**From:** Joshua Rhoads
**To:** APC Permitting
**Cc:** Julie Verissimo
**Subject:** Smoglog Help - AESC US LLC (75-0851)
**Date:** Monday, October 23, 2023 3:03:57 PM
**Attachments:** image001.png
Public Version of Application with Engine Data.pdf

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Good afternoon,

When you have the opportunity, please update the following in Smoglog:

1. Add the emission points from the table below to facility 75-0851
2. Create an exempt/insig. activity log for 75-0851, attach points 14 through 24, and upload the attached application to that new permit page.
3. Attach point 02 and points 08 through 13 to 75-0851/981359

| Point # | Point Description |
|---|---|
| 08 | Four (4) Electric Baking Ovens (Stanford) |
| 09 | Electrolyte Injection (Stanford) |
| 10 | Degassing/Formation (Smyrna LFP) |
| 11 | Degassing/Formation (Stanford) |
| 12 | Sealers and Adhesives (Smyrna LFP) |
| 13 | Sealers and Adhesives (Stanford) |
| 14 | Electrode Preparation (Smyrna LFP) |
| 15 | Electrode Preparation (Stanford) |
| 16 | Stacking/Winding (Smyrna LFP) |
| 17 | Stacking/Winding (Stanford) |
| 18 | Cell Assembly (Smyrna LFP) |
| 19 | Cell Assembly (Stanford) |
| 20 | Module and Pack Assembly (Smyrna LFP) |
| 21 | Module and Pack Assembly (Stanford) |
| 22 | Eleven (11) Natural Gas-fired Dehumidifier Units |
| 23 | Twenty-two (22) Natural Gas-fired Air Handling Units |
| 24 | 750 kW Diesel-fired Emergency Generator Set |

Let me know if you have any questions.

Thank you,
Joshua Rhoads

TN Department of Environment & Conservation

**Joshua Rhoads** | Environmental Protection Specialist 2
Air Pollution Control
Tennessee Tower, 15th Floor
312 Rosa L Parks Ave., Nashville, TN 37243
p. 615-532-0547
Joshua.Rhoads@tn.gov
https://www.tn.gov/environment/program-areas/apc-air-pollution-control-home.html

| | |
|---|---|
| **From:** | Air.Pollution Control |
| **To:** | APC Permitting |
| **Subject:** | FW: Submittal Air Application for Envision AESC US, Emission Source 75-0851 |
| **Date:** | Tuesday, May 2, 2023 3:44:55 PM |
| **Attachments:** | image001.png<br>Public Version of Envision Application.pdf |

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**From:** John Shipp <JShipp@Ensafe.com>
**Sent:** Tuesday, May 2, 2023 2:38 PM
**To:** Air.Pollution Control <Air.Pollution.Control@tn.gov>
**Cc:** Cross, John <John.Cross@envision-aesc.com>; McIndoo, Logan <Logan.McIndoo@envision-aesc.com>; Gurel, Jim <Jim.Gurel@envision-aesc.com>; Bry Roberson <broberson@Ensafe.com>; John Fuss <John.Fuss@tn.gov>; Julie Verissimo <Julie.Verissimo@tn.gov>
**Subject:** [EXTERNAL] Submittal Air Application for Envision AESC US, Emission Source 75-0851



On behalf of Envision AESC US, Emission Source 75-0851 and current permit number 077494, I am submitting the attached public version of an application for the construction of new equipment at the existing facility located at 500 Battery Plant Road, Smyrna Tennessee. A confidential version of the application, along with a Request for Protection Order for Confidential Information form, will be submitted separately in hardcopy.

If you have questions or need additional information, please do not hesitate to contact John Cross at john.cross@envision-aesc.com or (615) 751- 3548 or me at jshipp@ensafe.com or (865) 414-8489.

**John Shipp, PE**
*Senior Project Engineer*
865-414-8489 *cell*

ENSAFE creative thinking | custom solutions

April 25, 2023

Michelle Owenby, Director
Division of Air Pollution Control
Tennessee Department of Environment and Conservation
William R. Snodgrass Tennessee Tower, 15th Floor
312 Rosa L. Parks Avenue
Nashville, TN 37243

**RE: Application for Modification of Air Permit No. 077494, Emission Source Reference No. 75-0851**

Ms. Owenby:

Envision AESC US LLC (Envision) is submitting the attached application to the Division of Air Pollution Control (Division) to modify its existing electric vehicle battery manufacturing plant located at 500 Battery Plant Road, Smyrna, Tennessee (existing Permit No. 077494). Envision proposes to add twenty-five additional processes, some of which are similar to the existing processes at the plant. The new processes will allow Envision to produce different type batteries than those currently being produced at the Smyrna plant.

Envision is requesting some of the information in the application be protected as business confidential information. Accordingly, a public (redacted) version of the application is being submitted electronically to Air.Pollution.Control@tn.gov, while a confidential version of the application, along with a Request for Protection Order for Confidential Information (Form CN-1060), is being submitted in hardcopy to the Division.

If you have any questions concerning our application or if you need additional information, please contact John Cross at John.Cross@envision-aesc.com or (615) 751-3548.

Jeff Deaton

Managing Director

Attachment

# AIR PERMIT MODIFICATION APPLICATION

Envision AESC US
Smyrna, Tennessee

EnSafe Project Number
0888834830

Prepared for:

Envision AESC US
Smyrna, Tennessee

April 2023

220 Athens Way, Suite 410
Nashville, Tennessee 37228
615-255-9300 | 800-588-7962
www.ensafe.com

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## PROJECT DESCRIPTION

Envision AESC US LLC (Envision) proposes a modification to its existing electric vehicle battery manufacturing plant located at 500 Battery Plant Road, Smyrna, Tennessee. Envision is a world-leading battery technology company headquartered in Japan which is committed to research, development, design, manufacture, and sales of high-power batteries and energy-storage batteries. Envision proposes to add twenty-five additional processes, some of which are similar to existing processes at the plant. The new processes will allow Envision to produce different type batteries than those currently being produced at the Smyrna plant. Eventually, most of the existing process equipment will be removed and replaced by the new process equipment.

The new process equipment will be installed in two phases. The first phase is designated Smyrna LFP and the second phase is designated Stanford. During a period of transition, some of the existing process equipment and some new process equipment will be operated at the same time. Figures 1, 2, and 3 show the current process layout, the Phase 1 process layout, and the Phase 2 (which will be the final) process layout, respectively.

Following is a brief description of the new processes proposed for the facility:

### Electrode Preparation

Preparation of the electrode material involves compressing the electrode rolls using a series of rollers and dryers. Emissions from this process are controlled using air filters.

### Stacking

Sheets of electrode material are fully cut and stacked during this process. Cutting the electrode sheets causes trace amounts of material to become airborne. Emissions are controlled using dust collection systems.

### Stack Inspection

Electrode stacks are inspected in an X-ray chamber for proper alignment. For proper inspection, dust is collected from within the chamber and the discharge air is filtered.

### Assembly Line

Tab material is prepared for welding by cutting. Tabs are welded. Cutting and welding of the tab materials leads to trace amounts of the tab materials being released (PM). Emissions will be controlled by dust collectors. Top caps are welded. This welding leads to trace amounts of cap materials (PM) being released. Emissions will be controlled by dust collectors.

### Baking

Cell units are baked to remove any remaining humidity within the cells. Emissions from baking are captured via vacuum pump and treated by activated carbon adsorption.

### 1st Injection and 2nd Injection

Electrolyte is injected into cells during these processes. During injection, emissions from the electrolyte can become airborne. Emissions are controlled using activated carbon adsorption.

### Case Seal Welding

Sealing pin welding results in trace amounts of pin material being emitted. Emissions are controlled using dust collection systems.

### Formation

Electrolyte vapors are off-gassed from the cells during this process. These vapors are captured using vacuum pumps and controlled using activated carbon adsorption.

### Side Plate Gluing and Welding

Thermal glue is applied to the modules for strengthening the overall structure and for inclusion of thermistors for temperature regulation. Side Plates are welded to the cells. This gluing and welding leads to trace amounts of plate material being emitted. Emissions are controlled using dust collection systems.

### Busbar Welding and Gluing

Busbar welding results in trace amounts of busbar material being emitted. Emissions are controlled using dust collection systems. Adhesive is also applied during busbar welding to improve adhesion and strength. Excess adhesive is collected and properly disposed of.

### Electrode Notching

Anode and Cathode sheets are perforated using a laser to improve cutting conditions in later processes. Notching causes trace amounts of Anode and cathode material to become airborne. Emissions are controlled using dust collection systems.

## EMISSIONS SUMMARY

Tables 1 summarizes the existing emissions from both permitted and insignificant emission sources and the proposed potential emissions from the new process equipment.

**Table 1**
**Emissions Summary**

| Emission Source Number/Name | PM (TPY) | $SO_2$ (TPY) | $NO_X$ (TPY) | CO (TPY) | VOC (TPY) | HAP (TPY) | GHG as $CO_2e$ (TPY) |
|---|---|---|---|---|---|---|---|
| **Emissions from Existing Sources (Permitted and Insignificant)** | | | | | | | |
| 75-0851-01 — Electrolyte Filling and Degassing | | | | | 32.0 | | |
| 75-0851-02 — Sealers and Adhesives | | | | | 40.7 | | |
| 75-0851-03 — Natural Gas Fuel Burning Sources | 1.0 | 8.0E-02 | 12.5 | 10.5 | 0.7 | 0.2 | 16,007 |
| 75-0851-04 — Emergency Generators | 4.8E-02 | 3.0E-03 | 1.5 | 0.8 | 0.1 | 8.5E-03 | 320 |
| Slitting (Insignificant) | 1.0E-03 | | | | | | |
| Roll Drying (Insignificant) | | | | | 0.7 | | |
| Stacking (Insignificant) | | | | | 2.3 | | |
| Cooling Towers (Insignificant) | 3.5 | | | | | | |
| Battery Case Weld (Insignificant) | 0.1 | | | | | | |
| **Existing Totals** | **4.5** | **8.3E-02** | **14.0** | **11.3** | **76.5** | **0.2** | **16,327** |
| **Potential Emissions from Proposed New Sources [1]** | | | | | | | |
| 75-0851-03 — Natural Gas Fuel Burning Sources | 0.1 | 7.4E-03 | 1.2 | 1.0 | 0.1 | 2.3E-02 | 1,481 |
| 75-0851-04 — Emergency Generators | 1.1E-02 | 2.8E-03 | 2.9 | 0.1 | 1.7E-02 | 8.0E-03 | 303 |
| 75-0851-05 — Stacking — LFP Smyrna | 0.8 | | | | | 0.1 | |
| 75-0851-06 — Electrolyte Injection – LFP Smyrna | | | | | 1.4 | 0.8 | 24 |
| Electrode Preparation, Anode Calendering — LFP Smyrna (Insignificant) | 1.9 | | | | | | |
| Transfer from Stacking to Inspection — LFP Smyrna (Insignificant) | 0.4 | | | | | 0.1 | |
| Stack Inspection — LFP Smyrna (Insignificant) | 0.6 | | | | | 0.1 | |
| Assembly — LFP Smyrna (Insignificant) | 0.2 | | | | | | |
| Baking — LFP Smyrna (Insignificant) | | | | | 0.4 | 4.7E-02 | 1.5 |
| Case Seal Welding — LFP Smyrna (Insignificant) | 3.1E-02 | | | | | | |
| Formation – LFP Smyrna (Insignificant) | | | | | 0.5 | 0.3 | 8.5 |
| Side Plate Gluing — LFP Smyrna (Insignificant) | | | | | 2.1E-02 | 1.2E-02 | 0.4 |
| Side Plate Welding — LFP Smyrna (Insignificant) | 6.4E-03 | | | | | | |

**Table 1**
**Emissions Summary**

| Emission Source Number/Name | PM (TPY) | $SO_2$ (TPY) | $NO_X$ (TPY) | CO (TPY) | VOC (TPY) | HAP (TPY) | GHG as $CO_2e$ (TPY) |
|---|---|---|---|---|---|---|---|
| **Emissions from Existing Sources (Permitted and Insignificant)** | | | | | | | |
| Busbar Welding — LFP Smyrna (Insignificant) | 1.9E-02 | | | | | 6.4E-03 | |
| Busbar Gluing — LFP Smyrna (Insignificant) | | | | | 1.4E-02 | 8.3E-03 | 0.2 |
| Electrode Preparation, Cathode Slitter — Stanford (Insignificant) | 0.4 | | | | | 9.0E-02 | |
| Electrode Preparation, Anode Slitter — Stanford (Insignificant) | 0.2 | | | | | | |
| Electrode Notching, Cathode — Stanford (Insignificant) | 0.4 | | | | | 9.0E-02 | |
| Electrode Notching, Anode — Stanford (Insignificant) | 0.2 | | | | | | |
| Stacking — Stanford (Insignificant) | 1.8 | | | | | 0.3 | |
| Transfer from Stacking to Inspection — Stanford (Insignificant) | 0.4 | | | | | 0.1 | |
| Stack Inspection — Stanford (Insignificant) | 0.6 | | | | | 0.1 | |
| Assembly — Stanford (Insignificant) | 0.2 | | | | | | |
| Baking — Stanford (Insignificant) | | | | | 1.1E-02 | 1.3E-03 | 4.1E-02 |
| Electrolyte Injection — Stanford (Insignificant) | | | | | 0.8 | 0.5 | 12.9 |
| Electrolyte Injection, Degas — Stanford (Insignificant) | | | | | 4.6E-02 | 2.7E-02 | 0.8 |
| Side Plate Gluing — Stanford (Insignificant) | | | | | 0.3 | 0.2 | 4.9 |
| Busbar Welding — Stanford (Insignificant) | 1.9E-02 | | | | | 6.4E-03 | |
| Diesel Storage Tank (Insignificant) | | | | | 7.0E-04 | | |
| **Totals from New Sources** | **8.3** | **1.0E-02** | **4.1** | **1.1** | **3.6** | **2.9** | **1,837** |
| **Facility-Wide Totals After Modification** | **12.8** | **9.3E-02** | **18.1** | **12.4** | **80.1** | **3.1** | **18,164** |

***Notes:***

1. Potential emissions from proposed new sources are controlled emissions for permitted sources and uncontrolled emissions for insignificant emissions units. Actual emissions from most uncontrolled emissions units will be lower.

PM = particulate matter
SO2 = sulfur dioxide
NOx = nitrogen oxides
CO = carbon dioxide
VOC = volatile organic compound
HAP = Hazardous Air Pollutant
GHG = greenhouse gas
CO2e = carbon dioxide equivalent

Appendix A includes the required air permit application forms, and Appendix B includes the supporting emission calculations. Appendix C provides the safety data sheets for the materials used in the production process. Individual process flow diagrams are provided in Appendix D.

# Appendix A
# Application Forms

DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF AIR POLLUTION CONTROL
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 15th Floor, Nashville, TN 37243
Telephone: (615) 532-0554, Email: Air.Pollution.Control@TN.gov



# NON-TITLE V PERMIT APPLICATION
# FACILITY IDENTIFICATION

Type or print and submit. Attach appropriate source description forms.

## SITE INFORMATION

**1. Organization's legal name and SOS control number** [as registered with the TN Secretary of State (SOS)]
Envision AESC US LLC, 000993842

**2. Site name** (if different from legal name)

**3. Is a construction permit application fee being submitted?** Yes [✓] No [ ]
(see instructions for appropriate fee to submit)

| **4. Site address** (St./Rd./Hwy.) | | County name |
|---|---|---|
| 500 Battery Plant Road | | Rutherford |
| City | Zip code | **5.** NAICS or SIC code |
| Smyrna | 37167 | NAICS 335912 |

| **6. Site location** (in lat. /long.) | Latitude | Longitude |
|---|---|---|
| | 35°57′38.3″N | 86°28′58.1″W |

## CONTACT INFORMATION (RESPONSIBLE PERSON)

| **7. Responsible person/Authorized contact** | | | Phone number with area code |
|---|---|---|---|
| Jeff Deaton | | | (615) 751-3539 |
| **Mailing address** (St./Rd./Hwy.) | | | Fax number with area code |
| 500 Battery Plant Road | | | NA |
| City | State | Zip code | Email address |
| Smyrna | TN | 37167 | jeff.deaton@envision-aesc.com |

## CONTACT INFORMATION (TECHNICAL)

| **8. Principal technical contact** | | | Phone number with area code |
|---|---|---|---|
| Kimberly Cloyd | | | (615) 751-3338 |
| **Mailing address** (St./Rd./Hwy.) | | | Fax number with area code |
| 500 Battery Plant Road | | | NA |
| City | State | Zip code | Email address |
| Smyrna | TN | 37167 | kimberly.cloyd@envision-aesc.com |

## CONTACT INFORMATION (BILLING)

| **9. Billing contact** | | | Phone number with area code |
|---|---|---|---|
| Kimberly Cloyd | | | (615) 751-3338 |
| **Mailing address** (St./Rd./Hwy.) | | | Fax number with area code |
| 500 Battery Plant Road | | | NA |
| City | State | Zip code | Email address |
| Smyrna | TN | 37167 | kimberly.cloyd@envision-aesc.com |

## AIR CONTAMINANT SOURCE(S) INFORMATION

**10. Description of air contaminant source(s) and Unique Source ID(s).** List, identify, and briefly describe process emission sources, fuel burning installations, and incinerators that are contained in this application and include a Unique Source ID for each source. The Unique Source ID is a name/number/letter, which uniquely identifies the air contaminant source(s), like Boiler #1, Paint Line #1, Engine #1, etc. (see instructions for more details)

75-0851-03 - Natural Gas Fuel Burning Sources (Existing Source) -- Requst the addition of two new dehumidification units.

