

# Development Services

## From Concept to Construction

Phone: 503-823-7300 Email: [bds@portlandoregon.gov](mailto:bds@portlandoregon.gov) 1900 SW 4th Ave, Portland, OR 97201

More Contact Info (<http://www.portlandoregon.gov/bds/article/519984>)



### APPEAL SUMMARY

**Status:** Decision Rendered - Held over from ID 26321 (11/24/21) for additional information

<b>Appeal ID:</b> 26351	<b>Project Address:</b> 506 NE Alberta St
<b>Hearing Date:</b> 12/8/21	<b>Appellant Name:</b> Brendan Sanchez
<b>Case No.:</b> M-001	<b>Appellant Phone:</b> 3603261221
<b>Appeal Type:</b> Mechanical	<b>Plans Examiner/Inspector:</b> Thomas Ng
<b>Project Type:</b> commercial	<b>Stories:</b> 5 <b>Occupancy:</b> R-2, A-3, S-2 <b>Construction Type:</b> III-B
<b>Building/Business Name:</b>	<b>Fire Sprinklers:</b> Yes - NFPA 13 throughout
<b>Appeal Involves:</b> Reconsideration of appeal	<b>LUR or Permit Application No.:</b> 21-045682-CO
<b>Plan Submitted Option:</b> pdf [File 1] [File 2]	<b>Proposed use:</b> Multi Dwelling Living Units

### APPEAL INFORMATION SHEET

#### Appeal item 1

<b>Code Section</b>	OMSC 501.3 and 501.3.1
<b>Requires</b>	<p>501.3: "The air removed by every mechanical exhaust system shall be discharged outdoors at a point where it will not cause a public nuisance and not less than the distances specified in Section 501.3.1. The air shall be discharged to a location from which it cannot again be readily drawn in by a ventilating system. Air shall not be exhausted into an attic, crawl space, or be directed onto walkways."</p> <p>501.3.1 (Location of Exhaust Outlets)</p> <p>(2) For other product-conveying outlets: 10 feet from the property lines; 3 feet from exterior walls and roofs; 10 feet from operable openings into buildings; 10 feet above adjoining grade.</p> <p>(3) For all environmental air exhaust: 3 feet from property lines; 3 feet from operable openings into buildings for all occupancies other than Group U, and 10 feet from mechanical air intakes. Such exhaust shall not be considered hazardous or noxious.</p> <p>The Code Official is interpreting "nuisance" as any airflow discharging 10 feet or less above grade at a speed greater than 300 fpm.</p> <p>The Code Official is also interpreting the radiator relief airflow as a combination of a product-conveying system requiring a 10 foot above grade discharge location IAW 501.3.1(2) and an environmental air system requiring 10 feet of separation between inlet and outlet to prevent discharged air from being readily drawn back into the system.</p>
<b>Code Modification or Alternate Requested</b>	The proposed design discharges air at greater than 300 fpm with discharge and intake louvers closer than 10 feet apart.

The infrequent operation of this emergency system (only in operation during emergencies or testing) and the airflow analysis attached show the discharge airflow to not be a nuisance.

The attached analysis also shows how the radiator discharge air is pushed away from the building and intake louver. This limits recirculation and shows there is not concern of overheating the generator room.

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**Proposed Design**

Please see the attached analysis with design and commentary. The analysis shows a localized jet of air classified as a "Moderate Breeze" on the Beaufort Wind Scale (1575 fpm for 3 feet) that quickly reduces to below 500 fpm ("Light Breeze").

The Louver spacing of 6 feet is sufficient to prevent recirculation back into the generator room, keeping temperatures well below the 122F design limit for the generator's cooling system.

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**Reason for alternative**

The small and tight building footprint necessitates placing the generator where it's radiator fan discharges to a space where the airflow could be felt by people outside of the building.

The generator in this building is for emergency standby power for the elevator only. The likelihood of them running for any significant period of time is quite small and would be incredibly infrequent or during an emergency, equating to immaterial impact on any passersby. When they are running, the airflows of 1575 fpm in a very limited area to 500 fpm in the rest of the immediate surroundings are considered a "Moderate Breeze, Raises Dust and Loose Paper, Small Branches Moved" to "Light Breeze, Wind Felt on Face, Leaves Rustle" (as defined on the Beaufort Wind Scale). These velocities will be barely perceptible to passersby and will only occur once a month when testing of the system occurs.

Multnomah County defines a nuisance as "any condition(s) or practice causing or capable of causing an unreasonable threat to public health, safety and welfare. We do not believe that a 'light to moderate breeze' felt monthly would constitute an unreasonable threat to public health.

Furthermore, there is no reference under the Chapter 29.20 Property Nuisances for air movement, discharge or any other type of air movement associated with a generator or other equipment.

The tight building design and shear wall layout necessitates placing the intake louver within ten feet of the discharge louver.

Given the small footprint/structural design of the building, the generator room placement does not allow for the required 10' spacing between louvers. Our analysis confirms that the generators will have airflow speeds sufficient to prevent the short circuiting of the airflow, which is what drives the louver spacing requirement. Therefore the louver spacing as designed will not impact the ability of the generator to function and should alleviate any concerns regarding recirculation of air back into the intake louver.

Therefore, any disturbance on the public is minimal and infrequent as well as very unlikely to recirculate from exhaust back in intake louvers.

Reconsideration Text

Please see attached for stamped analysis from the Mechanical EOR

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## APPEAL DECISION

### **Emergency generator discharge and intake louvers with less than 10 feet of separation with engineering analysis: Granted as proposed.**

The Administrative Appeal Board finds that the information submitted by the appellant demonstrates that the approved modifications or alternate methods are consistent with the intent of the code; do not lessen health,

safety, accessibility, life, fire safety or structural requirements; and that special conditions unique to this project make strict application of those code sections impractical.

Pursuant to City Code Chapter 24.10, you may appeal this decision to the Building Code Board of Appeal within 90 calendar days of the date this decision is published. For information on the appeals process, go to [www.portlandoregon.gov/bds/appealsinfo](http://www.portlandoregon.gov/bds/appealsinfo), call (503) 823-7300 or come in to the Development Services Center.

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**WINDSOR**  
ENGINEERS

## Alberta Alive – Grand Ave. Radiator Fan Airflow

### Site Layout:

The building is to be located at the intersection of Alberta Street and Grand Avenue with the generator room in the southwestern corner.

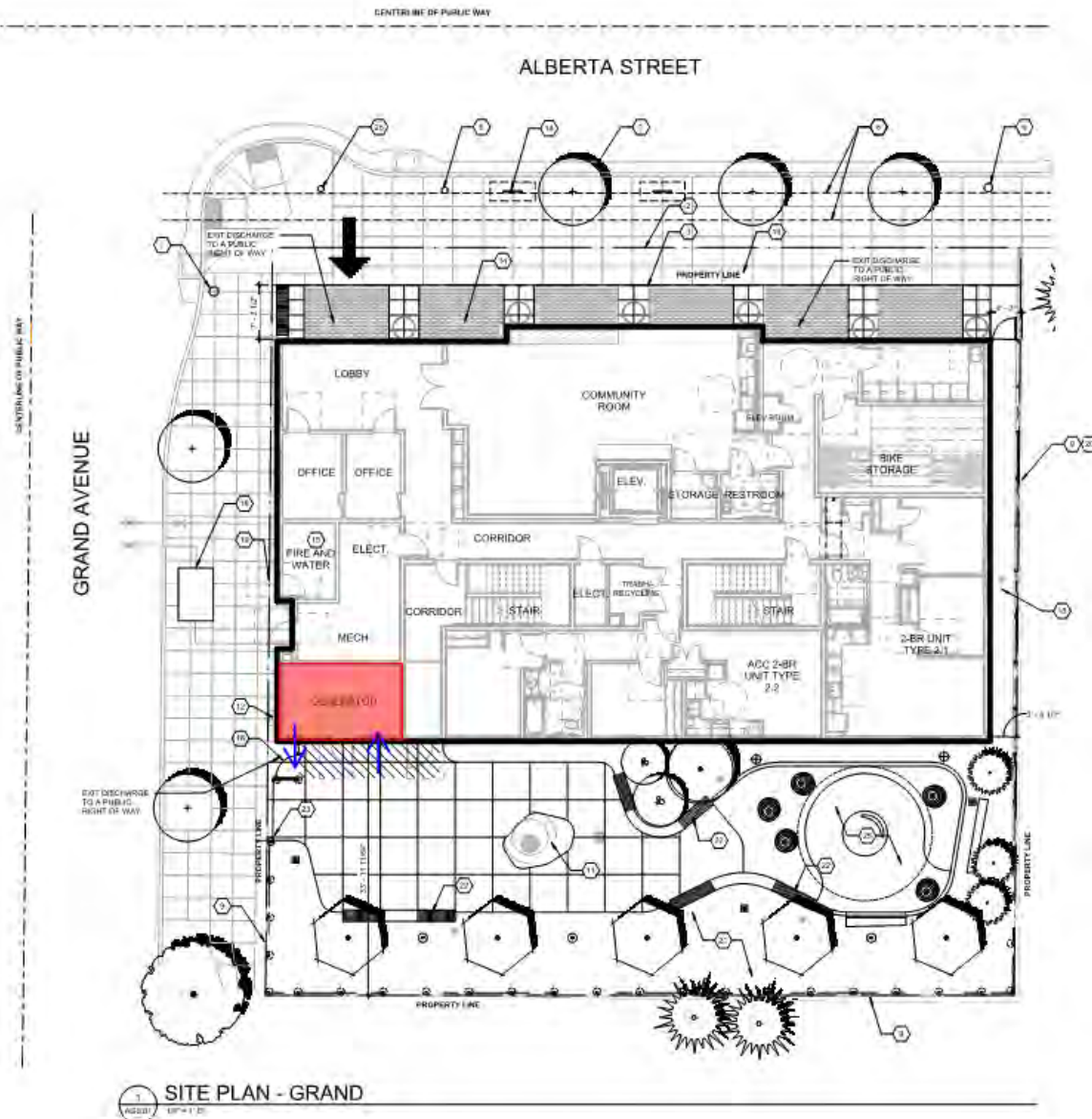


Figure 1: Site Layout

## Generator Room Airflow:

The generator radiator fan takes suction on the generator room and discharges to a courtyard on the property. Make-up air is drawn into the room via an intake louver. A flue carries all combustion products to the roof. The generator room layout is as per Figure 2 and Figure 3 below.

