Development Services

From Concept to Construction

Phone: 503-823-7300 Email: 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 26323 (11/24/21) for additional information

Appeal ID: 26354	**Project Address:** 4957 NE 8th Ave
Hearing Date: 12/8/21	**Appellant Name:** Brendan Sanchez
Case No.: M-002	**Appellant Phone:** 3603261221
Appeal Type: Mechanical	**Plans Examiner/Inspector:** Thomas Ng
Project Type: commercial	**Stories:** 5 **Occupancy:** R-2, B, S-2 **Construction Type:** III-B
Building/Business Name:	**Fire Sprinklers:** Yes - NFPA 13 throughout
Appeal Involves: Reconsideration of appeal	**LUR or Permit Application No.:** 21-049755-CO
Plan Submitted Option: pdf [File 1] [File 2]	**Proposed use:** Multi Dwelling Living Units

APPEAL INFORMATION SHEET

Appeal item 1

Code Section	OMSC 501.3 and 501.3.1
Requires	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.“ 501.3.1 (Location of Exhaust Outlets) (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. (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. The Code Official is interpreting “nuisance” as any airflow discharging 10 feet or less above grade at a speed greater than 300 fpm. 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.
Code Modification or Alternate Requested	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.
Proposed Design	Please see the attached addendum with design and analysis. The analysis shows a localized region of air classified as a “Moderate Breeze” on the Beaufort Wind Scale (1200 fpm to 780 fpm on the sidewalk immediately in front of the generator room for approximately 6 feet) that reduces to below 500 fpm (“Light Breeze) at 10 feet. The Louver spacing and arrangement is sufficient to prevent recirculation back into the generator room, keeping temperatures well below the 122F design limit for the generator’s cooling system.
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 generators in these buildings are for emergencies 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 1200 fpm to 780 fpm in a very limited area to less than 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 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 buildings, the generator rooms do 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. From the Review Board: “Can exhaust be located above intake with louvers pointed up?” Conditions inside the generator room preclude ducting radiator discharge above the intake louver. The ductwork necessary to switch these airstreams would not fit in the generator room. In order to cool the body of the generator, air flow across the generator body should be maximized. The current design achieves this by ducting the point of introduction of make-up air

back from the make-up air louver. This large duct runs over the top of the generator and opens further down the generator body.

Both sides of the generator are required to remain clear of material and equipment in order for the generator to operate and be serviced. If the make-up air louver was located below the radiator discharge louver, any ducting back would need to first pass the radiator discharge louver plenum before routing up to the ceiling to avoid impinging upon these required side clearances. There is not sufficient space in the room to perform this duct routing while remaining clear of the generator.

From the Review Board: “Can additional separation of exhaust and intake be provided?”

The back of house space in this building is limited and does not allow for increased separation between the intake and exhaust louvers. The generator room and louver position is the result of accommodating other building systems within a constrained amount of square footage including the adjacent heat pump water heater, fire pump, and electrical room. Repositioning the generator so as to increase distance between the louvers would result in a configuration enlarges the back of house spaces, and encroaches on the adjacent amenity spaces (management and resident services offices and meeting rooms, which are critical spaces in this building which will house formerly homeless individuals). Any relocation of the generator room will impact the building required open space area.

The CFD analysis which has been resubmitted with engineer’s stamp, clearly shows that the current louver size, location, and spacing are effective at supporting radiator cooling airflow. While it is commonly understood that hot air rises, the CFD analysis gives us empirical data to illustrate that little to no air recirculates from the outlet louver to the inlet louver. The two airstreams are shown to maintain separation from one another, the air steam from the exhaust stays low to the ground and does not rise up and back into the intake louver. Therefore the current design does not endanger the functioning of the generator system or the health and safety of the building occupants.

We would like to reiterate that the generator will only be operated on a very infrequent basis, for testing. There is an extremely low likelihood of the generator running for any meaningful duration of time.