75-0851-04 - Reciprocating Internal Combustion Engines with Generators (Existing Source) -- Request the addition of one 750 kW emergency generator.

75-0851-05 - Stacking LFP Smyrna (New Source) -- Sheets of electrode material are fully cut and stacked during this process. Cutting the electrode sheets causes trace amounts of material to become airborne. Emissions will be controlled using dust collection systems.

75-0851-06 - Electrolyte Injection Areas 1 and 2 (New Source) -- Electrolyte is injected into cells during these processes. During injection, emissions from the electrolyte can become airborne. Emissions will be controlled using activated carbon adsorption. The electrolyte used in the process is different from the electrolyte used in existing Source 01.

In addition, twenty one (21) Insignificant Emissions Units/Activites listed in the Comments section are proposed for installation and are exempt from permitting in accordance with TAPCR 1200-03-09-.04(4). Emission calculations for all proposed permitted and insignificant sources are included with this application.

**11. Is the air contaminant source(s) in a nonattainment area? If "Yes", then minor source BACT must be addressed.** Yes ☐ No ☑

| | | | | |
|---|---|---|---|---|
| **12. Normal operation:** | Hours/Day<br>24 | Days/Week<br>7 | Weeks/Year<br>52 | Days/Year<br>365 |
| **13. Percent annual throughput** | Dec. – Feb.<br>25 | March – May<br>25 | June – August<br>25 | Sept. – Nov.<br>25 |

## TYPE OF PERMIT REQUESTED (check appropriate box)

| | | | |
|---|---|---|---|
| **14.** Operating permit ☐ | Date construction started | Date completed | Date of ownership change (if applicable) |
| | Last permit number(s) | Emission Source Reference Number(s) | |
| Construction permit ☑ | Last permit number(s)<br>077494 | Emission Source Reference Number(s)<br>75-0851-01, 75-0851-02, 75-0851-03, and 75-0851-04 | |

If you chose Construction permit above, then choose either New Construction, Modification, or Location Transfer

| | | |
|---|---|---|
| New Construction ☑ | Starting date<br>August 1, 2023 | Completion date<br>March 2026 |
| Modification ☐ | Date modification started or will start | Date completed or will complete |
| Location Transfer ☐ | Transfer date | Address of last location |

**15. Describe changes that have been made to this equipment or operation(s) since the last construction or operating permit application:**

None

**16. Comments**

The following emission units/activities have been identified as being insignificant and/or otherwise eligible for exemption to permitting:
Electrode Preparation - LFP Smyrna
Transfer from Stacking to Inspection - LFP Smyrna
Stack Inspection - LFP Smyrna
Assembly Line - LFP Smyrna
Baking - LFP Smyrna
Case Seal Welding - LFP Smyrna
Formation - LFP Smyrna
Side Plate Gluing and Welding - LFP Smyrna
Busbar Gluing and Welding - LFP Smyrna
Electrode Preparation - Stanford
Notching Cathode - Stanford
Notching Anode - Stanford
Stacking - Stanford
Transfer from Stacking to Inspection - Stanford
Stack Inspection - Stanford
Assembly - Stanford
Baking - Stanford
Electrolyte Injection and Degas - Stanford
Side Plate Gluing - Stanford
Busbar Welding - Stanford
Diesel Storage Tank

**SIGNATURE**

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

| **17. Signature** (application must be signed before it will be processed) | | **Date** 4/26/2023 |
|---|---|---|
| **Signer's name** (type or print) | **Title** | **Phone number with area code** |
| Jeff Deaton | Managing Director | (615) 751-3539 |

DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF AIR POLLUTION CONTROL
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 15th Floor, Nashville, TN 37243
Telephone: (615) 532-0554, Email: Air.Pollution.Control@TN.gov



# NON-TITLE V PERMIT APPLICATION
# EMISSION POINT DESCRIPTION

Type or print and submit for each stack or air contaminant source. Submit with the APC 100.

## GENERAL IDENTIFICATION AND DESCRIPTION

**1. Organization's legal name and SOS control number** [as registered with the TN Secretary of State (SOS)]
Envision AESC US LLC, 000993842

**2. Unique Source ID** (name/number/letter which uniquely identifies this air contaminant source, like Boiler #1)
75-0851-03 - Natural Gas Fuel Burning Sources

**3. Unique Emission Point ID** (name/number/letter which uniquely identifies this emission point, like Stack #1)
DH10 - DH11

**4. Brief description of air contaminant source** (Attach a diagram if appropriate):
Two additional dehumidifiers similar to DH3-DH4, and DH7-DH9.

| **5. Emission point location** | Latitude | Longitude | **6. Distance to nearest property line (Ft.)** |
|---|---|---|---|
| | 35°57'38.3"N | 86°28'58.1"W | 50 feet |

## STACK AND EMISSION DATA

| **7. Stack or emission point data:** → | Height above grade (Ft.) | Diameter (Ft.) | Temperature (°F) | % of time over 125°F | Direction of exit (Up, down or horizontal) |
|---|---|---|---|---|---|
| | TBD | TBD | TBD | TBD | TBD |

| Data at exit conditions: → | Flow (actual $Ft.^3$/Min.) | Velocity (Ft. /Sec.) | Moisture ($Grains/Ft.^3$) | Moisture (Percent) |
|---|---|---|---|---|
| | TBD | TBD | | TBD |

| Data at standard conditions: → | Flow (Dry std. $Ft.^3$/Min.) | Velocity (Ft. /Sec.) | Moisture ($Grains/Ft.^3$) | Moisture (Percent) |
|---|---|---|---|---|
| | TBD | TBD | | TBD |

**8. Monitoring device and recording instrument (check all that apply):**

| Opacity monitor | $SO_2$ monitor | $NO_x$ monitor | Strip chart | Electronic data logger | Other (specify in comments) | No monitor (none) |
|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |

**9. Control device.** Description of proposed monitoring, recordkeeping, and reporting to assure compliance with emission limits. Include operating parameters of control device (flow rate, temperature, pressure drop, etc.).
Maintain a log of the monthly natural gas usage.

**10. Air contaminants.** Emission estimates for each air contaminant emitted from this point should be based on stack sampling results or engineering calculations. Calculations should be attached on a separate sheet. (see instructions for more details)

| Air contaminants | Average Emissions (Lbs./Hr.) | Maximum Emissions (Lbs./Hr.) | Concen-tration | Average Emissions (Ton/Yr.) | Potential Emissions (Ton/Yr.) | Emissions Estimation Method Code * | Control Devices * | Control Effi-ciency % |
|---|---|---|---|---|---|---|---|---|
| Particulate matter (PM) | 0.02 | 0.02 | ** | 0.1 | 0.1 | 3 | 000 | NA |
| Sulfur dioxide ($SO_2$) | 0.002 | 0.002 | *** | 0.007 | 0.007 | 3 | 000 | NA |
| Carbon monoxide (CO) | 0.24 | 0.24 | PPM | 1.0 | 1.0 | 3 | 000 | NA |
| Volatile organic compounds (VOC) | 0.02 | 0.02 | PPM | 0.1 | 0.1 | 3 | 000 | NA |
| Nitrogen oxides ($NO_X$) | 0.28 | 0.28 | PPM | 1.2 | 1.2 | 3 | 000 | NA |
| Hydrogen fluoride (HF) | | | | | | | | |
| Hydrogen chloride (HCl) | | | | | | | | |
| Lead (Pb) | | | | | | | | |
| Greenhouse gases ($CO_2$ equivalents) | 338 | 338 | | 1,481 | 1,481 | 3 | 000 | NA |
| Hazardous air pollutant (specify) Total | 0.01 | 0.01 | | 0.02 | 0.02 | 3 | 000 | NA |
| Hazardous air pollutant (specify) Hexane | 0.01 | 0.01 | | 0.02 | 0.02 | 3 | 000 | NA |
| Hazardous air pollutant (specify) | | | | | | | | |
| Hazardous air pollutant (specify) | | | | | | | | |
| Hazardous air pollutant (specify) | | | | | | | | |
| Other (specify) | | | | | | | | |
| Other (specify) | | | | | | | | |
| Other (specify) | | | | | | | | |
| Other (specify) | | | | | | | | |

**11. Comments**

**SIGNATURE**

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

| **12. Signature** | | **Date** |
|---|---|---|
| **Signer's name** (type or print)<br>Jeff Deaton | **Title**<br>Managing Director | **Phone number with area code**<br>(615) 751-3539 |

* Refer to the tables in the instructions for estimation method and control device codes.

** Exit gas particulate matter concentration units: Process – Grains/Dry Standard $Ft^3$ ($70^0$F), Wood fired boilers - Grains/Dry Standard $Ft^3$ ($70^0$F), all other boilers – Lbs. /Million BTU heat input.

*** Exit gas sulfur dioxide concentrations units: Process – PPM by volume, dry bases, and boilers – Lbs. /Million BTU heat input

DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF AIR POLLUTION CONTROL
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# NON-TITLE V PERMIT APPLICATION
# EMISSION POINT DESCRIPTION

Type or print and submit for each stack or air contaminant source. Submit with the APC 100.

## GENERAL IDENTIFICATION AND DESCRIPTION

**1. Organization's legal name and SOS control number** [as registered with the TN Secretary of State (SOS)]
Envision AESC US LLC, 000993842

**2. Unique Source ID** (name/number/letter which uniquely identifies this air contaminant source, like Boiler #1)
75-0851-04 - Reciprocating Internal Combustion Engines with Generators

**3. Unique Emission Point ID** (name/number/letter which uniquely identifies this emission point, like Stack #1)
Generator 3

**4. Brief description of air contaminant source** (Attach a diagram if appropriate):
750 kW Caterpillar C27 diesel-fired emergency generator

| **5. Emission point location** | Latitude | Longitude | **6. Distance to nearest property line (Ft.)** ? |
|---|---|---|---|
| | 35°57'38.3"N | 86°28'58.1"W | 50 feet |

## STACK AND EMISSION DATA

| **7. Stack or emission point data:** → | Height above grade (Ft.) | Diameter (Ft.) | Temperature (°F) | % of time over 125°F | Direction of exit (Up, down or horizontal) |
|---|---|---|---|---|---|
| | ~ 7.5 | 0.5 | 949 | 100 | Horizontal |

| Data at exit conditions: → | Flow (actual $Ft.^3$/Min.) | Velocity (Ft. /Sec.) | Moisture (Grains/$Ft.^3$) | Moisture (Percent) |
|---|---|---|---|---|
| | 5,610 | 477 | | 10.0 |

| Data at standard conditions: → | Flow (Dry std. $Ft.^3$/Min.) | Velocity (Ft. /Sec.) | Moisture (Grains/$Ft.^3$) | Moisture (Percent) |
|---|---|---|---|---|
| | 4,884 | 415 | | 0.0 |

**8. Monitoring device and recording instrument (check all that apply):**

| Opacity monitor | $SO_2$ monitor | $NO_X$ monitor | Strip chart | Electronic data logger | Other (specify in comments) | No monitor (none) |
|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☑ |

**9. Control device.** Description of proposed monitoring, recordkeeping, and reporting to assure compliance with emission limits. Include operating parameters of control device (flow rate, temperature, pressure drop, etc.).
Nonresettable hour meter

**10. Air contaminants.** Emission estimates for each air contaminant emitted from this point should be based on stack sampling results or engineering calculations. Calculations should be attached on a separate sheet. (see instructions for more details)

| Air contaminants | Average Emissions (Lbs./Hr.) | Maximum Emissions (Lbs./Hr.) | Concen-tration | Average Emissions (Ton/Yr.) | Potential Emissions (Ton/Yr.) | Emissions Estimation Method Code * | Control Devices * | Control Effi-ciency % |
|---|---|---|---|---|---|---|---|---|
| Particulate matter (PM) | 0.04 | 0.04 | ** | 0.01 | 0.01 | 3 | 000 | NA |
| Sulfur dioxide ($SO_2$) | 0.01 | 0.01 | *** | 0.003 | 0.003 | 3 | 000 | NA |
| Carbon monoxide (CO) | 0.55 | 0.55 | PPM | 0.1 | 0.1 | 3 | 000 | NA |
| Volatile organic compounds (VOC) | 0.07 | 0.07 | PPM | 0.02 | 0.02 | 3 | 000 | NA |
| Nitrogen oxides ($NO_X$) | 11.64 | 11.64 | PPM | 2.9 | 2.9 | 3 | 000 | NA |
| Hydrogen fluoride (HF) | | | | | | | | |
| Hydrogen chloride (HCl) | | | | | | | | |
| Lead (Pb) | | | | | | | | |
| Greenhouse gases ($CO_2$ equivalents) | 1,213 | 1,213 | | 303 | 303 | 3 | 000 | NA |
| Hazardous air pollutant (specify) Total | 0.03 | 0.03 | | 0.008 | 0.008 | 3 | 000 | NA |
| Hazardous air pollutant (specify) Benzene | 0.01 | 0.01 | | 0.001 | 0.001 | 3 | 000 | NA |
| Hazardous air pollutant (specify) | | | | | | | | |
| Hazardous air pollutant (specify) | | | | | | | | |
| Hazardous air pollutant (specify) | | | | | | | | |
| Other (specify) | | | | | | | | |
| Other (specify) | | | | | | | | |
| Other (specify) | | | | | | | | |
| Other (specify) | | | | | | | | |

**11. Comments**

**SIGNATURE**

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

| **12. Signature** | | **Date** |
|---|---|---|
| **Signer's name** (type or print)<br>Jeff Deaton | **Title**<br>Managing Director | **Phone number with area code**<br>(615) 751-3539 |

* Refer to the tables in the instructions for estimation method and control device codes.

** Exit gas particulate matter concentration units: Process – Grains/Dry Standard $Ft^3$ ($70^0$F), Wood fired boilers - Grains/Dry Standard $Ft^3$ ($70^0$F), all other boilers – Lbs. /Million BTU heat input.

*** Exit gas sulfur dioxide concentrations units: Process – PPM by volume, dry bases, and boilers – Lbs. /Million BTU heat input

DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF AIR POLLUTION CONTROL
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 15th Floor, Nashville, TN 37243
Telephone: (615) 532-0554, Email: Air.Pollution.Control@TN.gov



# NON-TITLE V PERMIT APPLICATION
# EMISSION POINT DESCRIPTION

Type or print and submit for each stack or air contaminant source. Submit with the APC 100.

## GENERAL IDENTIFICATION AND DESCRIPTION

**1. Organization's legal name and SOS control number** [as registered with the TN Secretary of State (SOS)]
Envision AESC US LLC, 000993842

**2. Unique Source ID** (name/number/letter which uniquely identifies this air contaminant source, like Boiler #1)
75-0851-05 - Stacking -- LFP Smyrna

**3. Unique Emission Point ID** (name/number/letter which uniquely identifies this emission point, like Stack #1)
ST1-ST24

**4. Brief description of air contaminant source** (Attach a diagram if appropriate):
Twenty-four identical Stacking units for cutting and stacking sheets of electrode material

| **5. Emission point location** | Latitude | Longitude | **6. Distance to nearest property line (Ft.)** |
|---|---|---|---|
| | 35°57'38.3"N | 86°28'58.1"W | 50 feet |

## STACK AND EMISSION DATA

| **7. Stack or emission point data:** → | Height above grade (Ft.) | Diameter (Ft.) | Temperature (°F) | % of time over 125°F | Direction of exit (Up, down or horizontal) |
|---|---|---|---|---|---|
| | Inside building | 0.72 | 86 | 0 | Inside building |

| | | | | |
|---|---|---|---|---|
| Data at exit conditions: → | Flow (actual $Ft.^3$/Min.) | Velocity (Ft. /Sec.) | Moisture (Grains/$Ft.^3$) | Moisture (Percent) |
| | 1869 each | 72 | | 1.6 |
| Data at standard conditions: → | Flow (Dry std. $Ft.^3$/Min.) | Velocity (Ft. /Sec.) | Moisture (Grains/$Ft.^3$) | Moisture (Percent) |
| | 1779 each | 69 | | 0 |

**8. Monitoring device and recording instrument (check all that apply):**

| Opacity monitor | $SO_2$ monitor | $NO_x$ monitor | Strip chart | Electronic data logger | Other (specify in comments) | No monitor (none) |
|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ |

**9. Control device.** Description of proposed monitoring, recordkeeping, and reporting to assure compliance with emission limits. Include operating parameters of control device (flow rate, temperature, pressure drop, etc.).
Install pressure drop gauges on dust collectors, make weekly pressure drop readings, and maintain a record of the readings.