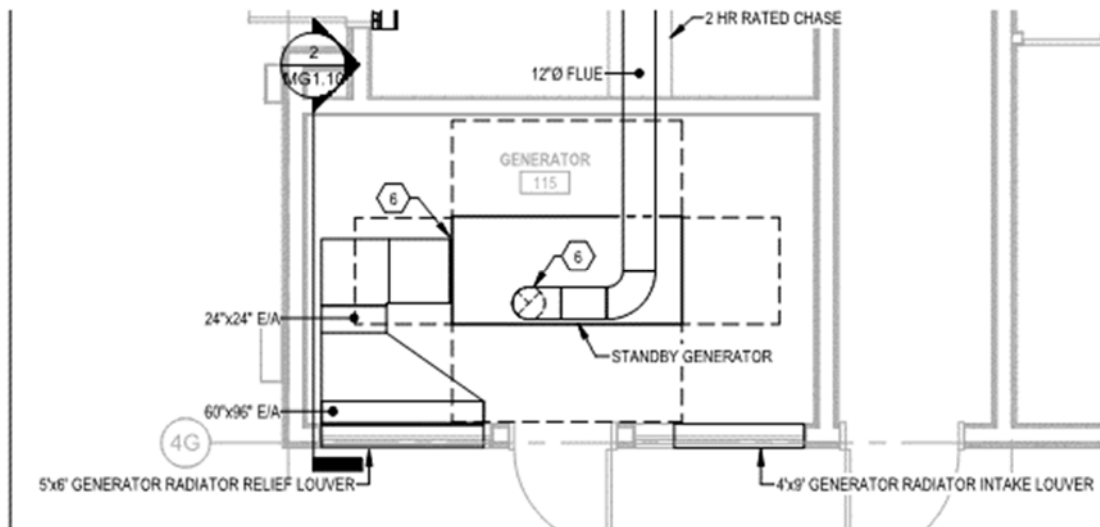


Figure 2: Generator Room Plan View

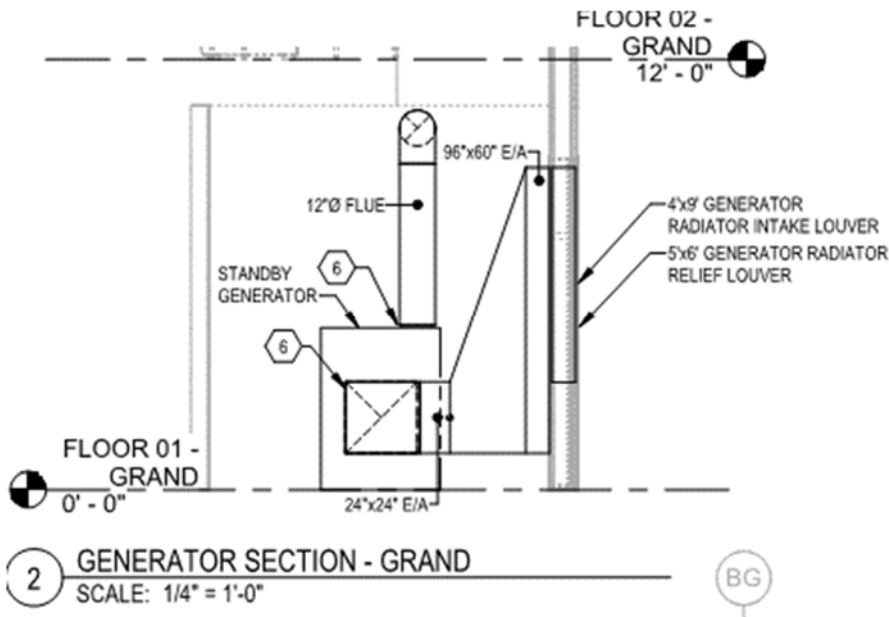


Figure 3: Generator Section View

## System Design

The generator room is designed to draw air through the intake louver, across the body of the generator, past the radiator cooling coil and fan, and out the generator relief louver. With uniform airflow and louvers with 50% free area air speeds would be approximately 390 fpm through the intake louver and 470 fpm through the relief louver.

## Natural Gas Generator Characteristics

The specified emergency generator is the Car DG60-2.

The generator cooling system is designed to operate in 122F ambient conditions.

It rejects 3120 Btu/min to its radiator cooling system and 273 Btu/min to the atmosphere.

### Model Set-up

A computational fluid dynamics analysis of the generator room conditions was performed to investigate the operation of the generator during a design day.

Room, duct, and louver geometry was modeled as per Figures 2 and 3.

Generator radiator fan was modeled to produce 7,000 cfm as per generator documentation.

Generator heat introduction into the room and into the radiator air stream were as per the above generator characteristics and documentation.

Outdoor conditions were as per ASHRAE 0.4% design conditions of 91.2 F.

A light breeze from west to east at a rate of 40 fpm was included.

### Model Results: Temperature

CFD analysis shows that there is little to no air recirculation from the outlet louver to the inlet louver.

Figure 4 and Figure 5 show the temperature of the air discharged from the outlet louver. Small portions of the discharged airstream can reach up to 122F, as shown by the red portions below.

