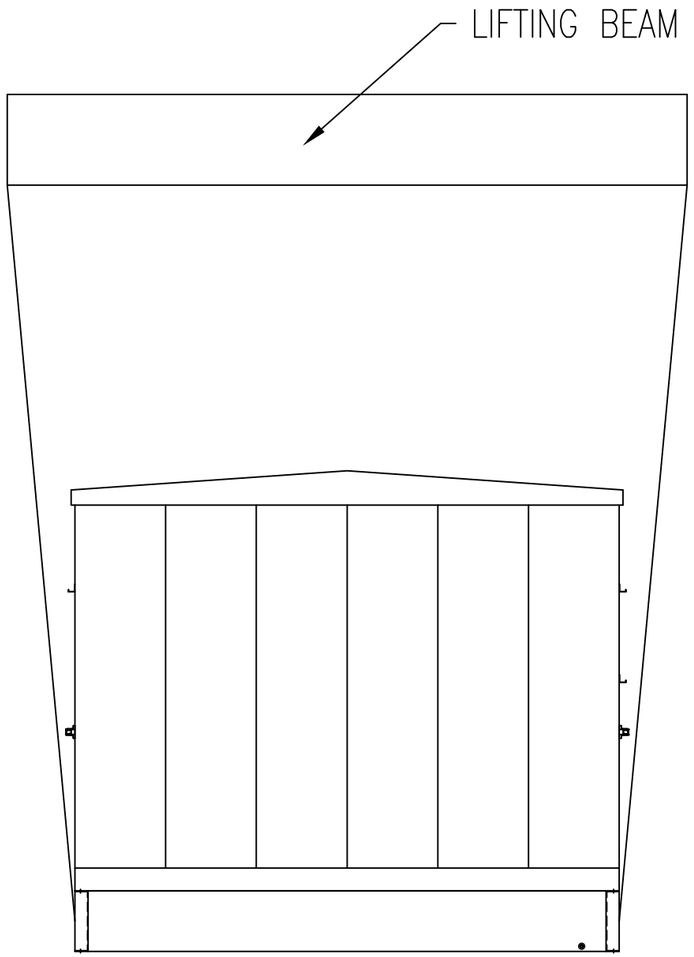
REV DATE: 12-12-2023

JOB NUMBER: 29125

REV: C

SHEET: 14 OF 15





RIGGING DIAGRAM IS FOR REFERENCE ONLY.

JOB NAME: MICROSOFT ADMIN BUILDING 500KW

PART NUMBER: SAE-G2-ULSB-1235 (WALK-IN)

APPROVAL SIGNATURE:

DATE:

GENERATOR: QSX15-G9 500KW

DRAWN BY: SLL

SCALE: NTS

QUOTE: 17473-REV A

REV DATE: 12-12-2023

JOB NUMBER: 29125

REV: C

SHEET: 15 OF 15

CLARKE®

P115 and P236

Rating Specific Emissions Data

Nameplate Rating Information

Clarke Model	**JU6H-UFADP0**
Power Rating (BHP/kW)	**209/156**
Certified Speed (RPM)	**2100**

Refer to **Rating Data** section on page 2 for emissions output values

Rating Specific Emissions Data - John Deere Power Systems

Rating Data

Rating	6068HFC48B	
Certified Power(kW)	236	
Rated Speed	2400	
Vehicle Model Number	OEM (Clarke Fire Pump-Emergency)	
Units	g/kW-hr	g/hp-hr
NOx	3.43	2.56
HC	0.09	0.07
NOx + HC	N/A	N/A
Pm	0.11	0.08
CO	0.8	0.6

Certificate Data

Engine Model Year	2024
EPA Family Name	RJDXL13.5103
EPA JD Name	650HAA
EPA Certificate Number	RJDXL13.5103-008
CARB Executive Order	
Parent of Family	6135HF485A
Units	g/kW-hr
NOx	3.31
HC	0.11
NOx + HC	N/A
Pm	0.10
CO	0.6

* The emission data listed is measured from a laboratory test engine according to the test procedures of 40 CFR 89 or 40 CFR 1039, as applicable. The test engine is intended to represent nominal production hardware, and we do not guarantee that every production engine will have identical test results. The family parent data represents multiple ratings and this data may have been collected at a different engine speed and load. Emission results may vary due to engine manufacturing tolerances, engine operating conditions, fuels used, or other conditions beyond our control.

This information is property of Deere & Company. It is provided solely for the purpose of obtaining certification or permits of Deere powered equipment. Unauthorized distribution of this information is prohibited.

Emissions Results by Rating run on Jan-17-2024

Appendix E

MALFUNCTION AND PREVENTION ABATEMENT PLAN FOR SCR

Malfunction Prevention and Abatement Plan

Prepared for:

Microsoft Corporation (MKE Area 2)
Mount Pleasant, Wisconsin
Racine County

Prepared by:

Stantec Consulting Services Inc.
2080 Wooddale Drive
Suite 100
Woodbury, Minnesota 55125

August 30, 2024

MALFUNCTION PREVENTION AND ABATEMENT PLAN

MICROSOFT CORPORATION – MKE Area 2
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 Area 2 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
2080 Wooddale Drive, Suite 100
Woodbury, MN 55125

Stantec

August 30, 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 MKE Area 2 Data Centers, located on approximately 792 acres north of Braun Road, east of Wisconn Valley Way, west of County Road H, and south of Durance Avenue in Mount Pleasant, Wisconsin. The proposed emergency engines P85-P114, P116-P135, P137-P202, and P204-P233 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.

Matt Kilpo

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Project Manager – Air Quality
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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