**10. Air contaminants.** Emission estimates for each air contaminant emitted from this point should be based on stack sampling results or engineering calculations. Calculations should be attached on a separate sheet. (see instructions for more details)

| Air contaminants | Average Emissions (Lbs./Hr.) | Maximum Emissions (Lbs./Hr.) | Concen-tration | Average Emissions (Ton/Yr.) | Potential Emissions (Ton/Yr.) | Emissions Estimation Method Code * | Control Devices * | Control Effi-ciency % |
|---|---|---|---|---|---|---|---|---|
| Particulate matter (PM) | 0.18 | 0.18 | ** | 0.8 | 0.8 | 1,2 | 018 | 99 |
| Sulfur dioxide ($SO_2$) | | | *** | | | | | |
| Carbon monoxide (CO) | | | PPM | | | | | |
| Volatile organic compounds (VOC) | | | PPM | | | | | |
| Nitrogen oxides ($NO_X$) | | | PPM | | | | | |
| Hydrogen fluoride (HF) | | | | | | | | |
| Hydrogen chloride (HCl) | | | | | | | | |
| Lead (Pb) | | | | | | | | |
| Greenhouse gases ($CO_2$ equivalents) | | | | | | | | |
| Hazardous air pollutant (specify) Total | 0.03 | 0.03 | | 0.1 | 0.1 | 1,2 | 018 | 99 |
| Hazardous air pollutant (specify) Phosphorus | <0.03 | <0.03 | | <0.1 | <0.1 | 1,2 | 018 | 99 |
| Hazardous air pollutant (specify) | | | | | | | | |
| Hazardous air pollutant (specify) | | | | | | | | |
| Hazardous air pollutant (specify) | | | | | | | | |
| Other (specify) | | | | | | | | |
| Other (specify) | | | | | | | | |
| Other (specify) | | | | | | | | |
| Other (specify) | | | | | | | | |

**11. Comments**

Emissions calculated using emission factors based on emissions scaled from similar, previous-generation equipment at another facility.

**SIGNATURE**

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| **12. Signature** | | **Date** |
|---|---|---|
| **Signer's name** (type or print)<br>Jeff Deaton | **Title**<br>Managing Director | **Phone number with area code**<br>(615) 751-3539 |

* Refer to the tables in the instructions for estimation method and control device codes.

** Exit gas particulate matter concentration units: Process – Grains/Dry Standard $Ft^3$ ($70^0$F), Wood fired boilers - Grains/Dry Standard $Ft^3$ ($70^0$F), all other boilers – Lbs. /Million BTU heat input.

*** Exit gas sulfur dioxide concentrations units: Process – PPM by volume, dry bases, and boilers – Lbs. /Million BTU heat input

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# NON-TITLE V PERMIT APPLICATION
# PROCESS OR FUEL BURNING SOURCE DESCRIPTION

Type or print. Submit with the APC 100.

## GENERAL IDENTIFICATION AND DESCRIPTION

| 1. **Organization's legal name and SOS control number** [as registered with the TN Secretary of State (SOS)] | 2. **Emission Source Reference Number** |
|---|---|
| Envision AESC US LLC, 000993842 | 75-0851-03 |

**3. Is this air contaminant source subject to an NSPS or NESHAP rule?** Yes ☐ No ☑
If Yes, list rule citation, including Part, Subpart, and applicable Sections:

| 4. **Unique Source ID** (see instructions) | 5. **Unique Emission Point ID** (see instructions) |
|---|---|
| 75-0851-03 New dehumidifier | DH10 |

**6. Description of air contaminant source**

Two additional dehumidifiers similar to DH3-DH4, and DH7-DH9.

**7. Type of air contaminant source** (Check only one option to the right)

| | |
|---|---|
| Process Emission Source: For each process emission source, submit a separate application. (Check at right and complete lines 8, 9, and 14) | ☐ |
| Process Emission Source with in process fuel: Products of combustion contact materials heated. For each process emission source, submit a separate application. (Check at right and complete lines 8 through 14) | ☐ |
| Non-Process fuel burning source: Products of combustion do not contact materials heated. Complete this form for each boiler or fuel burner and complete a Non-Title V Emission Point Description Form (APC 101) for each stack. (Check at right and complete lines 10 through 14) | ☑ |

## PROCESS EMISSION SOURCE DESCRIPTION AND DATA

| 8. **Type of operation:** Continuous ☐ Batch ☐ | Normal batch time | Normal batches/day |
|---|---|---|
| | | |

| 9. **Process material inputs and In-process solid fuels** | Diagram reference | Input rates (pounds/hour) Design | Actual |
|---|---|---|---|
| A. | | | |
| B. | | | |
| C. | | | |
| D. | | | |
| E. | | | |
| F. | | | |
| G. | | | |
| Totals | | | |

* A simple process flow diagram must be attached.

## DESCRIPTION OF BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE

**10. Boiler or burner data:** (Complete lines 10 through 14 using a separate form for each boiler, burner, etc.)

| Serial Number | Type of firing*** |
|---|---|
| Concepts & Designs Inc. CDH-1114 | Natural gas burner |

| Rated horsepower | Rated input capacity ($10^6$ BTU/Hr.) | Other rating (specify capacity and units) |
|---|---|---|
| 565.5 | 1.437 | |

| Date constructed | Date manufactured | Date of last modification (explain in comments below) |
|---|---|---|
| 2023 | TBD | NA |

** Source with a common stack will have the same stack number.

*** Cyclone, spreader (with or without reinjection), pulverized (wet or dry bottom, with or without reinjection), other stoker (specify type, hand fired, automatic, or other type (describe below in comments).

## FUEL USED IN BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE

**11. Fuel data:** (Complete for a process emission source with in process fuel or a non-process fuel burning source)

Primary fuel type (specify) | Standby fuel type(s) (specify)

| Fuels used | Annual usage | Hourly usage | | % Sulfur | % Ash | BTU value of fuel | | (For APC use only) SCC code |
|---|---|---|---|---|---|---|---|---|
| | | Design | Average | | | | | |
| Natural gas: | $10^6$ Cu. Ft. 12.3 | Cu. Ft. 1409 | Cu. Ft. 1409 | ////////// ////////// | ///// ///// | 1,020 | | |
| #2 Fuel oil: | $10^3$ Gal. | Gal. | Gal. | | ///// ///// | | | |
| #5 Fuel oil: | $10^3$ Gal. | Gal. | Gal. | | ///// ///// | | | |
| #6 Fuel oil: | $10^3$ Gal. | Gal. | Gal. | | ///// ///// | | | |
| Coal: | Tons | Lbs. | Lbs. | | | | | |
| Wood: | Tons | Lbs. | Lbs. | ////////// ////////// | ///// ///// | | | |
| Liquid propane: | $10^3$ Gal. | Gal. | Gal. | //////// //////// | ///// ///// | 85,000 | | |
| Other (specify type & units): | | | | | | | | |

**12. If Wood is used as a fuel, specify types and estimate percent by weight of bark**

**13. If Wood is used with other fuels, specify percent by weight of wood charged to the burner.**

**14. Comments**

**SIGNATURE**

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Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

| **15. Signature** | | **Date** |
|---|---|---|
| **Signer's name** (type or print) | **Title** | **Phone number with area code** |

DEPARTMENT OF ENVIRONMENT AND CONSERVATION
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# NON-TITLE V PERMIT APPLICATION
# PROCESS OR FUEL BURNING SOURCE DESCRIPTION

Type or print. Submit with the APC 100.

## GENERAL IDENTIFICATION AND DESCRIPTION

| 1. **Organization's legal name and SOS control number** [as registered with the TN Secretary of State (SOS)] | 2. **Emission Source Reference Number** |
|---|---|
| Envision AESC US LLC, 000993842 | 75-0851-03 |

**3. Is this air contaminant source subject to an NSPS or NESHAP rule?** Yes ☐ No ☑
If Yes, list rule citation, including Part, Subpart, and applicable Sections:

| 4. **Unique Source ID** (see instructions) | 5. **Unique Emission Point ID** (see instructions) |
|---|---|
| 75-0851 -03 New dehumidifier | DH11 |

**6. Description of air contaminant source**

Two additional dehumidifiers similar to DH3-DH4, and DH7-DH9.

**7. Type of air contaminant source** (Check only one option to the right)

| | |
|---|---|
| Process Emission Source: For each process emission source, submit a separate application. (Check at right and complete lines 8, 9, and 14) | ☐ |
| Process Emission Source with in process fuel: Products of combustion contact materials heated. For each process emission source, submit a separate application. (Check at right and complete lines 8 through 14) | ☐ |
| Non-Process fuel burning source: Products of combustion do not contact materials heated. Complete this form for each boiler or fuel burner and complete a Non-Title V Emission Point Description Form (APC 101) for each stack. (Check at right and complete lines 10 through 14) | ☑ |

## PROCESS EMISSION SOURCE DESCRIPTION AND DATA

| 8. **Type of operation:** Continuous ☐ Batch ☐ | Normal batch time | Normal batches/day |
|---|---|---|

| 9. **Process material inputs and In-process solid fuels** | Diagram reference | Input rates (pounds/hour) Design | Actual |
|---|---|---|---|
| A. | | | |
| B. | | | |
| C. | | | |
| D. | | | |
| E. | | | |
| F. | | | |
| G. | | | |
| Totals | | | |

* A simple process flow diagram must be attached.

## DESCRIPTION OF BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE

**10. Boiler or burner data:** (Complete lines 10 through 14 using a separate form for each boiler, burner, etc.)

| Serial Number | Type of firing*** |
|---|---|
| Concepts & Designs Inc. CDH-1114 | Natural gas burner |

| Rated horsepower | Rated input capacity ($10^6$ BTU/Hr.) | Other rating (specify capacity and units) |
|---|---|---|
| 565.5 | 1.437 | |

| Date constructed | Date manufactured | Date of last modification (explain in comments below) |
|---|---|---|
| 2023 | TBD | NA |

** Source with a common stack will have the same stack number.

*** Cyclone, spreader (with or without reinjection), pulverized (wet or dry bottom, with or without reinjection), other stoker (specify type, hand fired, automatic, or other type (describe below in comments).

## FUEL USED IN BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE

**11. Fuel data:** (Complete for a process emission source with in process fuel or a non-process fuel burning source)

Primary fuel type (specify) | Standby fuel type(s) (specify)

| Fuels used | Annual usage | Hourly usage | | % Sulfur | % Ash | BTU value of fuel | | (For APC use only) SCC code |
|---|---|---|---|---|---|---|---|---|
| | | Design | Average | | | | | |
| Natural gas: | $10^6$ Cu. Ft. 12.3 | Cu. Ft. 1409 | Cu. Ft. 1409 | ////////// ////////// | ///// ///// | 1,020 | | |
| #2 Fuel oil: | $10^3$ Gal. | Gal. | Gal. | | ///// ///// | | | |
| #5 Fuel oil: | $10^3$ Gal. | Gal. | Gal. | | ///// ///// | | | |
| #6 Fuel oil: | $10^3$ Gal. | Gal. | Gal. | | ///// ///// | | | |
| Coal: | Tons | Lbs. | Lbs. | | | | | |
| Wood: | Tons | Lbs. | Lbs. | ////////// ////////// | ///// ///// | | | |
| Liquid propane: | $10^3$ Gal. | Gal. | Gal. | //////// //////// | ///// ///// | 85,000 | | |
| Other (specify type & units): | | | | | | | | |

**12. If Wood is used as a fuel, specify types and estimate percent by weight of bark**

**13. If Wood is used with other fuels, specify percent by weight of wood charged to the burner.**

**14. Comments**

**SIGNATURE**

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Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

| **15. Signature** | | **Date** |
|---|---|---|
| **Signer's name** (type or print) | **Title** | **Phone number with area code** |

DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF AIR POLLUTION CONTROL
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# NON-TITLE V PERMIT APPLICATION
# PROCESS OR FUEL BURNING SOURCE DESCRIPTION

Type or print. Submit with the APC 100.

## GENERAL IDENTIFICATION AND DESCRIPTION

| 1. **Organization's legal name and SOS control number** [as registered with the TN Secretary of State (SOS)] | 2. **Emission Source Reference Number** |
|---|---|
| Envision AESC US LLC, 000993842 | 75-0851-04 |

**3. Is this air contaminant source subject to an NSPS or NESHAP rule?** Yes ☑ No ☐
If Yes, list rule citation, including Part, Subpart, and applicable Sections:
40 CFR 60, Subpart IIII and 40 CFR 63, Subpart ZZZZ

| 4. **Unique Source ID** (see instructions) | 5. **Unique Emission Point ID** (see instructions) |
|---|---|
| Reciprocating Internal Combustion Engines | Generator 3 |

**6. Description of air contaminant source**
750 kW Caterpillar C27 Emergency Generator

**7. Type of air contaminant source** (Check only one option to the right)

| | |
|---|---|
| Process Emission Source: For each process emission source, submit a separate application. (Check at right and complete lines 8, 9, and 14) | ☐ |
| Process Emission Source with in process fuel: Products of combustion contact materials heated. For each process emission source, submit a separate application. (Check at right and complete lines 8 through 14) | ☐ |
| Non-Process fuel burning source: Products of combustion do not contact materials heated. Complete this form for each boiler or fuel burner and complete a Non-Title V Emission Point Description Form (APC 101) for each stack. (Check at right and complete lines 10 through 14) | ☑ |

## PROCESS EMISSION SOURCE DESCRIPTION AND DATA

| 8. **Type of operation:** Continuous ☐ Batch ☐ | Normal batch time | Normal batches/day |
|---|---|---|

| 9. **Process material inputs and In-process solid fuels** | Diagram reference | Input rates (pounds/hour) Design | Actual |
|---|---|---|---|
| A. | | | |
| B. | | | |
| C. | | | |
| D. | | | |
| E. | | | |
| F. | | | |
| G. | | | |
| Totals | | | |

* A simple process flow diagram must be attached.

## DESCRIPTION OF BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE

**10. Boiler or burner data:** (Complete lines 10 through 14 using a separate form for each boiler, burner, etc.)

| Serial Number | Type of firing*** |
|---|---|
| NA | Reciprocating internal combustion |

| Rated horsepower | Rated input capacity ($10^6$ BTU/Hr.) | Other rating (specify capacity and units) |
|---|---|---|
| 1006 | 2.56 | 750 kW |

| Date constructed | Date manufactured | Date of last modification (explain in comments below) |
|---|---|---|
| 2010 | 2010 | NA |

** Source with a common stack will have the same stack number.

*** Cyclone, spreader (with or without reinjection), pulverized (wet or dry bottom, with or without reinjection), other stoker (specify type, hand fired, automatic, or other type (describe below in comments).

## FUEL USED IN BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE

**11. Fuel data:** (Complete for a process emission source with in process fuel or a non-process fuel burning source)

| Primary fuel type (specify) | | | | Standby fuel type(s) (specify) | | | | |
|---|---|---|---|---|---|---|---|---|
| Fuels used | Annual usage | Hourly usage | | % Sulfur | % Ash | BTU value of fuel | | (For APC use only) SCC code |
| | | Design | Average | | | | | |
| Natural gas: | $10^6$ Cu. Ft. | Cu. Ft. | Cu. Ft. | ////////// ////////// | ///// ///// | 1,020 | | |
| #2 Fuel oil: | $10^3$ Gal. 26.8 | Gal. 53.6 | Gal. 53.6 | 0.0015 | ///// ///// | 137,030 BTU/gal | | |
| #5 Fuel oil: | $10^3$ Gal. | Gal. | Gal. | | ///// ///// | | | |
| #6 Fuel oil: | $10^3$ Gal. | Gal. | Gal. | | ///// ///// | | | |
| Coal: | Tons | Lbs. | Lbs. | | | | | |
| Wood: | Tons | Lbs. | Lbs. | ////////// ////////// | ///// ///// | | | |
| Liquid propane: | $10^3$ Gal. | Gal. | Gal. | //////// //////// | ///// ///// | 85,000 | | |
| Other (specify type & units): | | | | | | | | |

**12. If Wood is used as a fuel, specify types and estimate percent by weight of bark**

**13. If Wood is used with other fuels, specify percent by weight of wood charged to the burner.**

**14. Comments**

**SIGNATURE**

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Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

| **15. Signature** | | **Date** |
|---|---|---|
| **Signer's name** (type or print) | **Title** | **Phone number with area code** |

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# NON-TITLE V PERMIT APPLICATION
# PROCESS OR FUEL BURNING SOURCE DESCRIPTION

Type or print. Submit with the APC 100.