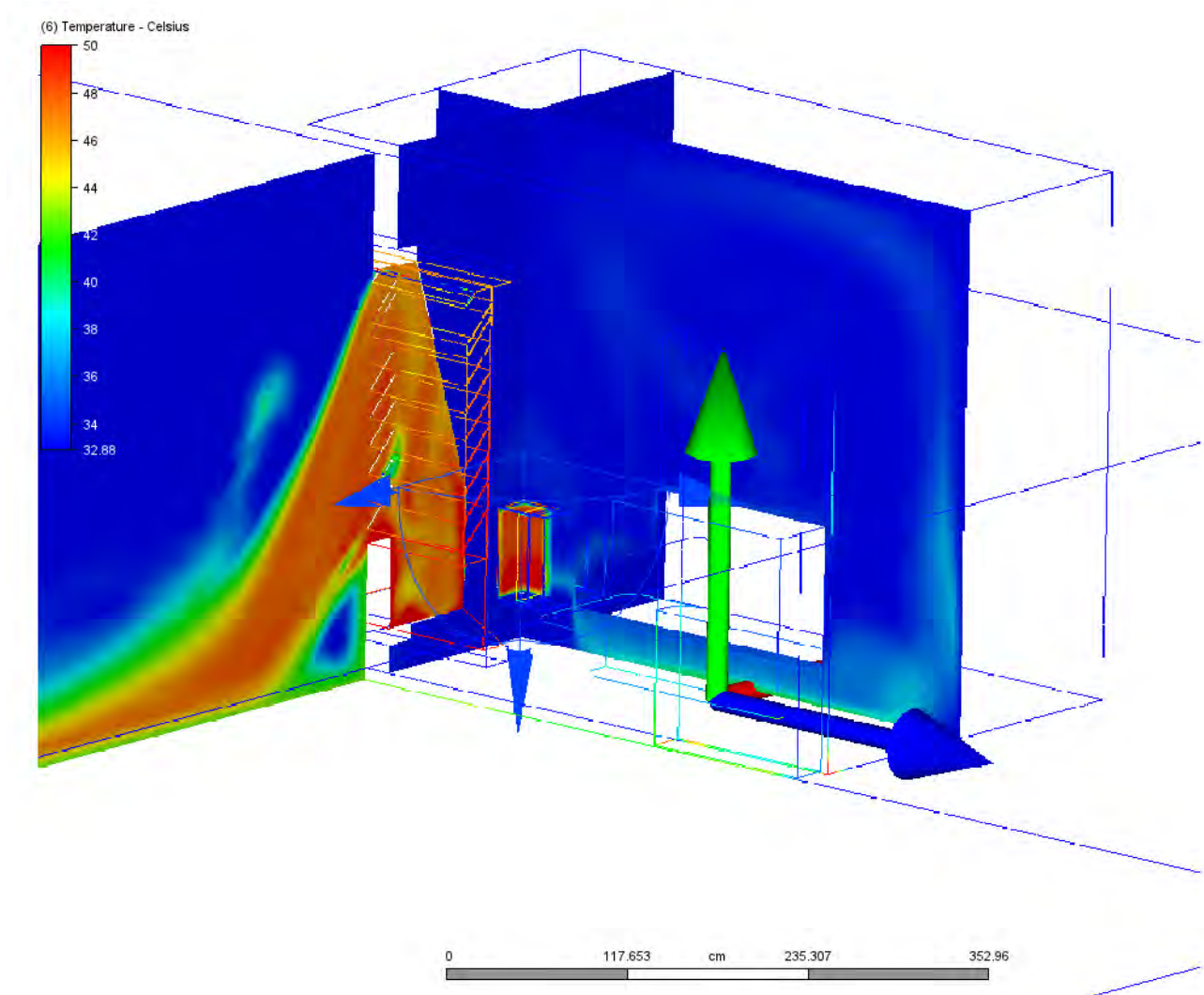


Figure 4: Discharge Temperature Profile, 3D View

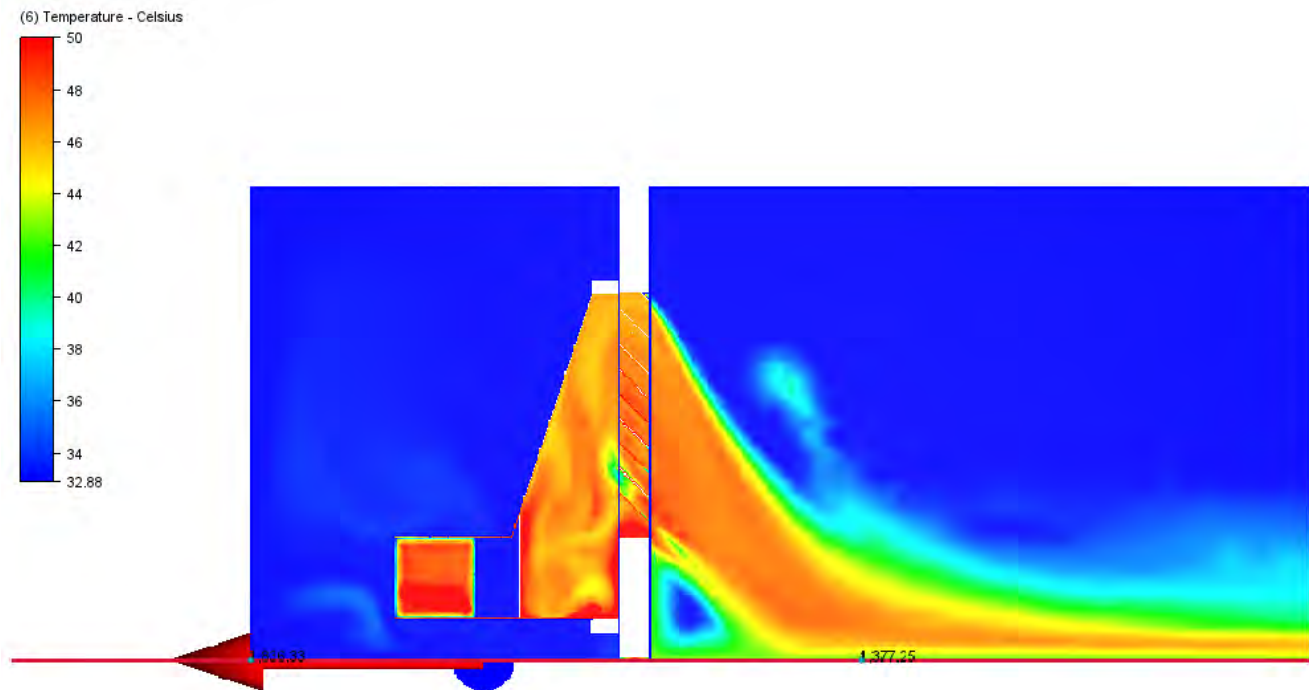


Figure 5: Discharge Temperature Section View

The temperature profile plan view shows little to no air moving from the outlet louver to the intake and conditions inside the generator room (Figure 6).

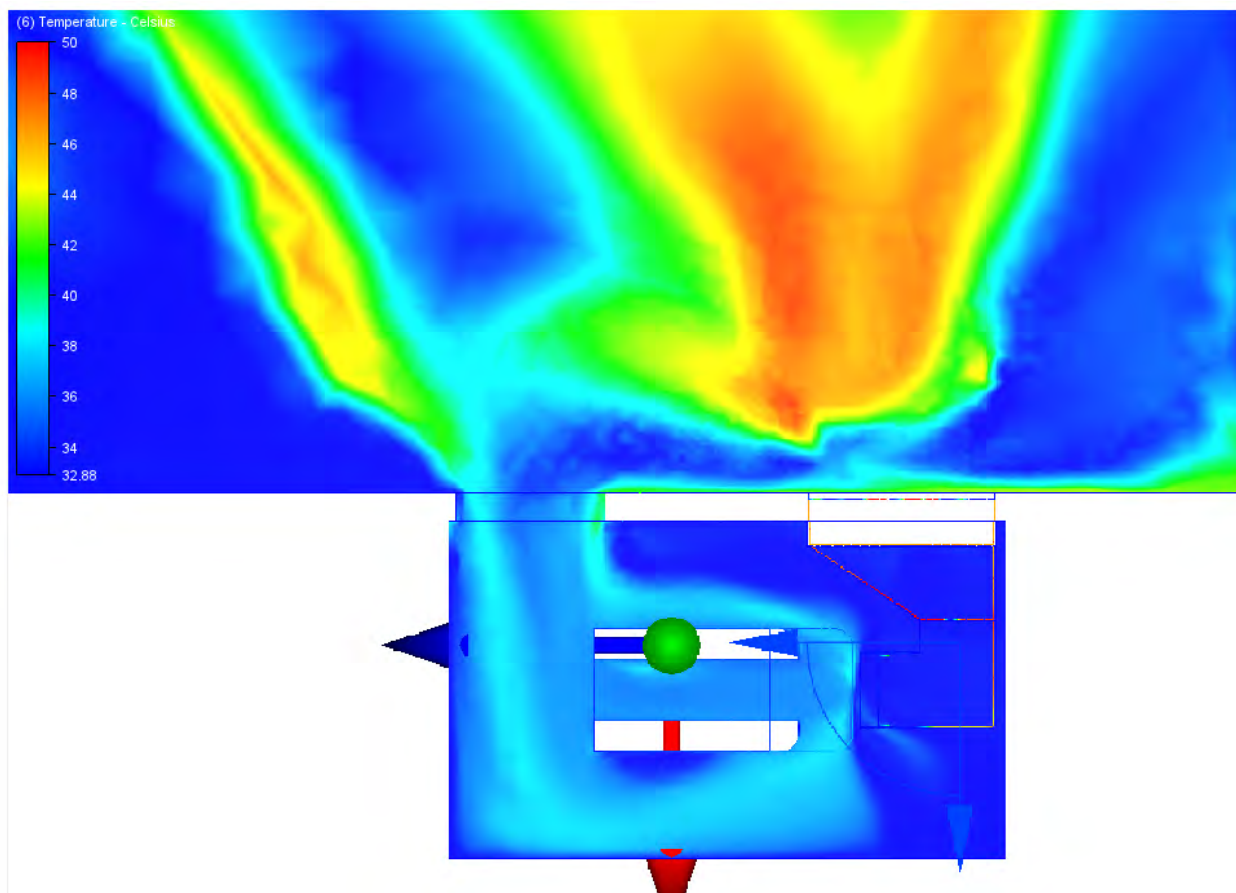


Figure 6: Temperature Plan View

After 40 minutes of simulation, the model boundaries start to artificially increase the simulated temperature inside the generator room. The hot spot to the left in Figure 6 is due to the boundaries of the model turning the warm airstream back toward the generator room and causing some increase in the generator room. Temperatures on the body of the generator are approximately 100F, well below the 122F limit.

There is some shift of the discharge air toward the intake louver due to the 40 fpm outdoor breeze.

### Model Results: Velocity

CFD analysis shows uniform air distribution does not occur in the outlet ductwork and louver.