## GENERAL IDENTIFICATION AND DESCRIPTION

| 1. **Organization's legal name and SOS control number** [as registered with the TN Secretary of State (SOS)] | 2. **Emission Source Reference Number** |
|---|---|
| Envision AESC US LLC, 000993842 | 75-0851-05 |

**3. Is this air contaminant source subject to an NSPS or NESHAP rule?** Yes ☐ No ☑
If Yes, list rule citation, including Part, Subpart, and applicable Sections:

| 4. **Unique Source ID** (see instructions) | 5. **Unique Emission Point ID** (see instructions) |
|---|---|
| Stacking LFP Smyrna | ST1 - ST24 |

**6. Description of air contaminant source**

Twenty four identical stacking units for cutting and stacking sheets of electrode material

**7. Type of air contaminant source** (Check only one option to the right)

| | |
|---|---|
| Process Emission Source: For each process emission source, submit a separate application. (Check at right and complete lines 8, 9, and 14) | ☑ |
| Process Emission Source with in process fuel: Products of combustion contact materials heated. For each process emission source, submit a separate application. (Check at right and complete lines 8 through 14) | ☐ |
| Non-Process fuel burning source: Products of combustion do not contact materials heated. Complete this form for each boiler or fuel burner and complete a Non-Title V Emission Point Description Form (APC 101) for each stack. (Check at right and complete lines 10 through 14) | ☐ |

## PROCESS EMISSION SOURCE DESCRIPTION AND DATA

| 8. **Type of operation:** Continuous ☒ Batch ☐ | Normal batch time | Normal batches/day |
|---|---|---|

| 9. **Process material inputs and In-process solid fuels** | Diagram reference | Input rates (pounds/hour) Design | Actual |
|---|---|---|---|
| A. Electrode material | | [redacted] | [redacted] |
| B. | | | |
| C. | | | |
| D. | | | |
| E. | | | |
| F. | | | |
| G. | | | |
| Totals | | | |

* A simple process flow diagram must be attached.

## DESCRIPTION OF BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE

**10. Boiler or burner data:** (Complete lines 10 through 14 using a separate form for each boiler, burner, etc.)

| Serial Number | Type of firing*** |
|---|---|
| | |

| Rated horsepower | Rated input capacity ($10^6$ BTU/Hr.) | Other rating (specify capacity and units) |
|---|---|---|
| | | |

| Date constructed | Date manufactured | Date of last modification (explain in comments below) |
|---|---|---|
| | | |

** Source with a common stack will have the same stack number.

*** Cyclone, spreader (with or without reinjection), pulverized (wet or dry bottom, with or without reinjection), other stoker (specify type, hand fired, automatic, or other type (describe below in comments).

## FUEL USED IN BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE

**11. Fuel data:** (Complete for a process emission source with in process fuel or a non-process fuel burning source)

| Primary fuel type (specify) | | | | Standby fuel type(s) (specify) | | | | |
|---|---|---|---|---|---|---|---|---|
| Fuels used | Annual usage | Hourly usage | | % Sulfur | % Ash | BTU value of fuel | | (For APC use only) SCC code |
| | | Design | Average | | | | | |
| Natural gas: | $10^6$ Cu. Ft. | Cu. Ft. | Cu. Ft. | ////////// ////////// | ///// ///// | 1,020 | | |
| #2 Fuel oil: | $10^3$ Gal. | Gal. | Gal. | | ///// ///// | | | |
| #5 Fuel oil: | $10^3$ Gal. | Gal. | Gal. | | ///// ///// | | | |
| #6 Fuel oil: | $10^3$ Gal. | Gal. | Gal. | | ///// ///// | | | |
| Coal: | Tons | Lbs. | Lbs. | | | | | |
| Wood: | Tons | Lbs. | Lbs. | ////////// ////////// | ///// ///// | | | |
| Liquid propane: | $10^3$ Gal. | Gal. | Gal. | //////// //////// | ///// ///// | 85,000 | | |
| Other (specify type & units): | | | | | | | | |

**12. If Wood is used as a fuel, specify types and estimate percent by weight of bark**

**13. If Wood is used with other fuels, specify percent by weight of wood charged to the burner.**

**14. Comments**

**SIGNATURE**

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

| **15. Signature** | | **Date** |
|---|---|---|
| **Signer's name** (type or print) | **Title** | **Phone number with area code** |

# Appendix B Emissions Calculations

**Process Name - Electrode Preparation, Anode Calendering - LFP Smyrna (Insignificant)**

| | |
|---|---|
| **Source ID** | NA |
| **Emission Point ID** | NA |

| | | |
|---|---|---|
| **Process Throughput** | [redacted] | cells/yr |
| **Process Throughput** | [redacted] | lb/yr |
| **Proposed Exhaust Flowrate** | 2,504.7 | scfm |
| **Proposed Exhaust Flowrate** | 67 | $Nm^3$/min |
| **Number of Process Units** | 6 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | HEPA Filtration | |
| **Emission Control Efficiency** | 99 | % |
| **Exhausts To** | Inside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| Cu | [redacted] |
| Graphite | |

**Allowable PM Emissions**

$E = 3.59\ P^{0.62}$

Where:

E = Emissions in pounds per hour

P = Process weight rate in tons per hour

E = [redacted]

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| PM | 4.23E-03 | 1.85E-02 | 0.42 | 1.9 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Stacking - LFP Smyrna**

| | |
|---|---|
| **Source ID** | 75-0851-05 |
| **Emission Point ID** | W-1 - W-24 |

| | | |
|---|---|---|
| **Process Throughput** | [redacted] | cells/yr |
| **Process Throughput** | | lb/yr |
| **Proposed Exhaust Flowrate** | 2,803.7 | scfm |
| **Proposed Exhaust Flowrate** | 75 | $Nm^3$/min |
| **Number of Process Units** | 24 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | Filtration | |
| **Emission Control Efficiency** | 99 | % |
| **Exhausts To** | Inside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| P | [redacted] |
| Fe | |
| Li | |
| Al | |
| Cu | |
| Graphite | |
| Ceramic | |

**Allowable PM Emissions**

$E = 3.59\ P^{0.62}$

Where:

E = Emissions in pounds per hour

P = Process weight rate in tons per hour

E = [redacted]

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| PM | 0.18 | 0.8 | 17.78 | 77.9 |
| HAP | 0.03 | 0.1 | 2.54 | 11.1 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Stack Inspection, Transfer from Stacking to Inspection - LFP Smyrna (Insignificant)**

| | |
|---|---|
| **Source ID** | NA |
| **Emission Point ID** | NA |

| | | |
|---|---|---|
| **Process Throughput** | [redacted] | cells/yr |
| **Process Throughput** | | lb/yr |
| **Proposed Exhaust Flowrate** | 2,803.7 | scfm |
| **Proposed Exhaust Flowrate** | 75 | $Nm^3$/min |
| **Number of Process Units** | 2 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | Filtration | |
| **Emission Control Efficiency** | 99 | % |
| **Exhausts To** | Inside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| P | [redacted] |
| Fe | |
| Li | |
| Al | |
| Cu | |
| Graphite | |
| Ceramic | |

**Allowable PM Emissions**

$E = 3.59\ P^{0.62}$

Where:

E = Emissions in pounds per hour

P = Process weight rate in tons per hour

E = [redacted]

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| PM | 9.88E-04 | 4.33E-03 | 0.10 | 0.4 |
| HAP | 1.41E-04 | 6.18E-04 | 0.01 | 0.1 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Stack Inspection LFP Smyrna (Insignificant)**

| | |
|---|---|
| **Source ID** | NA |
| **Emission Point ID** | NA |

| | | |
|---|---|---|
| **Process Throughput** | [redacted] | cells/yr |
| **Process Throughput** | | lb/yr |
| **Proposed Exhaust Flowrate** | 1,943.9 | scfm |
| **Proposed Exhaust Flowrate** | 52 | $Nm^3$/min |
| **Number of Process Units** | 2 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | Filtration | |
| **Emission Control Efficiency** | 99 | % |
| **Exhausts To** | Inside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| P | [redacted] |
| Fe | |
| Li | |
| Al | |
| Cu | |
| Graphite | |
| Ceramic | |

**Allowable PM Emissions**

$E = 3.59\ P^{0.62}$

Where:

E = Emissions in pounds per hour

P = Process weight rate in tons per hour

E = [redacted]

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| PM | 1.28E-03 | 5.59E-03 | 0.13 | 0.6 |
| HAP | 1.82E-04 | 7.98E-04 | 0.02 | 0.1 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Assembly Line, Tab Prep - LFP Smyrna (Insignificant)**

| | |
|---|---|
| **Source ID** | NA |
| **Emission Point ID** | NA |

| | | |
|---|---|---|
| **Process Throughput** | [redacted] | cells/yr |
| **Process Throughput** | [redacted] | lb/yr |
| **Proposed Exhaust Flowrate** | 972.0 | scfm |
| **Proposed Exhaust Flowrate** | 26 | $Nm^3$/min |
| **Number of Process Units** | 2 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | Filtration | |
| **Emission Control Efficiency** | 99 | % |
| **Exhausts To** | Inside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| Al | [redacted] |
| Cu | |

**Allowable PM Emissions**

$E = 3.59\ P^{0.62}$

Where:

E = Emissions in pounds per hour

P = Process weight rate in tons per hour

E = [redacted]

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| PM | 1.18E-04 | 5.15E-04 | 1.18E-02 | 5.15E-02 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Assembly Line, Tab Welding LFP Smyrna (Insignificant)**

| | |
|---|---|
| **Source ID** | NA |
| **Emission Point ID** | NA |

| | | |
|---|---|---|
| **Process Throughput** | [redacted] | cells/yr |
| **Process Throughput** | [redacted] | lb/yr |
| **Proposed Exhaust Flowrate** | 2,355.1 | scfm |
| **Proposed Exhaust Flowrate** | 63 | $Nm^3/min$ |
| **Number of Process Units** | 2 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | Filtration | |
| **Emission Control Efficiency** | 99 | % |
| **Exhausts To** | Inside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| Al | [redacted] |
| Cu | |

**Allowable PM Emissions**

$E = 3.59\ P^{0.62}$

Where:

E = Emissions in pounds per hour

P = Process weight rate in tons per hour

E = [redacted]

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| PM | 2.94E-04 | 1.29E-03 | 2.94E-02 | 0.1 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Assembly Line, Insert and Pre-Weld LFP Smyrna (Insignificant)**

| | | |
|---|---|---|
| **Source ID** | NA | |
| **Emission Point ID** | NA | |
| **Process Throughput** | [redacted] | cells/yr |
| **Process Throughput** | [redacted] | lb/yr |
| **Proposed Exhaust Flowrate** | 972.0 | scfm |
| **Proposed Exhaust Flowrate** | 26 | $Nm^3$/min |
| **Number of Process Units** | 2 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | Filtration | |
| **Emission Control Efficiency** | 99 | % |
| **Exhausts To** | Inside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| Al | [redacted] |

**Allowable PM Emissions**

$E = 3.59\ P^{0.62}$

Where:

E = Emissions in pounds per hour

P = Process weight rate in tons per hour

E = [redacted]

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| PM | 5.88E-05 | 2.57E-04 | 5.88E-03 | 2.57E-02 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Assembly Line, Top Cap Welding LFP Smyrna (Insignificant)**

| | |
|---|---|
| **Source ID** | NA |
| **Emission Point ID** | NA |

| | | |
|---|---|---|
| **Process Throughput** | [redacted] | cells/yr |
| **Process Throughput** | [redacted] | lb/yr |
| **Proposed Exhaust Flowrate** | 972.0 | scfm |
| **Proposed Exhaust Flowrate** | 26 | $Nm^3$/min |
| **Number of Process Units** | 2 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | Filtration | |
| **Emission Control Efficiency** | 99 | % |
| **Exhausts To** | Inside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| Al | [redacted] |

**Allowable PM Emissions**

$E = 3.59\ P^{0.62}$

Where:

E = Emissions in pounds per hour

P = Process weight rate in tons per hour

E = [redacted]

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| PM | 5.88E-05 | 2.57E-04 | 5.88E-03 | 2.57E-02 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Case Seal Welding LFP Smyrna (Insignificant)**

| | |
|---|---|
| **Source ID** | NA |
| **Emission Point ID** | NA |

| | | |
|---|---|---|
| **Process Throughput** | [redacted] | cells/yr |
| **Process Throughput** | [redacted] | lb/yr |
| **Proposed Exhaust Flowrate** | 1,121.5 | scfm |
| **Proposed Exhaust Flowrate** | 30 | $Nm^3/min$ |
| **Number of Process Units** | 2 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | Filtration | |
| **Emission Control Efficiency** | 99 | % |
| **Exhausts To** | Inside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| Al | [redacted] |

**Allowable PM Emissions**

$E = 3.59\ P^{0.62}$

Where:

E = Emissions in pounds per hour

P = Process weight rate in tons per hour

E = [redacted]

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| PM | 7.05E-05 | 3.09E-04 | 7.05E-03 | 3.09E-02 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Side Plate Gluing LFP Smyrna (Insignificant)**

| | |
|---|---|
| **Source ID** | NA |
| **Emission Point ID** | NA |

| | | |
|---|---|---|
| **Process Throughput** | [redacted] | cells/yr |
| **Proposed Exhaust Flowrate** | 560.7 | scfm |
| **Proposed Exhaust Flowrate** | 15 | $Nm^3/min$ |
| **Number of Process Units** | 1 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | None | |
| **Emission Control Efficiency** | 0 | % |
| **Exhausts To** | Outside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| Benzene | [redacted] |
| Toluene | |
| Ethylbenzene | |
| Xylene | |
| Methane | |
| Ethane | |
| Ethylene | |
| Formaldehyde | |

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| VOC | 4.89E-03 | 2.14E-02 | 4.89E-03 | 2.14E-02 |
| HAP | 2.83E-03 | 1.24E-02 | 2.83E-03 | 1.24E-02 |
| GHG | 0.08 | 0.4 | 0.08 | 0.4 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Side Plate Welding LFP Smyrna (Insignificant)**

| | | |
|---|---|---|
| **Source ID** | NA | |
| **Emission Point ID** | NA | |
| **Process Throughput** | [redacted] | cells/yr |
| **Process Throughput** | [redacted] | lb/yr |
| **Proposed Exhaust Flowrate** | 953.3 | scfm |
| **Proposed Exhaust Flowrate** | 25.5 | $Nm^3$/min |
| **Number of Process Units** | 1 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | Filtration | |
| **Emission Control Efficiency** | 99 | % |
| **Exhausts To** | Inside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| Al | [redacted] |

**Allowable PM Emissions**

$E = 3.59\ P^{0.62}$

Where:

E = Emissions in pounds per hour

P = Process weight rate in tons per hour

E = [redacted]

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| PM | 1.47E-05 | 6.44E-05 | 1.47E-03 | 6.44E-03 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Busbar Welding LFP Smyrna (Insignificant)**

| | |
|---|---|
| **Source ID** | NA |
| **Emission Point ID** | NA |

| | | |
|---|---|---|
| **Process Throughput** | [redacted] | cells/yr |
| **Process Throughput** | | lb/yr |
| **Proposed Exhaust Flowrate** | 953.3 | scfm |
| **Proposed Exhaust Flowrate** | 25.5 | $Nm^3/min$ |
| **Number of Process Units** | 1 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | Filtration | |
| **Emission Control Efficiency** | 99 | % |
| **Exhausts To** | Inside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| Al | [redacted] |
| Cu | |
| Cr | |

**Allowable PM Emissions**

$E = 3.59\ P^{0.62}$

Where:

E = Emissions in pounds per hour

P = Process weight rate in tons per hour

E = [redacted]

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| PM | 4.41E-05 | 1.93E-04 | 4.41E-03 | 1.93E-02 |
| HAP | 1.47E-05 | 6.44E-05 | 1.47E-03 | 6.44E-03 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Busbar Gluing LFP Smyrna (Insignificant)**

| | |
|---|---|
| **Source ID** | NA |
| **Emission Point ID** | NA |

| | | |
|---|---|---|
| **Process Throughput** | [redacted] | cells/yr |
| **Proposed Exhaust Flowrate** | 392.5 | scfm |
| **Proposed Exhaust Flowrate** | 10.5 | $Nm^3/min$ |
| **Number of Process Units** | 1 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | NA | |
| **Emission Control Efficiency** | 0 | % |
| **Exhausts To** | Outside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| Benzene | [redacted] |
| Toluene | |
| Ethylbenzene | |
| Xylene | |
| Methane | |
| Ethane | |
| Ethylene | |
| Formaldehyde | |

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| VOC | 3.26E-03 | 1.43E-02 | 3.26E-03 | 1.43E-02 |
| HAP | 1.89E-03 | 8.26E-03 | 1.89E-03 | 8.26E-03 |
| GHG | 0.06 | 0.2 | 0.06 | 0.2 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Electrode Preparation, Cathode Slitter Stanford (Insignificant)**

| | |
|---|---|
| **Source ID** | NA |
| **Emission Point ID** | NA |

| | | |
|---|---|---|
| **Process Throughput** | [redacted] | cells/yr |
| **Process Throughput** | | lb/yr |
| **Proposed Exhaust Flowrate** | 2,168.2 | scfm |
| **Proposed Exhaust Flowrate** | 58 | $Nm^3$/min |
| **Number of Process Units** | 2 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | Dust Collector | |
| **Emission Control Efficiency** | 99 | % |
| **Exhausts To** | Inside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| P | [redacted] |
| Fe | |
| Li | |
| Al | |