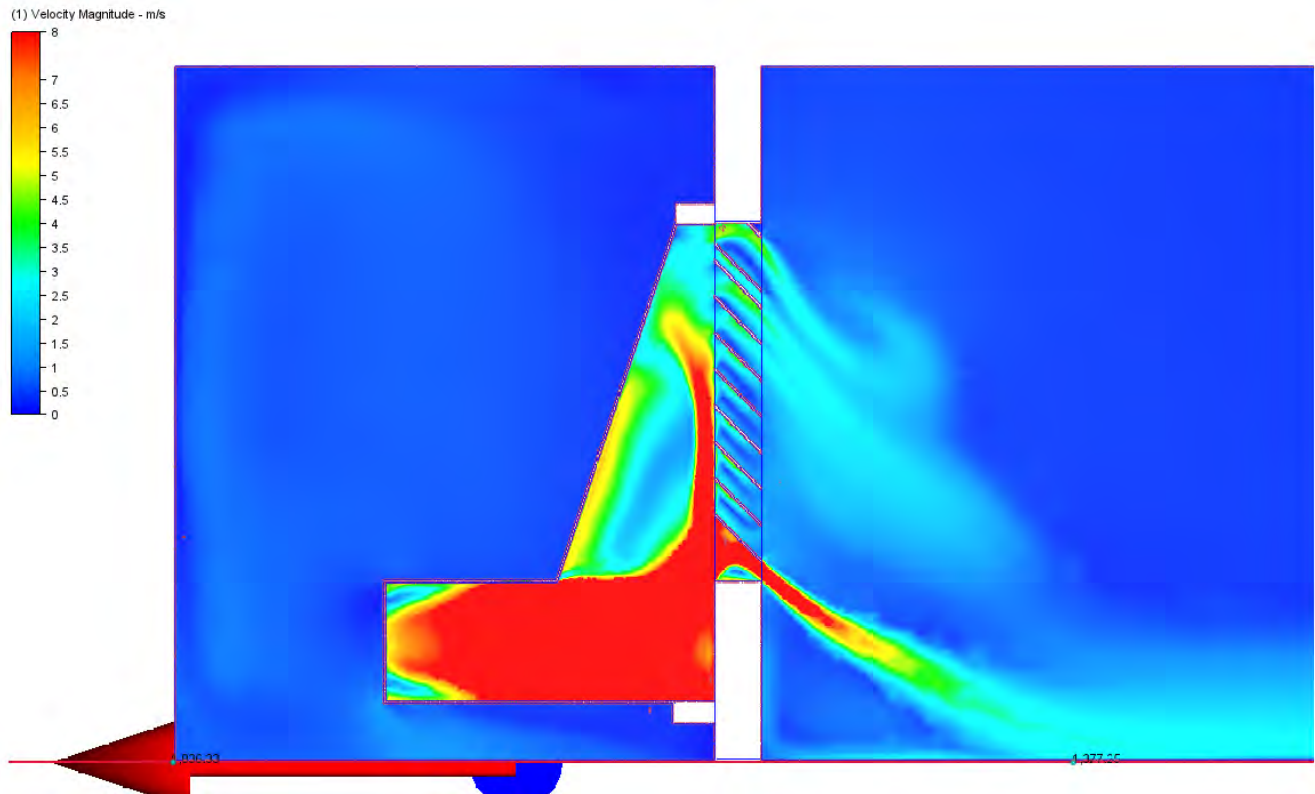


Figure 7: Outlet Velocity Profile

There is a localized high velocity area where airspeeds approach 1575 fpm (8 m/s). This quickly dissipates to below 780 fpm (4m/s) within three feet of the building wall.

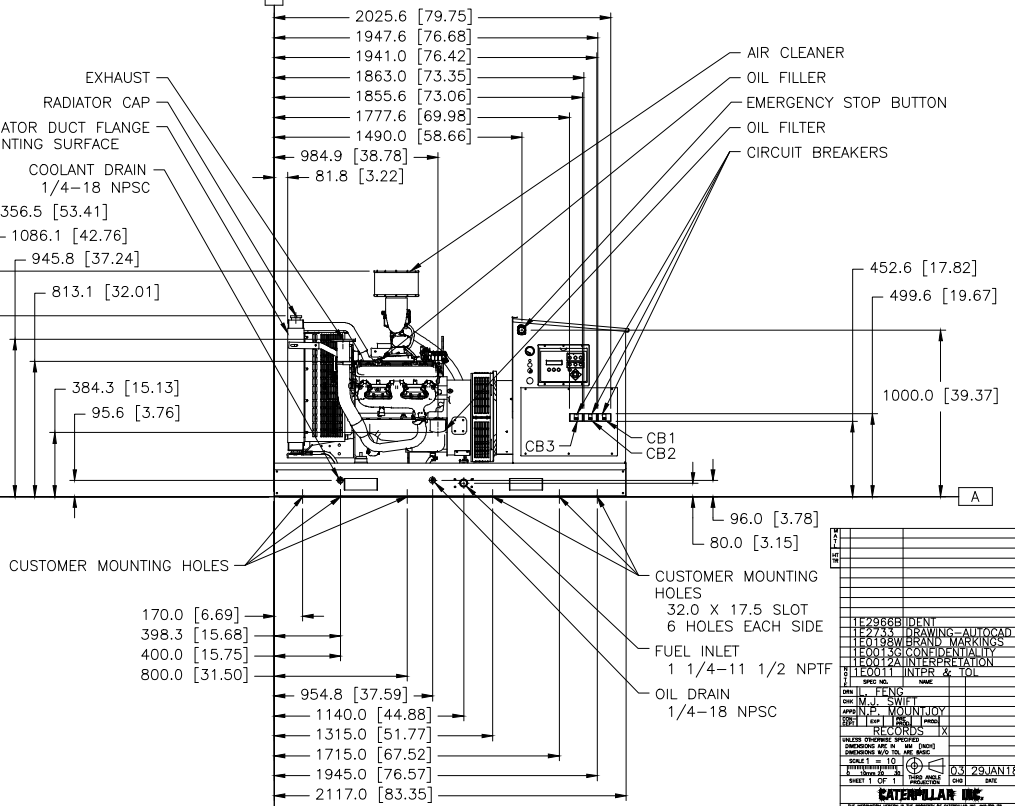
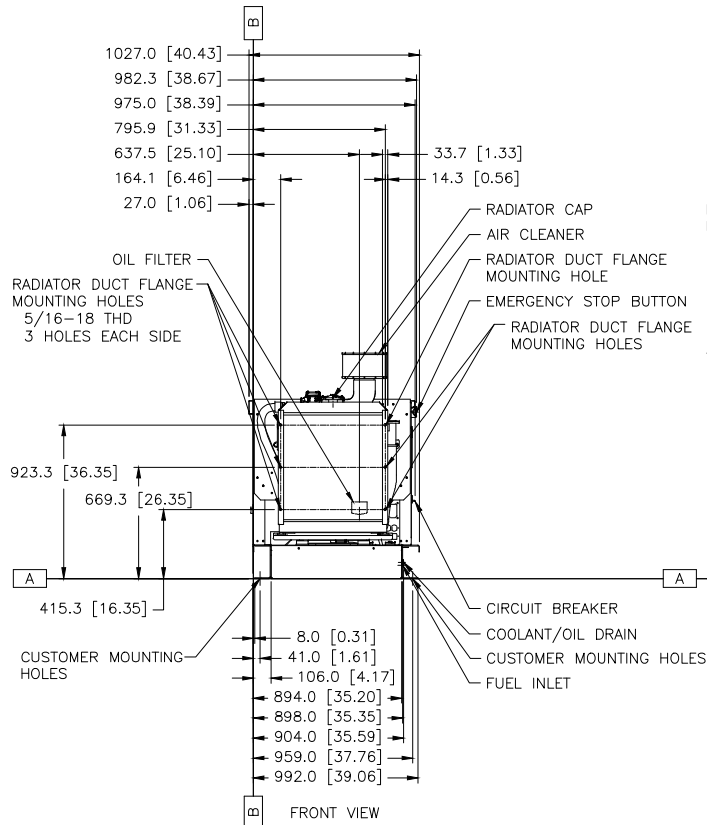
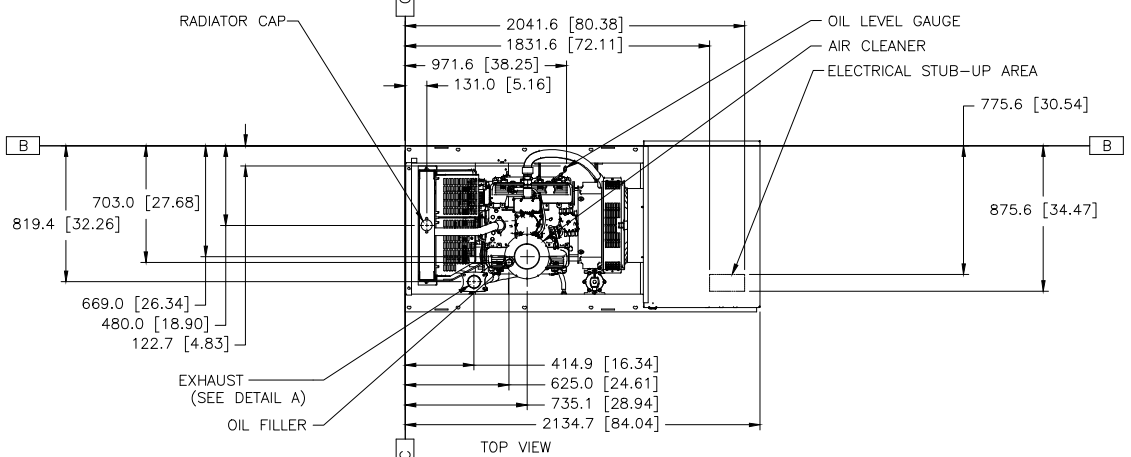
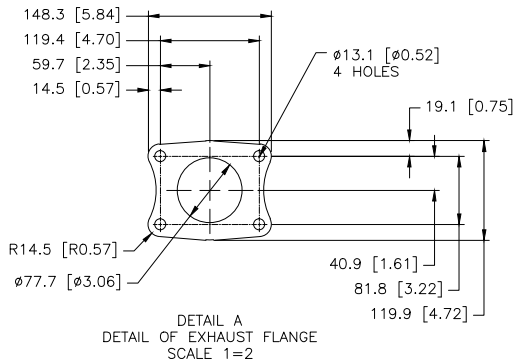
The air moving along the ground is approximately 500 fpm (2.5 m/s).