**Allowable PM Emissions**

$E = 3.59\ P^{0.62}$

Where:

E = Emissions in pounds per hour

P = Process weight rate in tons per hour

E = [redacted]

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| PM | 8.23E-04 | 3.60E-03 | 8.23E-02 | 0.4 |
| HAP | 2.06E-04 | 9.01E-04 | 2.06E-02 | 9.01E-02 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Electrode Preparation, Anode Slitter Stanford (Insignificant)**

| | |
|---|---|
| **Source ID** | NA |
| **Emission Point ID** | NA |

| | | |
|---|---|---|
| **Process Throughput** | [redacted] | cells/yr |
| **Process Throughput** | | lb/yr |
| **Proposed Exhaust Flowrate** | 2,168.2 | scfm |
| **Proposed Exhaust Flowrate** | 58 | $Nm^3$/min |
| **Number of Process Units** | 2 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | Dust Collector | |
| **Emission Control Efficiency** | 99 | % |
| **Exhausts To** | Inside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| Cu | [redacted] |
| Graphite | |

**Allowable PM Emissions**

$E = 3.59\ P^{0.62}$

Where:

E = Emissions in pounds per hour

P = Process weight rate in tons per hour

E = [redacted]

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| PM | 4.12E-04 | 1.80E-03 | 0.04 | 0.2 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Electrode Notching, Cathode Stanford (Insignificant)**

| | | |
|---|---|---|
| **Source ID** | NA | |
| **Emission Point ID** | NA | |
| **Process Throughput** | [redacted] | cells/yr |
| **Process Throughput** | [redacted] | lb/yr |
| **Proposed Exhaust Flowrate** | 2,168.2 | scfm |
| **Proposed Exhaust Flowrate** | 58 | $Nm^3/min$ |
| **Number of Process Units** | 2 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | Dust Collector | |
| **Emission Control Efficiency** | 99 | % |
| **Exhausts To** | Inside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| P | [redacted] |
| Fe | |
| Li | |
| Al | |

**Allowable PM Emissions**

$E = 17.31\ P^{0.16}$

Where:

E = Emissions in pounds per hour

P = Process weight rate in tons per hour

E = [redacted]

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| PM | 8.23E-04 | 3.60E-03 | 8.23E-02 | 0.4 |
| HAP | 2.06E-04 | 9.01E-04 | 2.06E-02 | 9.01E-02 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Electrode Notching, Anode Stanford (Insignificant)**

| | | |
|---|---|---|
| **Source ID** | NA | |
| **Emission Point ID** | NA | |
| **Process Throughput** | [redacted] | cells/yr |
| **Process Throughput** | [redacted] | lb/yr |
| **Proposed Exhaust Flowrate** | 2,168.2 | scfm |
| **Proposed Exhaust Flowrate** | 58 | $Nm^3$/min |
| **Number of Process Units** | 2 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | Dust Collector | |
| **Emission Control Efficiency** | 99 | % |
| **Exhausts To** | Inside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| Cu | [redacted] |
| Graphite | |

**Allowable PM Emissions**

$E = 17.31\ P^{0.16}$

Where:

E = Emissions in pounds per hour

P = Process weight rate in tons per hour

E = [redacted]

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| PM | 4.12E-04 | 1.80E-03 | 0.04 | 0.2 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Stacking Stanford (Insignificant)**

| | |
|---|---|
| **Source ID** | NA |
| **Emission Point ID** | NA |

| | | |
|---|---|---|
| **Process Throughput** | [redacted] | cells/yr |
| **Process Throughput** | | lb/yr |
| **Proposed Exhaust Flowrate** | 2,803.7 | scfm |
| **Proposed Exhaust Flowrate** | 75 | $Nm^3$/min |
| **Number of Process Units** | 6 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | Dust Collector | |
| **Emission Control Efficiency** | 99 | % |
| **Exhausts To** | Inside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| P | [redacted] |
| Fe | |
| Li | |
| Al | |
| Cu | |
| Graphite | |
| Ceramic | |

**Allowable PM Emissions**

$E = 3.59\ P^{0.62}$

Where:

E = Emissions in pounds per hour

P = Process weight rate in tons per hour

E = [redacted]

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| PM | 4.18E-03 | 1.83E-02 | 0.42 | 1.8 |
| HAP | 5.97E-04 | 2.61E-03 | 0.06 | 0.3 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Stack Inspection, Transfer from Stacking to Inspection Stanford (Insignificant)**

| | |
|---|---|
| **Source ID** | NA |
| **Emission Point ID** | NA |

| | | |
|---|---|---|
| **Process Throughput** | [redacted] | cells/yr |
| **Process Throughput** | | lb/yr |
| **Proposed Exhaust Flowrate** | 2,803.7 | scfm |
| **Proposed Exhaust Flowrate** | 75 | $Nm^3$/min |
| **Number of Process Units** | 2 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | Dust Collector | |
| **Emission Control Efficiency** | 99 | % |
| **Exhausts To** | Inside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| P | [redacted] |
| Fe | |
| Li | |
| Al | |
| Cu | |
| Graphite | |
| Ceramic | |

**Allowable PM Emissions**

$E = 3.59\ P^{0.62}$

Where:

E = Emissions in pounds per hour

P = Process weight rate in tons per hour

E = [redacted]

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| PM | 9.88E-04 | 4.33E-03 | 0.10 | 0.4 |
| HAP | 1.41E-04 | 6.18E-04 | 0.01 | 0.1 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Stack Inspection Stanford (Insignificant)**

| | |
|---|---|
| **Source ID** | NA |
| **Emission Point ID** | NA |

| | | |
|---|---|---|
| **Process Throughput** | [redacted] | cells/yr |
| **Process Throughput** | | lb/yr |
| **Proposed Exhaust Flowrate** | 1,943.9 | scfm |
| **Proposed Exhaust Flowrate** | 52 | $Nm^3$/min |
| **Number of Process Units** | 2 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | Dust Collector | |
| **Emission Control Efficiency** | 99 | % |
| **Exhausts To** | Inside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| P | [redacted] |
| Fe | |
| Li | |
| Al | |
| Cu | |
| Graphite | |
| Ceramic | |

**Allowable PM Emissions**

$E = 3.59\ P^{0.62}$

Where:

E = Emissions in pounds per hour

P = Process weight rate in tons per hour

E = [redacted]

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| PM | 1.28E-03 | 5.59E-03 | 0.13 | 0.6 |
| HAP | 1.82E-04 | 7.98E-04 | 0.02 | 0.1 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Assembly Pre-Welding and Cutting Stanford (Insignificant)**

| | | |
|---|---|---|
| **Source ID** | NA | |
| **Emission Point ID** | NA | |
| **Process Throughput** | [redacted] | cells/yr |
| **Process Throughput** | | lb/yr |
| **Proposed Exhaust Flowrate** | 972.0 | scfm |
| **Proposed Exhaust Flowrate** | 26 | $Nm^3$/min |
| **Number of Process Units** | 2 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | Dust Collector | |
| **Emission Control Efficiency** | 99 | % |
| **Exhausts To** | Inside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| Al | [redacted] |
| Cu | |

**Allowable PM Emissions**

$E = 3.59\ P^{0.62}$

Where:

E = Emissions in pounds per hour

P = Process weight rate in tons per hour

E = [redacted]

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| PM | 1.18E-04 | 5.15E-04 | 0.01 | 5.15E-02 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Assembly, Tab Welding Stanford (Insignificant)**

| | | |
|---|---|---|
| **Source ID** | NA | |
| **Emission Point ID** | NA | |
| **Process Throughput** | [redacted] | cells/yr |
| **Process Throughput** | [redacted] | lb/yr |
| **Proposed Exhaust Flowrate** | 2,355.1 | scfm |
| **Proposed Exhaust Flowrate** | 63 | $Nm^3/min$ |
| **Number of Process Units** | 2 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | Dust Collector | |
| **Emission Control Efficiency** | 99 | % |
| **Exhausts To** | Inside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| Al | [redacted] |
| Cu | |

**Allowable PM Emissions**

$E = 3.59\ P^{0.62}$

Where:

E = Emissions in pounds per hour

P = Process weight rate in tons per hour

E = [redacted]

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| PM | 2.94E-04 | 1.29E-03 | 0.03 | 0.1 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Assembly, Insert and Pre-Welding Stanford (Insignificant)**

| | | |
|---|---|---|
| **Source ID** | NA | |
| **Emission Point ID** | NA | |
| **Process Throughput** | [redacted] | cells/yr |
| **Process Throughput** | [redacted] | lb/yr |
| **Proposed Exhaust Flowrate** | 972.0 | scfm |
| **Proposed Exhaust Flowrate** | 26 | $Nm^3$/min |
| **Number of Process Units** | 2 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | Dust Collector | |
| **Emission Control Efficiency** | 99 | % |
| **Exhausts To** | Inside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| Al | [redacted] |

**Allowable PM Emissions**

$E = 3.59\ P^{0.62}$

Where:

E = Emissions in pounds per hour

P = Process weight rate in tons per hour

E = [redacted]

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| PM | 5.88E-05 | 2.57E-04 | 5.88E-03 | 2.57E-02 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Assembly, Top Cap Welding Stanford (Insignificant)**

| | | |
|---|---|---|
| **Source ID** | NA | |
| **Emission Point ID** | NA | |
| **Process Throughput** | [redacted] | cells/yr |
| **Process Throughput** | [redacted] | lb/yr |
| **Proposed Exhaust Flowrate** | 972.0 | scfm |
| **Proposed Exhaust Flowrate** | 26 | $Nm^3$/min |
| **Number of Process Units** | 2 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | Dust Collector | |
| **Emission Control Efficiency** | 99 | % |
| **Exhausts To** | Inside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| Al | [redacted] |

**Allowable PM Emissions**

$E = 3.59\ P^{0.62}$

Where:

E = Emissions in pounds per hour

P = Process weight rate in tons per hour

E = [redacted]

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| PM | 5.88E-05 | 2.57E-04 | 5.88E-03 | 2.57E-02 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Side Plate Gluing, RTV Gluing Stanford (Insignificant)**

| | |
|---|---|
| **Source ID** | NA |
| **Emission Point ID** | NA |

| | | |
|---|---|---|
| **Process Throughput** | [redacted] | cells/yr |
| **Proposed Exhaust Flowrate** | 560.7 | scfm |
| **Proposed Exhaust Flowrate** | 15 | $Nm^3/min$ |
| **Number of Process Units** | 1 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | Absorption & Release by Activated Carbon | |
| **Emission Control Efficiency** | 90 | % |
| **Exhausts To** | Outside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| Benzene | [redacted] |
| Toluene | |
| Ethylbenzene | |
| Xylene | |
| Methane | |
| Ethane | |
| Ethylene | |
| Formaldehyde | |

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| VOC | 4.87E-03 | 2.13E-02 | 0.05 | 0.2 |
| HAP | 2.81E-03 | 1.23E-02 | 0.03 | 0.1 |
| GHG | 0.08 | 0.4 | 0.84 | 3.7 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Side Plate Gluing, TIM Gluing Stanford (Insignificant)**

| | |
|---|---|
| **Source ID** | NA |
| **Emission Point ID** | NA |

| | | |
|---|---|---|
| **Process Throughput** | [redacted] | cells/yr |
| **Proposed Exhaust Flowrate** | 560.7 | scfm |
| **Proposed Exhaust Flowrate** | 15 | $Nm^3/min$ |
| **Number of Process Units** | 1 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | Absorption & Release by Activated Carbon | |
| **Emission Control Efficiency** | 90 | % |
| **Exhausts To** | Outside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| Benzene | [redacted] |
| Toluene | |
| Ethylbenzene | |
| Xylene | |
| Methane | |
| Ethane | |
| Ethylene | |
| Formaldehyde | |

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| VOC | 1.63E-03 | 7.13E-03 | 0.02 | 7.13E-02 |
| HAP | 9.43E-04 | 4.13E-03 | 9.43E-03 | 4.13E-02 |
| GHG | 0.03 | 0.1 | 0.28 | 1.2 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Busbar Welding Stanford (Insignificant)**

| | |
|---|---|
| **Source ID** | NA |
| **Emission Point ID** | NA |

| | | |
|---|---|---|
| **Process Throughput** | [redacted] | cells/yr |
| **Process Throughput** | | lb/yr |
| **Proposed Exhaust Flowrate** | 953.3 | scfm |
| **Proposed Exhaust Flowrate** | 25.5 | $Nm^3/min$ |
| **Number of Process Units** | 1 | |
| **Hours of Operation** | 8760 | hr/year |
| **Emission Control** | Filtration | |
| **Emission Control Efficiency** | 99 | % |
| **Exhausts To** | Inside the building | |

**Emission Factors** [1]

| | (kg/cell) |
|---|---|
| Al | [redacted] |
| Cu | |
| Ni | |

**Allowable PM Emissions**

$E = 3.59\ P^{0.62}$

Where:

E = Emissions in pounds per hour

P = Process weight rate in tons per hour

E = [redacted]

| Emissions | | | | |
|---|---|---|---|---|
| Pollutant | Controlled | | Uncontrolled | |
| | (lb/hr) | (TPY) | (lb/hr) | (TPY) |
| PM | 4.41E-05 | 1.93E-04 | 4.41E-03 | 1.93E-02 |
| HAP | 1.47E-05 | 6.44E-05 | 1.47E-03 | 6.44E-03 |

1. Emission factors are based on emissions scaled from similar, previous-generation equipment at another facility. Units are kg of substance per cell of throughput.

**Process Name - Emergency Generators**
**Source ID** 75-0851-04
**Emission Point ID** EG-1 through EG-3

| | | |
|---|---|---|
| **Manufacturer** | | Cummins |
| **Number of Generators** | 2 | Diesel-fired |
| **Rated Capacity** | 2179 | kW each |
| **Rated Capacity** | 2922 | bhp each |
| **Fuel Consumption @ 100% Load** [1] | 141.3 | gal/hr @ 100% Load |
| **Manufacturer** | | Caterpillar |
| **Number of Generators** | 1 | Diesel-fired |
| **Rated Capacity** | 750 | kW each |
| **Rated Capacity** | 1006 | bhp each |
| **Fuel Consumption @ 100% Load** [1] | 53.6 | gal/hr @ 100% Load |
| **Hours of Operation** | 500 | hr/year |
| **High Heat Value of Diesel Fuel** | 137,030 | BTU/gal |

**Potential Emissions from Both Cummins Engines**

| Pollutant | PM | $SO_2$ | $NO_X$ | CO | VOC | $CO_2e$ | HAP |
|---|---|---|---|---|---|---|---|
| **Emission Factor (lb/MMBtu)** [2] | | | | | | 165.2 | 0.0044 |
| **Emission Factor (g/bhp-hr)** [2] | 0.16 | 0.14 | 5.30 | 0.57 | 0.22 | | |
| **Emissions (lb/hr)** | 2.06 | 1.80 | 68.29 | 7.34 | 2.83 | 6397 | 0.17 |
| **Emissions (TPY)** | 0.5 | 0.5 | 17.1 | 1.8 | 0.7 | 1599 | 4.26E-02 |

**Potential Emissions from Caterpillar Engine**

| Pollutant | PM | $SO_2$ | $NO_X$ | CO | VOC | $CO_2e$ | HAP |
|---|---|---|---|---|---|---|---|
| **Emission Factor (lb/MMBtu)** [2] | | 1.5E-03 | | | | 165.2 | 0.0044 |
| **Emission Factor (g/bhp-hr)** [2] | 0.02 | | 5.25 | 0.25 | 0.03 | | |
| **Emissions (lb/hr)** | 0.04 | 1.10E-02 | 11.64 | 0.55 | 0.07 | 1213 | 3.23E-02 |
| **Emissions (TPY)** | 1.11E-02 | 2.75E-03 | 2.9 | 0.1 | 1.66E-02 | 303 | 8.08E-03 |

**Potential Emissions from All Three Engines**

| Pollutant | PM | $SO_2$ | $NO_X$ | CO | VOC | $CO_2e$ | HAP |
|---|---|---|---|---|---|---|---|
| **Emissions (lb/hr)** | 2.11 | 1.81 | 79.93 | 7.90 | 2.90 | 7610.68 | 0.20 |
| **Emissions (TPY)** | 0.5 | 0.5 | 20.0 | 2.0 | 0.7 | 1903 | 5.07E-02 |

1. From vendor specifications.

2. Emission factors for $NO_X$, CO, VOC, and PM from manufacturer performance data and emission factors for $CO_2e$ from AP-42, Chapter 3.4, Table 3.4-1. Emission factors for HAP from AP-42, Chapter 3.4, Tables 3.4-3 and 3.4-4. For the Cummins engines the $SO_2$ emission factor from manufacturer performance data and for the Caterpillar engine, the $SO_2$ emission factor from AP-42, Chapter 3.4, Table 3.4-1.