1575 fpm is the equivalent of a Moderate Breeze on the Beaufort Wind Scale. This wind would raise dust and loose paper within 3 feet along the bottom of the louver. The 500 fpm out in the courtyard would be a Light Breeze on this scale.

### Conclusions

The velocity of the airstream at the outlet louver is sufficient to move the radiator discharge air far enough from the building to prevent recirculation back into the inlet louver.

While there is a localized jet of air in the immediate vicinity of the louver, it quickly slows to a Light Breeze within 6 feet.



MODEL	TYPE	PRICING AR	
5.7LNA	Y	LS-2847 CHG 05	LS-2895 CHG 00
		LS-2848 CHG 05	LS-2896 CHG 00
		LS-2850 CHG 06	LS-2897 CHG 00
		LS-2851 CHG 05	LS-2898 CHG 00

REVISIONS

NO.	DATE	DESCRIPTION
1	10/1/81	ISSUED FOR PRODUCTION
2	10/1/81	REVISION 1
3	10/1/81	REVISION 2
4	10/1/81	REVISION 3
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020816C

## FUEL SYSTEM REQUIREMENTS

Utility High Pressure Fuel Supply  
 Less than 300kW-  
 Absolute MIN 2.0 PSI, Optimum 5.0 PSI, MAX 10.0 PSI  
 Greater than 300kW-  
 Absolute MIN 5.0 PSI, Optimum 10 PSI, MAX 15.0 PSI  
 Primary Fuel Pressure Regulator  
 Commercial/Industrial Rated.

Shall be rated for Engine/Mechanized application.

2.0in Connectors (Inlet & Outlet).

Minimum CFH Rating of 1.5x Greater Than  
 the 100 percent Required Fuel Flow  
 Rating of the Genset. Calculated using  
 a Specific Gravity of 0.65 NG,  
 1.6 LPG-V.

6inH2O to 14inH2O Spring Rate.

Drifce Size dependent upon CFH  
 Flow Rate requirement of Genset.

Output Pressure to be set at  
 13.0inH2O.

Maximum Allowable Pressure Drop  
 from a static condition to full  
 load, shall not be equal to or  
 greater than 2.0inH2O.

Installed 6 to 10ft. from flex hose  
 connection, on the same side as the  
 flex hose connection.

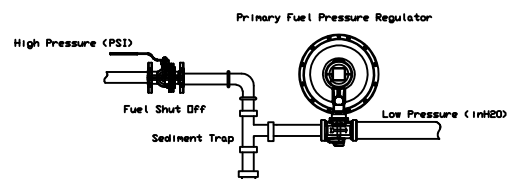
The Diaphragm case shall be orientated  
 in a Vertical Plane.

Flex Hose Connection  
 The flex hose shall be directly  
 connected to the genset inlet connector.

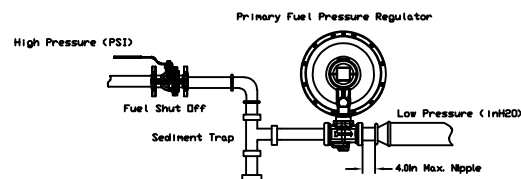
The flex hose shall be installed in a  
 straight line perpendicular to the  
 generator set rail with no bends or  
 kinks.

Sediment Trap and Fuel Shut Off Valve  
 A sediment trap shall be installed on the high  
 pressure side (inlet) of the Primary Fuel  
 Pressure Regulator.

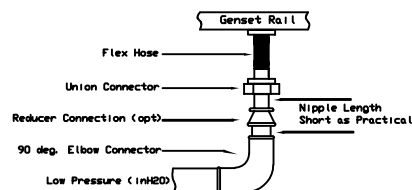
A fuel shut off valve shall be installed on  
 the high pressure side (inlet) of the Primary  
 Fuel Pressure Regulator.



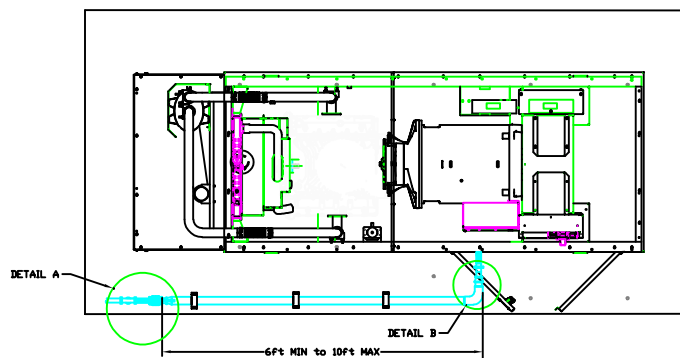
DETAIL A  
 Straight Pipe Run



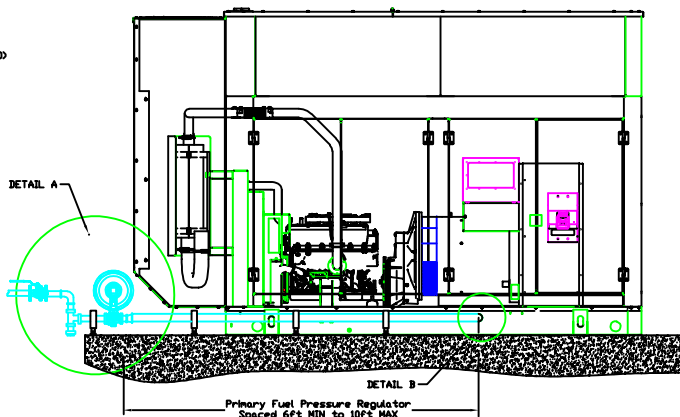
DETAIL A-1  
 Bell-Up Pipe Run



DETAIL B  
 Flex Hose Connection



TOP VIEW



SIDE VIEW

## FUEL SYSTEM LAYOUT REQUIREMENTS

Caterpillar, Inc.  
 CAT Compact Retail Gensets

NG or LPG-V FUEL TYPES  
 SINGLE FUEL SYSTEM LAYOUT

ISSUE DATE 05/06/2019

FILE NAME	020816C.DWG	SIZE	B
SCALE	NA	FIRST USE	CAT Compact
DWG NO.	020816C	REV	C

CATERPILLAR

MODEL TYPE: DG60-2

150% CFH = 1,161

BTU = 1,161,000

NATURAL GAS (NG)

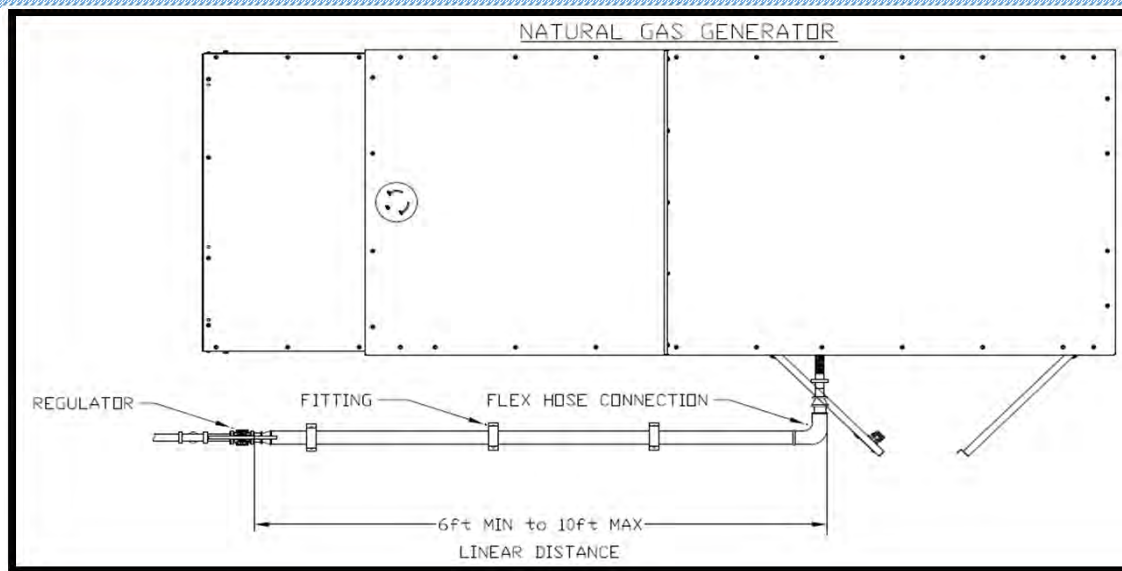
## GASEOUS FUEL SUPPLY SYSTEM PIPING

### LINEAR DISTANCE

- This is the distance between the outlet of the PRIMARY PRESSURE REGULATOR and the FLEX HOSE CONNECTION POINT.
- This value is the "STRAIGHT PIPE SECTION" of the pipe run installation.
- NOTE: The absolute minimum value is 6-ft of a properly sized pipe (See Picture Below)

### TARGETED CFH RATING OF PIPING:

- The selected pipe size must have a flow rate equal to or greater than the 150% CFH (Cu Ft/Hr) rating.
- NOTE: This is the minimum flow rate that must be obtained!