**Process Name - Dehumidifiers**
**Source ID** 75-0851-03
**Emission Point ID** DH-1 - DH-11

**Hours of Operation** 8760 hr/yr
**High Heat Value of Natural Gas** 1020 BTU/scf

| Dehumidifier Number | Maximum Rated Heat Input (MMBtu/hr) |
|---|---|
| DH-1 | 1.170 |
| DH-2 | 1.170 |
| DH-3 | 1.437 |
| DH-4 | 1.437 |
| DH-5 | 1.170 |
| DH-6 | 1.170 |
| DH-7 | 1.437 |
| DH-8 | 1.437 |
| DH-9 | 1.437 |
| DH-10 (New) | 1.437 |
| DH-11 (New) | 1.437 |
| Total | 14.739 |

**Potential to Emit for all Dehumidifiers**

| Pollutant | PM | $SO_2$ | $NO_X$ | CO | VOC | $CO_2e$ | HAP |
|---|---|---|---|---|---|---|---|
| **Emission Factor (lb/MMScf)** [1] | 7.6 | 0.6 | 100 | 84 | 5.5 | 120000 | 1.88 |
| **Emissions (lb/hr)** | 0.11 | 8.67E-03 | 1.45 | 1.21 | 0.08 | 1734.00 | 0.03 |
| **Emissions (TPY)** | 0.5 | 3.80E-02 | 6.3 | 5.3 | 0.3 | 7595 | 0.1 |

**Potential to Emit for Two New Dehumidifiers (DH-10 and DH-11)**

| Pollutant | PM | $SO_2$ | $NO_X$ | CO | VOC | $CO_2e$ | HAP |
|---|---|---|---|---|---|---|---|
| **Emission Factor (lb/MMScf)** [1] | 7.6 | 0.6 | 100 | 84 | 5.5 | 120000 | 1.88 |
| **Emissions (lb/hr)** | 0.02 | 1.69E-03 | 0.28 | 0.24 | 0.02 | 338.12 | 0.01 |
| **Emissions (TPY)** | 0.1 | 7.40E-03 | 1.2 | 1.0 | 0.1 | 1481 | 0.02 |

1. from AP-42, Chapter 1.4 Natural Gas Combustion

**Process Name - Air Handling Units**
**Source ID** 75-0851-03
**Emission Point ID** See Below

| AHU/ARU/Door Heater Number | Maximum Rated Heat Input (MMBtu/hr) |
|---|---|
| UH1 | 0.150 |
| UH2 | 0.150 |
| UH3 | 0.150 |
| UH4 | 0.150 |
| UH5 | 0.150 |
| DAC 1a | 0.345 |
| DAC 1b | 0.345 |
| DAC 2a | 0.345 |
| DAC 2b | 0.345 |
| AHU 1 | 0.630 |
| AHU 2 | 0.270 |
| AHU 27 | 0.235 |
| AHU 27a | 0.235 |
| ARU 1 | 1.125 |
| ARU 2 | 1.125 |
| ARU 3 | 2.160 |
| ARU 4 | 1.260 |
| ARU 5 | 1.260 |
| ARU 6 | 1.125 |
| ARU 7 | 1.125 |
| ARU 8 | 1.125 |
| ARU 9 | 1.26 |
| ARU 10 | 1.26 |
| Total | 16.325 |

**Hours of Operation** 8760 hr/yr
**High Heat Value of Natural Gas** 1020 BTU/scf

**Proposed Emissions**

| Pollutant | PM | $SO_2$ | $NO_X$ | CO | VOC | $CO_2e$ | HAP |
|---|---|---|---|---|---|---|---|
| **Emission Factor (lb/MMScf)** [1] | 7.6 | 0.6 | 100 | 84 | 5.5 | 120000 | 1.88 |
| **Emissions (lb/hr)** | 0.12 | 9.60E-03 | 1.60 | 1.34 | 0.09 | 1920.59 | 0.03 |
| **Emissions (TPY)** | 0.5 | 4.21E-02 | 7.0 | 5.9 | 0.4 | 8412 | 0.1 |

1. from AP-42, Chapter 1.4 Natural Gas Combustion

**Process Name - Diesel Storage Tank Associated with Caterpillar Emergency Generator (Insignificant)**
**Source ID** NA
**Emission Point ID** NA

## HORIZONTAL TANK
## EMISSION CALCULATION FORM (Annual Calculation)

| | | | | | |
|---|---|---|---|---|---|
| **Tank No.** | **NA** | **Tank type** | **Horizontal** | **Date** | 04/21/23 |
| **Material stored** | **Diesel** | **Company** | **Envision AESC US** | **Performed by** | **Shipp** |
| **City** | **Smyrna** | **State** | **Tennessee** | | |
| **Description** | **Diesel Storage** | | | | |

| **INPUT DATA** | | | | **CALCULATIONS** | | | |
|---|---|---|---|---|---|---|---|
| | **Symbol** | | **Units** | | **Symbol** | | **Units** |
| | | | | | | | |
| | | | | **Breathing losses** | | | |
| **Molecular Weight** | | | | **Tank vapor space vo** | Vv | 183.75 | ft3 |
| Molecular weight | Mv | 200 | Lb/lb-mole | Vapor density | Wv | 2.78E-04 | lb/ft3 |
| **Tank design data** | | | | Vapor space expansio | KE | 0.02559 | |
| **Shell length** | L | 7.50 | ft | Vented vapor saturati | Ks | 0.9986 | ft2 |
| Diameter | D | 7.00 | ft | | | | |
| **Effective Diameter** | DE | 8.18 | ft | | | | |
| Liquid height | Hl | 6.50 | ft | **Breathing losses** | LB | 0.48 | lb/yr |
| Avg. Liquid height | Hl | 3.25 | ft | | | 0.0002 | TPY |
| **Vapor space outage** | Hvo | 3.50 | ft | **Working losses** | Lw | 0.99 | lb/yr |
| Tank volume | | 2,158 | gallons | | | 0.0005 | TPY |
| Turnovers Per Year | N | 12 | | **TOTAL LOSSES** | LT | 1.46 | lb/yr |
| Net Annual throughput | Q | 26,800 | gallons/yr | | | **0.0007** | TPY |
| Tunover factor | KN | 1.000 | | | | | |
| Working loss product factor | Kp | 1.00 | | | | | |
| **Meteorological data (Annual Averages)** | | | | | | | |
| Daily ave. ambient temp. | TAA | 59.00 | °F | | | | |
| Daily max. ambient temp. | TAX | 64.00 | °F | | | | |
| Daily min. ambient temp. | TAN | 54.00 | °F | | | | |
| Daily ambient temp. range | DTA | 10.00 | °F | | | | |
| Tank paint solar absorptance (see adjacent | $\alpha$ | 0.17 | | | | | |
| Daily total insolation factor | I | 1,282 | Btu/ft2-day | | | | |
| | | | | | | | |
| Liquid bulk temperature | TB | 59.02 | °F | | | | |
| Daily vapor temp. range | DTv | 13.30 | °F | | | | |
| | | | | | | | |
| Daily ave. liquid surface temp. | TLA | 59.00 | °F | 519.00 | °R | | |
| Daily max. liquid surface temp. | TLX | 64.00 | °F | 524.00 | °R | | |
| Daily min. liquid surface temp. | TIN | 54.00 | °F | 514.00 | °R | | |
| VP @ daily ave. liquid surf. temp. | PvA | 0.40 | mm Hg | 0.008 | psia | | |
| VP @ daily max. liquid surf. temp. | PvX | 0.40 | mm Hg | 0.008 | psia | | |
| VP @ daily min. liquid surf. temp. | PvN | 0.40 | mm Hg | 0.008 | psia | | |
| Daily vapor pressure range | DPv | - | mm Hg | 0.000 | psia | | |
| Breather vent pressure setting range | DPB | 0.03 | mm Hg | 0.001 | psia | | |
| Atmospheric Pressure | PA | 760.00 | mm Hg | 14.700 | psia | | |

**Table 1**
**Tank Paint Solar Absorptance**

| **Tank Paint** | **Solar Absorptance** |
|---|---|
| white/white | 0.17 |
| Aluminum/Specular | 0.39 |
| gray/light | 0.54 |
| Aluminum/Diffuse | 0.6 |
| grey/medium | 0.68 |

**Calculations performed on this spreadsheet are taken from the USEPA AP-42- Section 7.1 Organic Liquid Storage Tanks**

# Appendix C Safety Data Sheets (Redacted)

# Appendix D
# Process Flow Diagrams
# (Redacted)

# Cat® C27
## Diesel Generator Sets

| | |
|---|---|
| Bore – mm (in) | 137.2 (5.4) |
| Stroke – mm (in) | 152.4 (6.0) |
| Displacement – L ($in^3$) | 27.03 (1649.47) |
| Compression Ratio | 16.5:1 |
| Aspiration | TA |
| Fuel System | MEUI |
| Governor Type | ADEM™ A4 |

Image shown may not reflect actual configuration

| Standby 60 Hz ekW (kVA) | Prime 60 Hz ekW (kVA) | Standby 60 Hz ekW (kVA) | Prime 60 Hz ekW (kVA) | Emissions Performance |
|---|---|---|---|---|
| 750 (937) | 680 (850) | 800 (1000) | 725 (906) | U.S. EPA Emergency Stationary Use Only (Tier 2) |

## Standard Features

### Cat® Diesel Engine
- Meets U.S. EPA Emergency Stationary Use Only (Tier 2) emission standards
- Reliable performance proven in thousands of applications worldwide

### Generator Set Package
- Accepts 100% block load in one step and meets NFPA 110 loading requirements
- Conforms to ISO 8528-5 G3 load acceptance requirements
- Reliability verified through torsional vibration, fuel consumption, oil consumption, transient performance, and endurance testing

### Alternators
- Superior motor starting capability minimizes need for oversizing generator
- Designed to match performance and output characteristics of Cat diesel engines

### Cooling System
- Cooling systems available to operate in ambient temperatures up to 50°C (122°F)
- Tested to ensure proper generator set cooling

### EMCP 4 Control Panels
- User-friendly interface and navigation
- Scalable system to meet a wide range of installation requirements
- Expansion modules and site specific programming for specific customer requirements

### Warranty
- 24 months/1000-hour warranty for standby and mission critical ratings
- 12 months/unlimited hour warranty for prime and continuous ratings
- Extended service protection is available to provide extended coverage options

### Worldwide Product Support
- Cat dealers have over 1,800 dealer branch stores operating in 200 countries
- Your local Cat dealer provides extensive post-sale support, including maintenance and repair agreements

### Financing
- Caterpillar offers an array of financial products to help you succeed through financial service excellence
- Options include loans, finance lease, operating lease, working capital, and revolving line of credit
- Contact your local Cat dealer for availability in your region

# Optional Equipment

## Engine

***Air Cleaner***
- ❑ Single element
- ❑ Dual element
- ❑ Heavy duty

***Muffler***
- ❑ Residential grade (25 dB)

***Starting***
- ❑ Standard batteries
- ❑ Oversized batteries
- ❑ Standard electric starter(s)
- ❑ Jacket water

## Alternator

***Output voltage***
- ❑ 208V
- ❑ 240V
- ❑ 480V
- ❑ 600V

***Temperature Rise (over 40°C ambient)***
- ❑ 150°C
- ❑ 125°C
- ❑ 105°C
- ❑ 80°C

***Winding type***
- ❑ Random wound

***Excitation***
- ❑ Internal excitation (IE)

***Attachments***
- ❑ Anti-condensation heater
- ❑ Stator and bearing temperature monitoring and protection

## Power Termination

***Type***
- ❑ Bus bar
- ❑ Circuit breaker
- ❑ 400A ❑ 800A
- ❑ 1200A ❑ 1600A
- ❑ 2000A ❑ 2500A
- ❑ 3000A
- ❑ UL ❑ IEC
- ❑ 3-pole ❑ 4-pole
- ❑ Manually operated
- ❑ Electrically operated

***Trip Unit***
- ❑ LSI ❑ LSI-G
- ❑ LSIG-P

## Factory Enclosure

- ❑ Sound attenuated

***Attachments***
- ❑ Cold weather bundle
- ❑ DC lighting package
- ❑ Motorized louvers

## Fuel Tank

- ❑ 1000 gal (3785 L)
- ❑ 2000 gal (7571 L)
- ❑ 3600 gal (13627 L)

## Control System

***Controller***
- ❑ EMCP 4.2B
- ❑ EMCP 4.3
- ❑ EMCP 4.4

***Attachments***
- ❑ Local annunciator module
- ❑ Remote annunciator module
- ❑ Expansion I/O module
- ❑ Remote monitoring software

## Charging

- ❑ Battery charger – 10A
- ❑ Battery charger – 20A
- ❑ Battery charger – 30A

## Vibration Isolators

- ❑ Rubber
- ❑ Spring
- ❑ Seismic rated

## Cat Connect

***Connectivity***
- ❑ Ethernet
- ❑ Cellular
- ❑ Satellite

## Extended Service Options

***Terms***
- ❑ 2 year (prime)
- ❑ 3 year
- ❑ 5 year
- ❑ 10 year

***Coverage***
- ❑ Silver
- ❑ Gold
- ❑ Platinum
- ❑ Platinum Plus

## Ancillary Equipment

- ❑ Automatic transfer switch (ATS)
- ❑ Uninterruptible power supply (UPS)
- ❑ Paralleling switchgear
- ❑ Paralleling controls

## Certifications

- ❑ UL 2200 Listed
- ❑ CSA
- ❑ IBC seismic certification
- ❑ OSHPD pre-approval

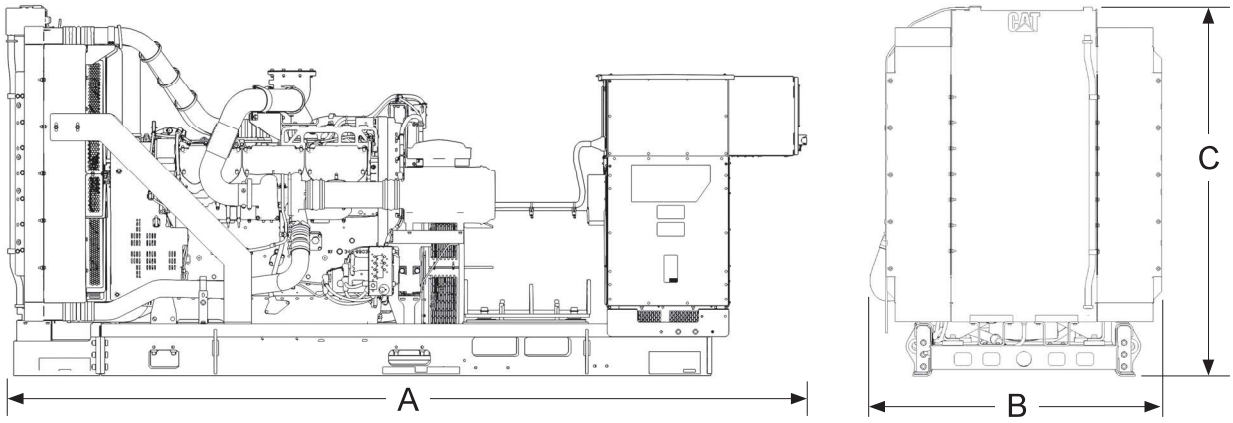
**Note:** *Some options may not be available on all models. Certifications may not be available with all model configurations. Consult factory for availability.*

## Package Performance

| Performance | Standby | | Prime | | Standby | | Prime | |
|---|---|---|---|---|---|---|---|---|
| Frequency | 60 Hz | | 60 Hz | | 60 Hz | | 60 Hz | |
| Gen set power rating with fan | 750 ekW | | 680 ekW | | 800 ekW | | 725 ekW | |
| Gen set power rating with fan @ 0.8 power factor | 937 kVA | | 850 kVA | | 1000 kVA | | 906 kVA | |
| Emissions | EPA ESE (Tier 2) | | EPA ESE (Tier 2) | | EPA ESE (Tier 2) | | EPA ESE (Tier 2) | |
| Performance number | DM9071-03 | | DM9073-02 | | DM7696-02 | | DM9069-02 | |
| **Fuel Consumption** | | | | | | | | |
| 100% load with fan – L/hr (gal/hr) | 202.9 | (53.6) | 187.4 | (49.5) | 216.9 | (57.3) | 199.6 | (52.7) |
| 75% load with fan – L/hr (gal/hr) | 162.4 | (42.9) | 149.6 | (39.5) | 171.7 | (45.4) | 157.8 | (41.7) |
| 50% load with fan – L/hr (gal/hr) | 116.2 | (30.7) | 107.0 | (28.3) | 122.3 | (32.3) | 112.5 | (29.7) |
| 25% load with fan – L/hr (gal/hr) | 70.6 | (18.7) | 66.0 | (17.4) | 73.9 | (19.5) | 69.0 | (18.2) |
| **Cooling System** | | | | | | | | |
| Radiator air flow restriction (system) – kPa (in. water) | 0.12 | (0.48) | 0.12 | (0.48) | 0.12 | (0.48) | 0.12 | (0.48) |
| Radiator air flow – $m^3$/min (cfm) | 1200 | (42377) | 1200 | (42377) | 1200 | (42377) | 1200 | (42377) |
| Engine coolant capacity – L (gal) | 55.0 | (14.5) | 55.0 | (14.5) | 55.0 | (14.5) | 55.0 | (14.5) |
| Radiator coolant capacity – L (gal) | 41.0 | (10.0) | 41.0 | (10.0) | 41.0 | (10.0) | 41.0 | (10.0) |
| Total coolant capacity – L (gal) | 96.0 | (24.5) | 96.0 | (24.5) | 96.0 | (24.5) | 96.0 | (24.5) |
| **Inlet Air** | | | | | | | | |
| Combustion air inlet flow rate – $m^3$/min (cfm) | 58.7 | (2073.6) | 56.0 | (1977.7) | 62.8 | (2216.4) | 60.3 | (2129.4) |
| **Exhaust System** | | | | | | | | |
| Exhaust stack gas temperature – °C (°F) | 509.3 | (948.7) | 502.5 | (936.5) | 511.4 | (952.5) | 500.6 | (933.0) |
| Exhaust gas flow rate – $m^3$/min (cfm) | 158.9 | (5610.2) | 149.7 | (5285.5) | 170.3 | (6011.7) | 160.7 | (5674.4) |
| Exhaust system backpressure (maximum allowable) – kPa (in. water) | 6.7 | (27.0) | 6.7 | (27.0) | 6.7 | (27.0) | 6.7 | (27.0) |
| **Heat Rejection** | | | | | | | | |
| Heat rejection to jacket water – kW (Btu/min) | 324 | (18441) | 307 | (17433) | 330 | (18785) | 320 | (18191) |
| Heat rejection to exhaust (total) – kW (Btu/min) | 738 | (41994) | 693 | (39387) | 796 | (45257) | 741 | (42135) |
| Heat rejection to aftercooler – kW (Btu/min) | 139 | (7898) | 123 | (6970) | 162 | (9235) | 146 | (8320) |
| Heat rejection to atmosphere from engine – kW (Btu/min) | 110 | (6249) | 92 | (5238) | 110 | (6240) | 89 | (5074) |
| Heat rejection from alternator – kW (Btu/min) | 53 | (3014) | 47 | (2644) | 40 | (2292) | 37 | (2081) |
| **Emissions* (Nominal)** | | | | | | | | |
| NOx mg/$Nm^3$ (g/hp-h) | 2637.1 | (5.25) | 2330.9 | (4.68) | 2580.0 | (5.18) | 2283.7 | (4.61) |
| CO mg/$Nm^3$ (g/hp-h) | 123.9 | (0.25) | 147.4 | (0.29) | 115.1 | (0.23) | 135.6 | (0.27) |
| HC mg/$Nm^3$ (g/hp-h) | 11.2 | (0.03) | 10.9 | (0.02) | 12.5 | (0.03) | 12.2 | (0.03) |
| PM mg/$Nm^3$ (g/hp-h) | 8.8 | (0.02) | 8.8 | (0.02) | 9.7 | (0.02) | 9.0 | (0.02) |

**mg/$Nm^3$ levels are corrected to 5% $O_2$. Contact your local Cat dealer for further information.*

## Weights and Dimensions




| Dim "A" mm (in) | Dim "B" mm (in) | Dim "C" mm (in) | Dry Weight kg (lb) |
|---|---|---|---|
| 4674 (184.0) | 1723 (67.8) | 2162 (85.1) | 6622 (14,600) |

**Note:** *For reference only. Do not use for installation design. Contact your local Cat dealer for precise weights and dimensions.*

## Ratings Definitions

**Standby**
Output available with varying load for the duration of the interruption of the normal source power. Average power output is 70% of the standby power rating. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year.

**Prime**
Output available with varying load for an unlimited time. Average power output is 70% of the prime power rating. Typical peak demand is 100% of prime rated ekW with 10% overload capability for emergency use for a maximum of 1 hour in 12. Overload operation cannot exceed 25 hours per year.

**Applicable Codes and Standards**
AS 1359, CSA C22.2 No. 100-04, UL 142, UL 489, UL 869, UL 2200, NFPA 37, NFPA 70, NFPA 99, NFPA 110, IBC, IEC 60034-1, ISO 3046, ISO 8528, NEMA MG1-22, NEMA MG1-33, 2014/35/EU, 2006/42/EC, 2014/30/EU.

**Note:** Codes may not be available in all model configurations. Please consult your local Cat dealer for availability.

**Data Center Applications**
- ISO 8528-1 Data Center Power (DCP) compliant per DCP application of Cat diesel generator set prime power rating.
- All ratings Tier III/Tier IV compliant per Uptime Institute requirements.
- All ratings ANSI/TIA-942 compliant for Rated-1 through Rated-4 data centers.

**Fuel Rates**
Fuel rates are based on fuel oil of 35º API [16°C (60ºF)] gravity having an LHV of 42,780 kJ/kg (18,390 Btu/lb) when used at 29ºC (85ºF) and weighing 838.9 g/liter (7.001 lbs/U.S. gal.)




C27 PGBG
LEHE1213-04 (10/19)

Power Generation

# 2012 EPA Tier 2 Exhaust Emission Compliance Statement 2000DQKAB Stationary Emergency

## 60 Hz Diesel Generator Set

### Compliance Information:

**The engine used in this generator set complies with U.S. EPA New Source Performance Standards for Stationary Emergency emission under the provisions of 40 CFR Part 60 Subpart IIII when tested per ISO 8178 D2.**

| | |
|---|---|
| Engine Manufacturer: | Cummins Inc |
| EPA Certificate Number: | CCEXL060.AAD-021-R01 |
| Effective Date: | 12/21/2011 |
| Date Issued: | 12/21/2011 |
| EPA Engine Family (Cummins Emissions Family): | CCEXL060.AAD(D593) |
| CARB / AQMD Certificate: | |

### Engine Information:

| | | | |
|---|---|---|---|
| Model: | QSK60 / QSK60-G / QSK60-G6 NR2 | Bore: | 6.25 in. (159 mm) |
| Engine Nameplate HP: | 2922 | Stroke: | 7.48 in. (190 mm) |
| Type: | 4 Cycle, 60°V, 16 Cylinder Diesel | Displacement: | 3673 cu. in. (60.2 liters) |
| Aspiration: | Turbocharged and CAC | Compression Ratio: | 14.5:1 |
| Emission Control Device: | Electronic Control | Exhaust Stack Diameter: | 2 - 14 in. |

### Diesel Fuel Emission Limits

**D2 Cycle Exhaust Emissions**

| | Grams per BHP-hr | | | Grams per kWm-hr | | |
|---|---|---|---|---|---|---|
| | NOx + NMHC | CO | PM | NOx + NMHC | CO | PM |
| Test Results - Diesel Fuel (300-4000 ppm Sulfur) | 4.2 | 0.7 | 0.10 | 5.6 | 1.0 | 0.14 |
| EPA Emissions Limit | 4.8 | 2.6 | 0.15 | 6.4 | 3.5 | 0.20 |
| Test Results - CARB Diesel Fuel (<15 ppm Sulfur) | 3.8 | 0.7 | 0.09 | 5.1 | 1.0 | 0.12 |
| CARB Emissions Limit | 4.8 | 2.6 | 0.15 | 6.4 | 3.5 | 0.20 |

The CARB emission values are based on CARB approved calculations for converting EPA (500 ppm) fuel to CARB (15 ppm) fuel.
**Test Methods:** EPA/CARB Nonroad emissions recorded per 40CFR89 (ref. ISO8178-1) and weighted at load points prescribed in Subpart E, Appendix A for Constant Speed Engines (ref. ISO8178-4, D2)

**Diesel Fuel Specifications:** Cetane Number: 40-48. Reference: ASTM D975 No. 2-D.
**Reference Conditions:** Air Inlet Temperature: 25°C (77°F), Fuel Inlet Temperature: 40°C (104°F). Barometric Pressure: 100 kPa (29.53 in Hg), Humidity: 10.7 g/kg (75 grains H2O/lb) of dry air; required for 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.

Power Generation

# Exhaust Emission Data Sheet
# 2000DQKAB*
## 60 Hz Diesel Generator Set

**Engine Information:**

| | | | |
|---|---|---|---|
| Model: | Cummins Inc QSK60-G6 NR2 | Bore: | 6.25 in. (158 mm) |
| Type: | 4 Cycle, 60°V, 16 Cylinder Diesel | Stroke: | 7.48 in. (189 mm) |
| Aspiration: | Turbocharged and Low Temperature Air Aftercooled | Displacement: | 3673 cu. In. (60.1 liters) |
| Compression Ratio: | 14.5:1 | | |
| Emission Control Device: | Turbocharged and Low Temperature Aftercooled | | |

| | 1/4 | 1/2 | 3/4 | Full | Full |
|---|---|---|---|---|---|
| **PERFORMANCE DATA** | **Standby** | **Standby** | **Standby** | **Standby** | **Prime** |
| BHP @ 1800 RPM (60 Hz) | 730 | 1460 | 2189 | 2919 | 2639 |
| Fuel Consumption (gal/Hr) | 46.5 | 82 | 107.3 | 141.3 | 124.1 |
| Exhaust Gas Flow (CFM) | 6510 | 10220 | 12000 | 14920 | 13780 |
| Exhaust Gas Temperature (°F) | 772 | 838 | 873 | 893 | 884 |
| | | | | | |
| **EXHAUST EMISSION DATA** | | | | | |
| | | | | | |
| HC (Total Unburned Hydrocarbons) | 0.22 | 0.13 | 0.10 | 0.11 | 0.09 |
| NOx (Oxides of Nitrogen as NO2) | 2.70 | 3.10 | 4.70 | 5.30 | 6.00 |
| CO (carbon Monoxide) | 0.57 | 0.36 | 0.13 | 0.18 | 0.16 |
| PM (Particular Matter) | 0.16 | 0.14 | 0.04 | 0.04 | 0.02 |
| SO2 (Sulfur Dioxide) | 0.14 | 0.13 | 0.11 | 0.11 | 0.11 |
| Smoke (Bosch) | 0.50 | 0.60 | 0.20 | 0.20 | 0.10 |
| All values are Grams per HP-Hour, Smoke is Bosch# | | | | | |

## TEST CONDITIONS

Data is representative of steady-state engine speed (± 25 RPM) at designated genset loads. Pressures, temperatures, and emission rates were stabilized.

| | |
|---|---|
| Fuel Specification: | ASTM D975 No. 2-D diesel fuel with 0.03-0.05% sulfur content (by weight), and 40-48 cetane number. |
| Fuel Temperature: | 99 ± 9 °F (at fuel pump inlet) |
| Intake Air Temperature: | 77 ± 9 °F |
| Barometric Pressure: | 29.6 ± 1 in. Hg |
| Humidity: | NOx measurement corrected to 75 grains H2O/lb dry air |
| Reference Standard: | ISO 8178 |

The NOx, HC, CO and PM emission data tabulated here 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.

**Model:** DQKAB
**Frequency:** 60
**Fuel type:** Diesel
**KW rating:** 2000 standby
1825 prime
**Emissions level:** EPA NSPS Stationary Emergency Tier 2

# ➤ Generator set data sheet

**Our energy working for you.™**

Cummins Power Generation

| | |
|---|---|
| **Exhaust emission data sheet:** | **EDS-1065** |
| **Exhaust emission compliance sheet:** | **EPA-1099** |
| **Sound performance data sheet:** | |
| **Cooling performance data sheet:** | **MCP-158** |
| **Prototype test summary data sheet:** | **PTS-267** |
| **Standard set-mounted radiator cooling outline:** | **0500-4392** |
| **Optional set-mounted radiator cooling outline:** | **0500-4780** |
| **Optional heat exchanger cooling outline:** | |
| **Optional remote radiator cooling outline:** | **0500-4393** |

| **Fuel consumption** | **Standby** | | | | **Prime** | | | | **Continuous** |
|---|---|---|---|---|---|---|---|---|---|
| | **kW (kVA)** | | | | **kW (kVA)** | | | | **kW (kVA)** |
| **Ratings** | 2000 (2500) | | | | 1825 (2281) | | | | |
| **Load** | **1/4** | **1/2** | **3/4** | **Full** | **1/4** | **1/2** | **3/4** | **Full** | **Full** |
| **US gph** | 46.5 | 82 | 107.3 | 141.3 | 43.4 | 75.1 | 100.6 | 124.1 | |
| **L/hr** | 176 | 311 | 407 | 535 | 164 | 285 | 381 | 470 | |

| **Engine** | **Standby rating** | **Prime rating** | **Continuous rating** |
|---|---|---|---|
| Engine manufacturer | Cummins Inc. | | |
| Engine model | QSK60-G6 NR2 | | |
| Configuration | Cast iron, V 16 cylinder | | |
| Aspiration | Turbocharged and low temperature aftercooled | | |
| Gross engine power output, kWm (bhp) | 2179 (2922) | 1975 (2647) | |
| BMEP at set rated load, kPa (psi) | 2420 (350) | 2185 (316) | |
| Bore, mm (in) | 159 (6.25) | | |
| Stroke, mm (in) | 190 (7.48) | | |
| Rated speed, rpm | 1800 | | |
| Piston speed, m/s (ft/min) | 11.4 (2244) | | |
| Compression ratio | 14.5:1 | | |
| Lube oil capacity, L (qt) | 334 (304) | | |
| Overspeed limit, rpm | 2100 ±50 | | |
| Regenerative power, kW | 168 | | |

| **Fuel flow** | | |
|---|---|---|
| Maximum fuel flow, L/hr (US gph) | 946 (250) | |
| Maximum fuel inlet restriction, kPa (in Hg) | 30 (9.0) | |
| Maximum fuel inlet temperature, °C (°F) | 71 (160) | |


D-3336h (10/11)

| Air | Standby rating | Prime rating | Continuous rating |
|---|---|---|---|
| Combustion air, $m^3$/min (scfm) | 178 (6295) | 159 (5615) | |
| Maximum air cleaner restriction, kPa (in $H_2O$) | 6.2 (25) | | |
| Alternator cooling air, $m^3$/min (cfm) | 204 (7300) | | |
| **Exhaust** | | | |
| Exhaust flow at set rated load, $m^3$/min (cfm) | 436 (15385) | 385 (13580) | |
| Exhaust temperature, °C (°F) | 488 (900) | 466 (870) | |
| Maximum back pressure, kPa (in $H_2O$) | 6.8 (27) | | |
| **Standard set-mounted radiator cooling** | | | |
| Ambient design, °C ( °F) | 40 (104) | | |
| Fan load, $kW_m$ (HP) | 57 (77) | | |
| Coolant capacity (with radiator), L (US gal) | 492 (130) | | |
| Cooling system air flow, $m^3$/min (scfm) | 1922 (67870) | | |
| Total heat rejection, MJ/min (Btu/min) | 99.5 (94395) | 91.0 (86382) | |
| Maximum cooling air flow static restriction, kPa (in $H_2O$) | 0.12 (0.5) | | |
| Maximum fuel return line restriction kPa (in Hg) | 30 (9.0) | | |
| **Optional set-mounted radiator cooling** | | | |
| Ambient design, °C (°F) | 50 (122) | | |
| Fan load, $kW_m$ (HP) | 57 (77) | | |
| Coolant capacity (with radiator), L (US gal) | 617 (163) | | |
| Cooling system air flow, $m^3$/min (scfm) | 2795 (98700) | | |
| Total heat rejection, MJ/min (Btu/min) | 99.5 (94395) | 91 (86382) | |
| Maximum cooling air flow static restriction, kPa (in $H_2O$) | 0.12 (0.5) | | |
| Maximum fuel return line restriction, kPa (in Hg) | 30 (9.0) | | |
| **Optional heat exchanger cooling** | | | |
| Set coolant capacity, L (US gal) | | | |
| Heat rejected, jacket water circuit, MJ/min (Btu/min) | | | |
| Heat rejected, aftercooler circuit, MJ/min (Btu/min) | | | |
| Heat rejected, fuel circuit, MJ/min (Btu/min) | | | |
| Total heat radiated to room, MJ/min (Btu/min) | | | |
| Maximum raw water pressure, jacket water circuit, kPa (psi) | | | |
| Maximum raw water pressure, aftercooler 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, aftercooler 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, aftercooler circuit, L/min (US gal/min) | | | |
| Minimum raw water flow at 27 °C (80 °F) inlet temp, fuel circuit, L/min (US gal/min) | | | |
| Raw water delta P at min flow, jacket water circuit, kPa (psi) | | | |
| Raw water delta P at min flow, aftercooler circuit, kPa (psi) | | | |
| Raw water delta P at min flow, fuel circuit, kPa (psi) | | | |
| Maximum jacket water outlet temp, °C (°F) | | | |
| Maximum aftercooler inlet temp, °C (°F) | | | |
| Maximum aftercooler inlet temp at 25 °C (77 °F) ambient, °C ( °F) | | | |
| Maximum fuel return line restriction, kPa (in Hg) | | | |

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D-3336h (10/11)

Power Generation

| Optional remote radiator cooling[1] | Standby rating | Prime rating | Continuous rating |
|---|---|---|---|
| Set coolant capacity, L (USg gal) | | | |
| Max flow rate at max friction head, jacket water circuit, L/min (US gal/min) | 1902 (502) | | |
| Max flow rate at max friction head, aftercooler circuit, L/min (US gal/min) | 606 (160) | | |
| Heat rejected, jacket water circuit, MJ/min (Btu/min) | 46.9 (44526) | 44.1 (41824) | |
| Heat rejected, aftercooler circuit, MJ/min (Btu/min) | 33.9 (32156) | 30.4 (28887) | |
| Heat rejected, fuel circuit, MJ/min (Btu/min) | | | |
| Total heat radiated to room, MJ/min (Btu/min) | 18.7 (17713) | 16.5 (15671) | |
| Maximum friction head, jacket water circuit, kPa (psi) | 69 (10) | | |
| Maximum friction head, aftercooler circuit, kPa (psi) | 48 (7) | | |
| Maximum static head, jacket water circuit, m (ft) | 18 (60) | | |
| Maximum static head, aftercooler circuit, m (ft) | 18 (60) | | |
| Maximum jacket water outlet temp, °C (°F) | 104 (220) | 100 (212) | |
| Maximum aftercooler inlet temp at 25 °C (77 °F) ambient, °C (°F) | 49 (120) | | |
| Maximum aftercooler inlet temp, °C (°F) | 66 (150) | | |
| Maximum fuel flow, L/hr (US gph) | | | |
| Maximum fuel return line restriction, kPa (in Hg) | 30 (9.0) | | |

## Weights[2]

| | |
|---|---|
| Unit dry weight kgs (lbs) | 14628 (32249) |
| Unit wet weight kgs (lbs) | 15155 (33410) |

**Notes:**

[1] For non-standard remote installations contact your local Cummins Power Generation representative.