## PRIMARY PRESSURE REGULATOR

### SIZING THE PRIMARY REGULATOR

- Inlet Pressure (Between 2-15 PSI. Preferred 5 PSI)
- Outlet Pressure: (14 In-H<sub>2</sub>O or .51 PSI)
- Outlet Pipe Size: 2-In Minimum. Size is based on a linear distance of 6-Ft.
- The primary regulator must be sized for at least 150% CFH of the generators required fuel consumption (at 100% load).
- NOTE: 150% CFH = 1,161 CFH (1,161,000 BTU)
- Spring Rating: (Between 6-14 In-H<sub>2</sub>O or .22-.51 PSI)

### PRIMARY PRESSURE REGULATOR

- The primary pressure regulator shall provide no more than a 2 In-H<sub>2</sub>O pressure drop from the minimum flow to full flow (regulator droop).

### OPERATING FUEL PRESSURE REQUIREMENTS

- The maximum allowable fuel system pressure drop, measured at the unit mounted test port, from a static condition to full load condition, shall not be equal to or greater than 2 in-H<sub>2</sub>O.
- EXAMPLE: If a unit has an operating fuel pressure range from 11 in-H<sub>2</sub>O to 14 in-H<sub>2</sub>O, the primary fuel pressure regulator shall have an output pressure set point of 12-inH<sub>2</sub>O.



## INTERPRETING THE NATURAL GAS PIPE SIZING TABLE INFORMATION

8-LF of pipe with three (3) 90° elbows, one (1) tee, one(1) reducer and one(1) bell-up requires a 2-in diameter pipe

### NATURAL GAS PIPE SIZING TABLE

LINEAR FT OF PIPE	PIPE FITTINGS & QUANTITY IN PIPE RUN						EQUIVALENT LENGTH (FT)	PIPE DIAMETER INCHES
	90° ELBOWS	TEE's	UNIONS	REDUCER	BELL-UP	VALVES		
6	1	1	0	1	1	0	25	2
6	2	1	0	1	1	0	30	2
6	3	1	0	1	1	0	35	2
7	1	1	0	1	1	0	25	2
7	2	1	0	1	1	0	30	2
7	3	1	0	1	1	0	35	2
8	1	1	0	1	1	0	25	2
8	2	1	0	1	1	0	30	2
8	3	1	0	1	1	0	35	2
9	1	1	0	1	1	0	30	2
9	2	1	0	1	1	0	35	2
9	3	1	0	1	1	0	40	2
10	1	1	0	1	1	0	30	2
10	2	1	0	1	1	0	35	2
10	3	1	0	1	1	0	40	2

PIPE LENGTH: 6 - 10 LF

#### EQUIVALENT LENGTH

- The generator set manufacture uses the "EQUIVALENT LENGTH", method to calculate the require pipe diameter size needed for a specific generator.
- The equivalent length method converts pressure losses inherent to pipe fittings into a "LENGTH OF PIPE", value which is added to the overall linear run of estimated pipe length to be used in the fuel supply system.
- The minimum equivalent length of any fitting or valve shall be equal to 1-ft.

#### SUPPLEMENTAL INFORMATION

- The following information is to provide assistance in planning gaseous fuel supply installations for generators.
- In **NO WAY** should this information be interpreted to conflict with any applicable fuel gas codes or local requirements / regulations.(i.e. NFPA-54: National Fuel Gas Code)
- Contact the local AHJ if questions arise. It is recommended that a local gas distributor or licensed installer be consulted when sizing and installing any gaseous fuel supply systems.

## Standby & Prime: 60Hz



Image shown might not reflect actual configuration

Engine Model	5.7L V8, 4-cycle
Bore, mm (in)	101.6 (4.0)
Stroke, mm (in)	88.4 (3.48)
Displacement, L (in <sup>3</sup> )	5.7 (350)
Compression Ratio	9.4:1
Aspiration	Naturally Aspirated
Fuel System	Natural Gas, LP Vapor
Governor Type	Electronic
Fuel Pressure Operating Range*, kPa (in. water)	2.7 - 3.5 (11 - 14)

Model	Standby	Emission Strategy
DG60-2	71.3 kVA (57 ekW)	U.S. EPA Certified for Stationary Emergency Application

## BENEFITS & FEATURES

### Generator

- Matched to the performance and output characteristics of engine
- Industry-leading mechanical and electrical design
- Industry-leading motor starting capabilities
- High efficiency

### Cat<sup>®</sup> EMCP Control Panel

The EMCP 4 controller features the reliability and durability you have come to expect from your Cat equipment. EMCP 4 is a scalable control platform designed to ensure reliable generator set operation, providing extensive information about power output and engine operation. EMCP 4 systems can be further customized to meet your needs through programming and expansion modules.

### Design Criteria

- The generator set facilitates compliance with NFPA 110 and meets ISO 8528-5 requirements for transient response
- Cooling system designed to operate in 50°C/122°F ambient temperatures with an air flow restriction of 0.5 in. water

### UL 2200/CSA – Optional

- UL 2200 Listed
- CSA Certified

Certain restrictions may apply. Consult with your Cat dealer.

### Worldwide Product Support

Cat dealers provide extensive post-sale support including maintenance and repair agreements. Cat dealers have over 1,800 dealer branch stores operating in 200 countries.

\*Optional fuel pressure options may be available, please contact your local dealer.

## STANDARD EQUIPMENT

### Air Inlet

- Single element air filter

### Cooling

- Radiator and cooling fan complete with protective guards
- Standard ambient temperatures up to 50°C (122°F)

### Exhaust

- Exhaust outlet with 3" pipe

### Fuel

- Natural Gas or LP Vapor
- Dual lock off valves
- NPT connection

### Generator

- Matched to the performance and output characteristics of engine
- IP23 protection
- Integrated Voltage Regulator

### Governor

- Electronic governor (non adjustable)

### Control Panels

- EMCP 4.2 Series generator set controller

### Mounting

- Rubber vibration isolators

### Starting/Charging

- 12 volt starting motor
- Batteries with rack and cables

## OPTIONAL EQUIPMENT

### Generator

- Excitation: [ ] Permanent Magnet Excited (PM)
- Oversize and premium generators
- Anti Condensation heater

### Starting/Charging

- Battery charger – UL Listed 10 amp
- Jacket water heater
- Battery heater
- Lube oil sump heater

### General

- UL 2200 Listed
- CSA Certified
- Enclosures: sound attenuated, weather protective
- Automatic transfer switches (ATS)
- Suitable for Use as Service Equipment (SUSE)

## PACKAGE PERFORMANCE

Performance		Standby	
Frequency		60 Hz	
Genset power rating with fan		71.3 kVA	
Genset power rating with fan @ 0.8 power factor		57 ekW	
Fuel Consumption with Natural Gas			
100% load with fan, m³/hr (ft³/hr)		21.9 (774)	
75% load with fan, m³/hr (ft³/hr)		19.9 (703)	
50% load with fan, m³/hr (ft³/hr)		15.7 (555)	
Fuel Consumption with LP Vapor			
100% load with fan, m³/hr (ft³/hr)		8.7 (309)	
75% load with fan, m³/hr (ft³/hr)		7.7 (273)	
50% load with fan, m³/hr (ft³/hr)		6.1 (215)	
Cooling System¹			
Radiator air flow restriction (system), kPa (in. Water)		0.12 (0.48)	
Engine coolant capacity, L (gal)		7.8 (2.1)	
Radiator coolant capacity, L (gal)		8.8 (2.3)	
Total coolant capacity, L (gal)		16.6 (4.4)	
Inlet Air			
Combustion air inlet flow rate, m³/min (cfm)		4.9 (173)	
Exhaust System			
Exhaust stack gas temperature, °C (°F)		715 (1319)	
Exhaust gas flow rate, m³/min (cfm)		15.8 (553)	
Exhaust system backpressure (maximum allowable), kPa (in. water)		0.2 (40.9)	
Heat Rejection		480V	208V
Heat rejection to coolant (total), kW (Btu/min)		54.9 (3120)	
Heat rejection to atmosphere from generator, kW (Btu/min)		5.7 (324)	4.8 (273)
Alternator²		480V	208V
Motor Starting Capability @ 30% Voltage Dip		157 skVA	168 skVA
Frame		LC1514P	LC3114D
Temperature Rise		130°C	105°C
Excitation		Self Excited	
Lube System			
Sump Refill with Filter, L (gal)		4.7 (1.24)	
Emissions (Nominal)³			
NOx + HC, g/kW-hr		13.4	
CO, g/kW-hr		519	

## PACKAGE DIMENSIONS\*\*

Dim "A" mm (in)	Dim "B" mm (in)	Dim "C" mm (in)	Dry Weight kg (lb)
2117 (83.3)	1000 (39.4)	1360 (53.5)	957 (2110)

\*\* Note: For reference only – do not use for installation design. Please contact your local dealer for exact weight and dimensions.

## APPLICABLE CODES AND STANDARDS:

CSA C22.2 No 100-04, UL 489, UL 869, UL 2200, NFPA 37, NFPA 70, NFPA 99, NFPA 110, IBC, IEC60034-1, ISO3046, ISO8528, NEMA MG 1-22, NEMA MG 1-33.

## DEFINITIONS AND CONDITIONS

<sup>1</sup> For ambient and altitude capabilities consult your Cat dealer. Air flow restriction (system) is added to the existing restriction from the factory.

<sup>2</sup> Generator temperature rise is based on a 40°C (104°F) ambient per NEMA MG1-32.

<sup>3</sup> The nominal emissions data shown is subject to environment, instrumentation, measurement, facility and engine to engine variations.

**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.

**Ratings** are based on SAE J1349 standard conditions. These ratings also apply at ISO3046 standard conditions.

**Fuel Rates** are based on heat values of 1015 BTU/SCF for Natural Gas and 2500 BTU/SFC for Propane Vapor @77°F (25°C) and 328 ft (100m) above sea level.

Additional ratings may be available for specific customer requirements, contact your Cat representative for details.

Genset Ratings are based on ambient temperature of 77°F and elevation of 1200 ft above sea level.

For higher temperatures and elevations the following derate specifications are to be used:

Altitude: Derate 3.0% per every 1000ft (305 m.) above 1200ft (365 m.)

Temperature: Derate 1.0% per 10°F (5.55°C) temperature above 77°F (25°C)

# LET'S DO THE WORK.™

LEHE0999-03 (05/20)



# **GEN SET PACKAGE PERFORMANCE DATA** **[57LGE03]**

**OCTOBER 29, 2020**

 For Help Desk Phone Numbers [Click here](#)
**Performance Number:** EM1973

**Change Level:** 00 ▼

<b>Sales Model:</b> 5.7L SINA	<b>Combustion:</b> SI	<b>Aspr:</b> NA
<b>Engine Power:</b>		
60 W/F EKW	<b>Speed:</b> 1,800 RPM	<b>After Cooler:</b>
94 HP		
<b>Manifold Type:</b>	<b>Governor Type:</b>	<b>After Cooler Temp(F):</b> 32
<b>Turbo Quantity:</b>	<b>Engine App:</b> GP	<b>Turbo Arrangement:</b>
<b>Hertz:</b> 60	<b>Application Type:</b> PACKAGE-DIE	<b>Engine Rating:</b> PGS <b>Strategy:</b>
<b>Rating Type:</b> STANDBY	<b>Certification:</b> EPA NSPS S.I. STATIONAR - Y EM GENCY -	
<b>Fuel:</b>	<b>Fuel Press (PSI):</b>	<b>NOx Level:</b>
<b>IGN:</b>	<b>JW Temp (F):</b>	<b>ELEK A/F CONT:</b>
<b>Cam Type:</b>	<b>Piston:</b>	
<b>CARB:</b>	<b>C/R:</b> 9.4:1	

## **EMISSIONS DATA**

EPA NSPS S.I. STATIONAR - Y EM \*\*\*\*\* ER  
 No notes were found for this certification...

EMISSIONS DATA MEASUREMENT IS CONSISTENT WITH THOSE DESCRIBED IN EPA CFR 40 PART 89 SUBPART D & E AND ISO 8178-1 FOR MEASURING HC, CO, CO2 AND NOX. THESE PROCEDURES ARE VERY SIMILAR TO THE METHODS DESCRIBED IN EPA CFR 40 PART 60 APPENDIX A METHOD 25A FOR HYDROCARBONS, METHOD 10 FOR CO, METHOD 7E FOR NOX. DATA SHOWN IS BASED ON STEADY STATE ENGINE OPERATING CONDITIONS OF 77 DEG F, 28.43 INCHES HG AND FUEL HAVING A LHV OF 911 BTU PER CUBIC FOOT AT 30.00 INCHES HG ABSOLUTE AND 32 DEG F. FUEL RATE IS BASED ON A STANDARD CUBIC FOOT AT 30.00 INCHES HG ABSOLUTE AND 32 DEG F.

REFERENCE EXHAUST STACK DIAMETER	0 IN
WET EXHAUST MASS	0.0 LB/HR
WET EXHAUST FLOW (-- STACK TEMP )	--
WET EXHAUST FLOW RATE ( 32 DEG F AND 29.98 IN HG )	--
DRY EXHAUST FLOW RATE ( 32 DEG F AND 29.98 IN HG )	--
FUEL FLOW RATE	--

**The powers listed above and all the Powers displayed are Corrected Powers****Identification Reference and Notes**

<b>Engine Arrangement:</b>		<b>Lube Oil Press @ Rated Spd(PSI):</b>	0.0
<b>Effective Serial No:</b>		<b>Piston Speed @ Rated Eng SPD(FT/Min):</b>	--
<b>Primary Engine Test Spec:</b>		<b>Max Operating Altitude(FT):</b>	0.0
<b>Performance Parm Ref:</b>		<b>PEEC Elect Control Module Ref</b>	
<b>Performance Data Ref:</b>	EM1973	<b>PEEC Personality Cont Mod Ref</b>	
<b>Aux Coolant Pump Perf Ref:</b>			
<b>Cooling System Perf Ref:</b>		<b>Turbocharger Model</b>	
<b>Certification Ref:</b>		<b>Fuel Injector</b>	
<b>Certification Year:</b>		<b>Timing-Static (DEG):</b>	--
<b>Compression Ratio:</b>	9.4	<b>Timing-Static Advance (DEG):</b>	--
<b>Combustion System:</b>	SI	<b>Timing-Static (MM):</b>	--
<b>Aftercooler Temperature (F):</b>	32	<b>Unit Injector Timing (MM):</b>	--
<b>Crankcase Blowby Rate(CFH):</b>	--	<b>Torque Rise (percent)</b>	0.0
<b>Fuel Rate (Rated RPM) No Load(Gal/HR):</b>	--	<b>Peak Torque Speed RPM</b>	--
<b>Lube Oil Press @ Low Idle Spd(PSI):</b>	0.0	<b>Peak Torque (LB.FT):</b>	--

**Reference  
Number: EM1973**

EPA NSPS S.I. STATIONARY EMERGENCY

**Parameters  
Reference:**

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Caterpillar Confidential: **Green**

Content Owner: Commercial Processes Division

Web Master(s): [PSG Web Based Systems Support](#)

Current Date: 10/29/2020, 11:00:12 AM

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[Data Privacy Statement](#).

**Systems Data**

Reference Number: EM1973



August 19, 2020  
 For Help Desk Phone Numbers  
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**AIR INTAKE SYSTEM**

*THE INSTALLED SYSTEM MUST COMPLY WITH THE SYSTEM LIMITS BELOW FOR ALL EMISSIONS CERTIFIED ENGINES TO ASSURE REGULATORY COMPLIANCE.*

MAXIMUM ALLOWABLE INTAKE RESTRICTION WITH DIRTY ELEMENT	13	IN-H2O
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**COOLING SYSTEM**

ENGINE ONLY COOLANT CAPACITY	2.1	GAL
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**ENGINE SPEC SYSTEM**

CYLINDER ARRANGEMENT	VEE	
NUMBER OF CYLINDERS	8	
CYLINDER BORE DIAMETER	4.0	IN
PISTON STROKE	3.5	IN
TOTAL CYLINDER DISPLACEMENT	348	CU IN
STANDARD CYLINDER FIRING ORDER	1-8-4-3-6-5-7-2	
STROKES/COMBUSTION CYCLE	4	

**EXHAUST SYSTEM**

*THE INSTALLED SYSTEM MUST COMPLY WITH THE SYSTEM LIMITS BELOW FOR ALL EMISSIONS CERTIFIED ENGINES TO ASSURE REGULATORY COMPLIANCE.*

MAXIMUM ALLOWABLE SYSTEM BACK PRESSURE	41	IN-H2O
MANIFOLD TYPE	DRY	

**MOUNTING SYSTEM**

DRY WEIGHT - ENGINE ONLY (REFERENCE VALUE)	432	LB
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**PACKAGE DATA [57LGE03]****OCTOBER 29, 2020**For Help Desk Phone Numbers [Click here](#)

<b>Feature Code:</b>	57LGE03	<b>Rating Type:</b>	STANDBY	<b>Sales model Package:</b>	DG60-2
<b>Engine Sales Model:</b>	5.7LNA	<b>Engine Arrangement Number:</b>	4830906	<b>Hertz:</b>	60
<b>EKW W/F:</b>	60.0	<b>Noise Reduction:</b>	0 dBA	<b>Back Pressure:</b>	0.0 inH2O