[2] Weights represent a set with standard features. See outline drawing for weights of other configurations.

## Derating factors

| | |
|---|---|
| **Standby** | Engine power available up to 447 m (1466 ft) at ambient temperatures up to 40 °C (104 °F). From 447 m (1466 ft) up to 2001 m (6562 ft) engine derates at 5.1% per 305 m (1000 ft) for 40 °C (104 °F). Above these elevations, derate an additional 5.8% per 305 m (1000 ft). For temperatures from 40 °C (104 °F) to 50 °C (122 °F) derate 14.6%. For temperatures above 50 °C (122 °F) derate 29% per 10 °C (50 °F). |
| **Prime** | Engine power available up to 447 m (1466 ft) at ambient temperatures up to 40 °C (104 °F). From 447 m (1466 ft) up to 2001 m (6562 ft) engine derates at 5.1% per 305 m (1000 ft) for 40 °C (104 °F). Above these elevations, derate an additional 5.8% per 305 m (1000 ft). For temperatures from 40 °C (104 °F) to 50 °C (122 °F) derate 14.6%. For temperatures above 50 °C (122 °F) derate 29% per 10 °C (50 °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. |


D-3336h (10/11)

## Alternator data

| Voltage | Connection[1] | Temp rise degrees C | Duty[2] | Single phase factor[3] | Max surge kVA[4] | Winding No. | Alternator data sheet | Feature Code |
|---|---|---|---|---|---|---|---|---|
| 380 | Wye, 3-phase | 150/125/105 | S/P/C | | 7327 | 13 | ADS-515 | B595 |
| 380 | Wye, 3-phase | 125/105/80 | S/P/C | | 7327 | 13 | ADS-515 | B598 |
| 380 | Wye, 3-phase | 105/80 | S/P | | 7327 | 13 | ADS-515 | B599 |
| 380 | Wye, 3-phase | 80 | S | | 7963 | 13 | ADS-516 | B660 |
| 440 | Wye, 3-phase | 125/105/80 | S/P/C | | 7361 | 312 | ADS-334 | B663 |
| 440 | Wye, 3-phase | 105 | S | | 7284 | 12 | ADS-515 | B665 |
| 480 | Wye, 3-phase | 125/105/80 | S/P/C | | 7361 | 312 | ADS-334 | B462 |
| 480 | Wye, 3-phase | 105/80 | S/P | | 7695 | 312 | ADS-335 | B463 |
| 480 | Wye, 3-phase | 125/105 | P/C | | 6716 | 312 | ADS-332 | B464 |
| 480 | Wye, 3-phase | 80 | S | | 8412 | 12 | ADS-516 | B601 |
| 480 | Wye, 3-phase | 80 | P | | 8412 | 12 | ADS-516 | B694 |
| 480 | Wye, 3-phase | 105 | S | | 7695 | 12 | ADS-517 | B796 |
| 600 | Wye, 3-phase | 125/105/80 | S/P/C | | 7361 | 07 | ADS-334 | B465 |
| 600 | Wye, 3-phase | 105/80 | S/P | | 7695 | 07 | ADS-335 | B301 |
| 600 | Wye, 3-phase | 125/105 | P/C | | 6716 | 07 | ADS-333 | B466 |
| 600 | Wye, 3-phase | 80 | S | | 7265 | 07 | ADS-516 | B604 |
| 4160 | Wye, 3-phase | 125/105/80 | S/P/C | | 6307 | 51 | ADS-518 | B467 |
| 4160 | Wye, 3-phase | 105/80 | S/P | | 6307 | 51 | ADS-518 | B313 |
| 4160 | Wye, 3-phase | 80 | S | | 6307 | 51 | ADS-518 | B605 |
| 4160 | Wye, 3-phase | 105 | S | | 6307 | 51 | ADS-520 | B795 |
| 12470-13800 | Wye, 3-phase | 125/105/80 | S/P/C | | 6062 | 91 | ADS-521 | B448 |
| 12470 | Wye, 3-phase | 105/80 | S/P | | 6038 | 87 | ADS-521 | B567 |
| 13200-13800 | Wye, 3-phase | 105/80 | S/P | | 6062 | 91 | ADS-521 | B612 |
| 12470 | Wye, 3-phase | 80 | S | | 6685 | 87 | ADS-522 | B607 |
| 13200-13800 | Wye, 3-phase | 80 | S | | 8012 | 91 | ADS-523 | B628 |
| 13800 | Wye, 3-phase | 80 | S | | 6833 | 91 | ADS-521 | B610 |
| 13800 | Wye, 3-phase | 105 | S | | 6062 | 91 | ADS-523 | B797 |

**Notes:**

[1] Limited single phase capability is available from some three phase rated configurations. To obtain single phase rating, multipy the three phase kW rating by the Single Phase Factor[3]. All single phase ratings are at unity power factor.

[2] Standby (S), Prime (P) and Continuous ratings (C).

[3] Factor for the *Single Phase Output from Three Phase Alternator* formula listed below.

[4] Maximum rated starting kVA that results in a minimum of 90% of rated sustained voltage during starting.

## Formulas for calculating full load currents:

**Three phase output**

$$\frac{kW \times 1000}{Voltage \times 1.73 \times 0.8}$$

**Single phase output**

$$\frac{kW \times SinglePhaseFactor \times 1000}{Voltage}$$

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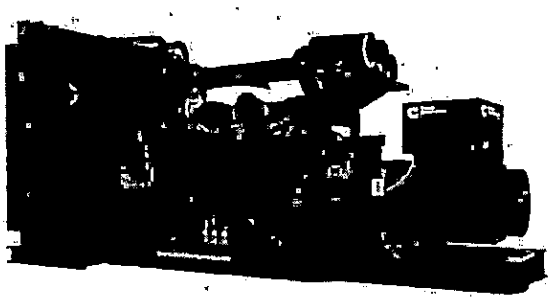
D-3336h, (10/11)

Power Generation

# Diesel generator set QSK60 series engine



> Specification sheet
1600 kW - 2000 kW 60 Hz

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## Description

Cummins Power Generation commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary standby and prime power applications. Codes or standards compliance may not be available with all model configurations – consult factory for availability.

| | |
|---|---|
| ISO 9001 | This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002. |
| | The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins Power Generation products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems. |
| CSA | All low voltage models are CSA certified to product class 4215-01. |
| UL | 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. |
| **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. |
| **International Building Code** | The generator set package is available certified for seismic application in accordance with the following International Building Code: IBC2000, IBC2003, IBC2006 and IBC2009. |

## 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.

**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) | 50 Hz kW (kVA) | 60 Hz kW (kVA) | 50 Hz kW (kVA) | 60 Hz kW (kVA) | 50 Hz kW (kVA) | 60 Hz | 50 Hz |
| DQKAA | 1750 (2188) | | 1600 (2000) | | | | D-3335 | |
| DQKAB | 2000 (2500) | | 1825 (2281) | | | | D-3336 | |


S-1514g (6/11)

## Generator set specifications

| | |
|---|---|
| Governor regulation class | ISO8528 Part 1 Class G3 |
| Voltage regulation, no load to full load | ± 0.5% |
| Random voltage variation | ± 0.5% |
| Frequency regulation | Isochronous |
| Random frequency variation | ± 0.25% |
| Radio frequency emissions compliance | IEC 801.2 through IEC 801.5; MIL STD 461C, Part 9 |

## Engine specifications

| | |
|---|---|
| Bore | 158.8 mm (6.25 in) |
| Stroke | 190.0 mm (7.48 in) |
| Displacement | 60.2 litres (3673 $in^3$) |
| Configuration | Cast iron, V 16 cylinder |
| Battery capacity | 2200 amps minimum at ambient temperature of -18 °C to 0 °C (0 °F to 32 °F) |
| Battery charging alternator | 40 amps |
| Starting voltage | 24 volt, negative ground |
| Fuel system | Cummins' Modular Common Rail System |
| Fuel filter | Dual element, 10 micron filtration, spin-on fuel filters with 15 micron water separator |
| Air cleaner type | Dry replaceable element |
| Lube oil filter type(s) | Four spin-on, combination full flow filter and bypass filters |
| Standard cooling system | High 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 on low and medium voltage, Class F on high voltage |
| Standard temperature rise | 150 °C standby at 40 °C ambient |
| Exciter type | PMG (permanent magnet generator) |
| Phase rotation | A (U), B (V), C (W) |
| Alternator cooling | Direct drive centrifugal blower fan |
| AC waveform total harmonic distortion | < 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 | | | | 50 Hz line-neutral/line-line | | | |
|---|---|---|---|---|---|---|---|
| • 219/380 | • 277/480 | • 2400/4160 | • 7620/13200 | • 220/380 | • 240/415 | • 1905/3300 | • 3810/6600 |
| • 254/440 | • 347/600 | • 7200/12470 | • 7970/13800 | • 230/400 | • 254/440 | • 3640/6300 | • 6350/11000 |

* Note: Consult factory for other voltages.

## Generator set options and accessories

**Engine**
- ☐ 208/240/480 V coolant heater for ambient above 4.5 °C (40 °F)
- ⊟ 208/240/480 V coolant heater for ambient below 4.5 °C (40 °F)

**Control panel**
- ☐ 120/240 V 100 W control anti-condensation heater
- ☐ Paralleling configuration
- ☐ Remote fault signal package
- ⊟ Run relay package

**Alternator**
- ☐ 80 °C rise
- ⊟ 105 °C rise
- ☐ 125 °C rise
- ☐ 120/240 V 300 W anti-condensation heater
- ☐ Temperature sensor - RTDs, 2/phase
- ☐ Temperature sensor – alternator bearing RTD
- ☐ Differential current transformers

**Exhaust system**
- ☐ Industrial grade exhaust silencer
- ☐ Residential grade exhaust silencer
- ⊟ Critical grade exhaust silencer

**Cooling system**
- ☐ Remote radiator

**Generator set**
- ☐ AC entrance box
- ⊟ Battery
- ⊟ Battery rack with hold-down - floor standing
- ⊟ Circuit breaker - set mounted
- ☐ Disconnect switch - set mounted
- ⊟ PowerCommand Network
- ⊟ Remote annunciator panel
- ⊟ Spring isolators
- ⊟ 2 year warranty
- ☐ 5 year warranty
- ☐ 10 year major components warranty

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

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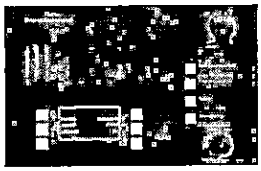
S-1514g (6/11)

Power Generation

## Control system PCC 3201



**PowerCommand control** is an integrated generator set control system providing governing, voltage regulation, engine protection and operator interface functions. Major features include:

- Integral AmpSentry™ Protective Relay providing a full range of alternator protection functions that are matched to the alternator provided.
- Battery monitoring and testing features and smart starting control system.
- Three phase sensing, full wave rectified voltage regulation system, with a PWM output for stable operation with all load types.
- Control suitable for operation in ambient temperatures from -40 °C to +70 °C (-40 °F to +158 °F) and altitudes to 5000 meters (13,000 feet).
- Prototype tested; UL, CSA, and CE compliant.
- InPower™ PC-based service tool available for detailed diagnostics.
- Optional Echelon® LonWorks® network interface.

**Operator/display panel**

- Off/manual/auto mode switch
- Manual run/stop switch
- Panel lamp test switch
- Emergency stop switch
- Exercise switch
- Alpha-numeric display with pushbutton access for viewing engine and alternator data and providing setup, controls and adjustments
- LED lamps indicating not in auto, common warning, common shutdown, remote start
- Configurable for local language

**Engine protection**

- Overspeed shut down
- Low oil pressure warning and shut down
- High coolant temperature warning and shut down
- High oil temperature warning
- Low coolant level warning or shut down
- Low coolant temperature warning
- High and low battery voltage warning
- Weak battery warning
- Dead battery shut down
- Fail to start (overcrank) shut down
- Fail to crank shut down
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication

**Engine data**

- DC voltage
- Lube oil pressure
- Coolant temperature
- Lube oil temperature
- Engine speed
- Engine ECM data

**AmpSentry AC protection**

- Over current and short-circuit shut down
- Over current warning
- Single and three phase fault regulation
- Over and under voltage shut down
- Over and under frequency shut down
- Overload warning with alarm contact
- Reverse power and reverse Var shut down

**Alternator data**

- Line-to-line and line-to-neutral AC volts
- Three phase AC current
- Frequency
- Total and individual phase power factor, kW and kVA
- Bus voltage and frequency (with paralleling options)

**Other data**

- Genset model data
- Start attempts, starts, running hours
- kW hours (total and since reset)
- Fault history
- Load profile (accessible with InPower)

**Governing**

- Digital electronic isochronous governor
- Temperature dynamic governing
- Smart idle speed mode

**Voltage regulation**

- Digital PWM electronic voltage regulation
- Three phase line-to-neutral sensing
- Single and three phase fault regulation
- Configurable torque matching

**Control functions**

- Data logging on faults
- Fault simulation (requires InPower)
- Time delay start and cooldown
- Cycle cranking
- Configurable customer outputs (4)
- Configurable network inputs (8) and outputs (16) (with optional network)
- Remote emergency stop

**Paralleling (Option)**

- Active digital phase lock loop synchronizer
- Isochronous kW and kVar load sharing controls
- kW import/export and kVar/PF control for utility (mains) paralleling

**Options**

- ☐ Thermostatically controlled space heater
- ☐ Key-type mode switch
- ⊟ Ground fault module
- ⊟ Auxiliary relays (3)
- ⊟ Echelon LonWorks interface
- ☐ Modion Gateway to convert to Modbus (loose)
- ☐ PowerCommand iWatch web server for remote monitoring and alarm notification (loose)
- ☐ Digital input and output module(s) (loose)
- ⊟ Remote annunciator (loose)
- ☐ Paralleling
- ☐ Power transfer control

For further detail see document S-1444.

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S-1514g (6/11)

Power Generation

## Ratings definitions

**Emergency standby power (ESP):**

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

**Limited-time running power (LTP):**

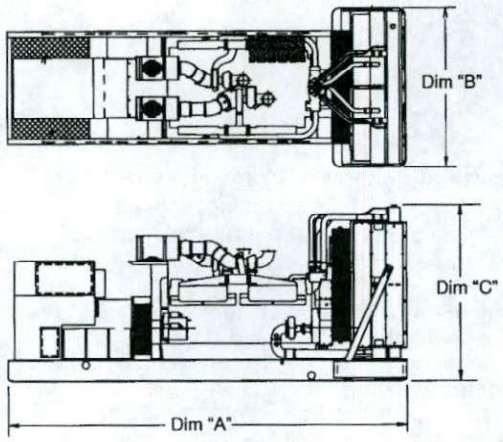
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

**Prime power (PRP):**

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

**Base load (continuous) power (COP):**

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




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

***Do not use for installation design***

| Model | Dim "A" mm (in.) | Dim "B" mm (in.) | Dim "C" mm (in.) | Set Weight* dry kg (lbs) | Set Weight* wet kg (lbs) |
|---|---|---|---|---|---|
| **DQKAA** | 6175 (243) | 2534 (100) | 3043 (120) | 15231 (33569) | 15396 (33932) |
| **DQKAB** | 6175 (243) | 2534 (100) | 3043 (120) | 17382 (38309) | 17908 (39470) |

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

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