**Engine Package Information**

Engine Package Data

**Package Cooling Information****Open Cooling Data**

% Load	Airflow Rate scfm			Ambient Capability Sea Level (Deg F)			Ambient Capability 300 m (Deg F)			Ambient Capability 600 m (Deg F)			Ambient Capability 900 m (Deg F)		
	1/2		3/4	0		1/2	3/4	0		1/2	3/4	0		1/2	3/4
	inH2O	inH2O	inH2O	inH2O	inH2O	inH2O	inH2O	inH2O	inH2O	inH2O	inH2O	inH2O	inH2O	inH2O	inH2O
100.0	7557	6956	6003	127	123	120	123	120	116	120	116	113	116	113	109
75.0	7557	6956	6003	132	129	125	129	125	122	125	122	118	122	118	114
50.0	7557	6956	6003	136	132	131	132	129	127	129	125	123	125	122	120
25.0	7557	6956	6003	141	138	134	138	134	131	134	131	127	131	127	123

**SA Level 2 Canopy Cooling Data**

% Load	Airflow Rate scfm	Ambient Capability Sea Level (Deg F)	Ambient Capability 300 m (Deg F)	Ambient Capability 600 m (Deg F)	Ambient Capability 900 m (Deg F)
100.0	5897	123	120	116	113
75.0	5897	131	127	123	120
50.0	5897	138	134	131	127
25.0	5897	143	140	136	132

**WP Canopy - Industrial Cooling Data**

% Load	Airflow Rate scfm	Ambient Capability Sea Level (Deg F)	Ambient Capability 300 m (Deg F)	Ambient Capability 600 m (Deg F)	Ambient Capability 900 m (Deg F)
100.0	6497	125	122	118	114
75.0	6497	127	123	120	116
50.0	6497	129	125	122	118
25.0	6497	129	125	122	118

**Package Sound Information****Sound Comments :**

**Open Sound Data****Distance:** 3.3 Feet

<b>EKW W/F</b>	<b>% LOAD</b>	<b>OVERALL SOUND DB(A)</b>	<b>OBCF 63HZ DB</b>	<b>OBCF 125HZ DB</b>	<b>OBCF 250HZ DB</b>	<b>OBCF 500HZ DB</b>	<b>OBCF 1000HZ DB</b>	<b>OBCF 2000HZ DB</b>	<b>OBCF 4000HZ DB</b>	<b>OBCF 8000HZ DB</b>
60.0	100.0	91.4	74.2	84.4	89.8	87.4	84.9	85.1	80.6	80.5
45.0	75.0	90.6	73.3	82.2	86.9	85.6	84.4	85.1	80.2	79.3
30.0	50.0	90.1	72.6	81.5	85.1	84.5	84.2	85.0	79.6	78.0
15.0	25.0	89.8	72.1	82.1	84.5	84.1	84.2	84.8	78.9	76.6

**Distance:** 23.0 Feet

<b>EKW W/F</b>	<b>% LOAD</b>	<b>OVERALL SOUND DB(A)</b>	<b>OBCF 63HZ DB</b>	<b>OBCF 125HZ DB</b>	<b>OBCF 250HZ DB</b>	<b>OBCF 500HZ DB</b>	<b>OBCF 1000HZ DB</b>	<b>OBCF 2000HZ DB</b>	<b>OBCF 4000HZ DB</b>	<b>OBCF 8000HZ DB</b>
60.0	100.0	81.4	64.2	74.4	79.8	77.4	74.9	75.1	70.6	70.5
45.0	75.0	80.6	63.3	72.2	76.9	75.6	74.4	75.1	70.2	69.3
30.0	50.0	80.1	62.6	71.5	75.1	74.5	74.2	75.0	69.6	68.0
15.0	25.0	79.8	62.1	72.1	74.5	74.1	74.2	74.8	68.9	66.6

**Distance:** 49.2 Feet

<b>EKW W/F</b>	<b>% LOAD</b>	<b>OVERALL SOUND DB(A)</b>	<b>OBCF 63HZ DB</b>	<b>OBCF 125HZ DB</b>	<b>OBCF 250HZ DB</b>	<b>OBCF 500HZ DB</b>	<b>OBCF 1000HZ DB</b>	<b>OBCF 2000HZ DB</b>	<b>OBCF 4000HZ DB</b>	<b>OBCF 8000HZ DB</b>
60.0	100.0	75.4	58.2	68.4	73.8	71.4	68.9	69.1	64.6	64.5
45.0	75.0	74.6	57.3	66.2	70.9	69.6	68.4	69.1	64.2	63.3
30.0	50.0	74.1	56.6	65.5	69.1	68.5	68.2	69.0	63.6	62.0
15.0	25.0	73.8	56.1	66.1	68.5	68.1	68.2	68.8	62.9	60.6

**SA Level 2 Canopy Sound Data****Distance:** 3.3 Feet

<b>EKW W/F</b>	<b>% LOAD</b>	<b>OVERALL SOUND DB(A)</b>	<b>OBCF 63HZ DB</b>	<b>OBCF 125HZ DB</b>	<b>OBCF 250HZ DB</b>	<b>OBCF 500HZ DB</b>	<b>OBCF 1000HZ DB</b>	<b>OBCF 2000HZ DB</b>	<b>OBCF 4000HZ DB</b>	<b>OBCF 8000HZ DB</b>
60.0	100.0	84.6	85.6	89.0	79.5	78.1	74.1	77.2	79.6	73.7
45.0	75.0	83.8	85.2	88.4	77.4	77.1	73.7	76.7	78.8	72.1
30.0	50.0	82.5	84.0	86.4	76.2	76.4	73.3	75.3	76.3	69.6
15.0	25.0	80.5	82.1	83.0	75.8	76.0	73.1	72.9	72.0	66.0

**Distance:** 23.0 Feet

<b>EKW W/F</b>	<b>% LOAD</b>	<b>OVERALL SOUND DB(A)</b>	<b>OBCF 63HZ DB</b>	<b>OBCF 125HZ DB</b>	<b>OBCF 250HZ DB</b>	<b>OBCF 500HZ DB</b>	<b>OBCF 1000HZ DB</b>	<b>OBCF 2000HZ DB</b>	<b>OBCF 4000HZ DB</b>	<b>OBCF 8000HZ DB</b>
60.0	100.0	69.6	78.5	77.6	69.9	64.5	60.8	61.2	62.0	57.6
45.0	75.0	68.9	78.2	76.6	69.4	64.0	60.3	61.1	61.3	56.3
30.0	50.0	68.0	77.0	74.7	68.5	63.6	59.9	60.1	59.5	54.4

15.0 25.0 66.7 74.9 72.0 67.2 63.4 59.6 58.2 56.5 52.0

**Distance:** 49.2 Feet

EKW W/F	% LOAD	OVERALL SOUND DB(A)	OBCF 63HZ DB	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
60.0	100.0	63.6	72.5	71.6	63.9	58.5	54.8	55.2	56.0	51.6
45.0	75.0	62.9	72.2	70.6	63.4	58.0	54.3	55.1	55.3	50.3
30.0	50.0	62.0	71.0	68.7	62.5	57.6	53.9	54.1	53.5	48.4
15.0	25.0	60.7	68.9	66.0	61.2	57.4	53.6	52.2	50.5	46.0

### WP Canopy - Industrial Sound Data

**Distance:** 3.3 Feet

EKW W/F	% LOAD	OVERALL SOUND DB(A)	OBCF 63HZ DB	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
60.0	100.0	104.6	89.9	106.9	102.7	98.7	96.5	97.2	98.4	91.9
45.0	75.0	103.6	89.3	106.6	100.7	97.4	95.7	96.6	97.6	90.3
30.0	50.0	101.7	88.0	105.4	99.6	95.8	93.8	94.3	94.3	86.9
15.0	25.0	98.9	86.0	103.4	99.2	94.0	90.9	90.4	88.6	81.7

**Distance:** 23.0 Feet

EKW W/F	% LOAD	OVERALL SOUND DB(A)	OBCF 63HZ DB	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
60.0	100.0	92.3	83.6	99.5	86.4	84.9	85.2	85.2	84.9	80.4
45.0	75.0	91.2	83.0	99.1	84.6	83.7	84.1	84.5	83.8	78.7
30.0	50.0	89.0	81.5	97.6	83.5	81.9	82.0	81.8	80.2	74.6
15.0	25.0	85.7	79.2	94.9	83.1	79.6	78.9	77.0	74.4	68.3

**Distance:** 49.2 Feet

EKW W/F	% LOAD	OVERALL SOUND DB(A)	OBCF 63HZ DB	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
60.0	100.0	86.3	77.6	93.5	80.4	78.9	79.2	79.2	78.9	74.4
45.0	75.0	85.2	77.0	93.1	78.6	77.7	78.1	78.5	77.8	72.7
30.0	50.0	83.0	75.5	91.6	77.5	75.9	76.0	75.8	74.2	68.6
15.0	25.0	79.7	73.2	88.9	77.1	73.6	72.9	71.0	68.4	62.3

### Open Exhaust Sound Data

**Distance:** 3.3 Feet

EKW W/F	% LOAD	OVERALL SOUND DB(A)	OBCF 63HZ DB	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
60.0	100.0	113.0	108.0	118.0	111.0	110.0	107.0	106.0	101.0	89.0
45.0	75.0	113.0	108.0	118.0	109.0	110.0	107.0	105.0	101.0	89.0

30.0	50.0	111.0	106.0	117.0	107.0	109.0	105.0	104.0	99.0	85.0
15.0	25.0	109.0	101.0	116.0	112.0	106.0	103.0	99.0	92.0	79.0

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