Therefore we urge the board to approve this appeal, based on the validity of the stamped engineering analysis that we have provided for you at the specific request of the mechanical reviewer.

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.

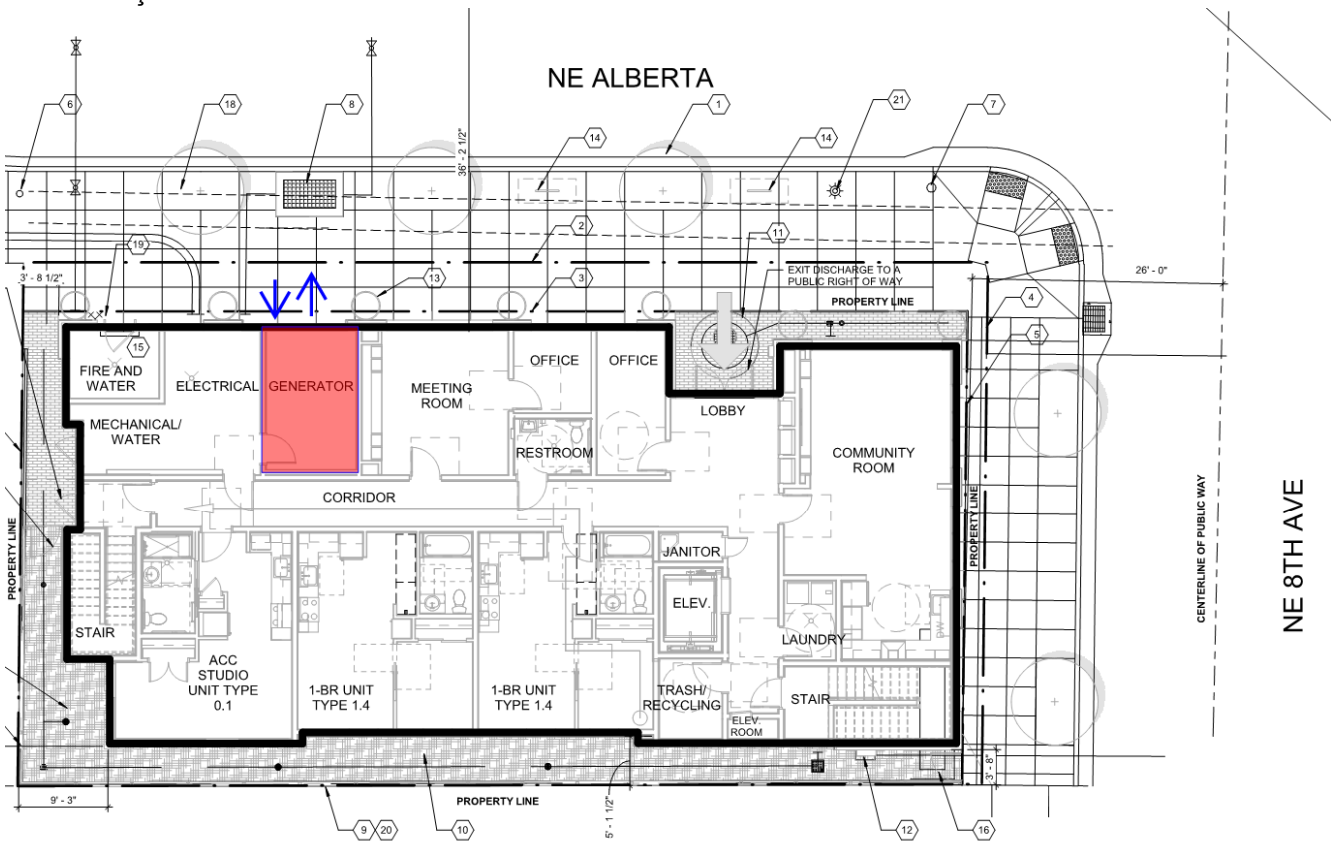
Pursuant to City Code Chapter 24.10, you may appeal this decision to the Building Code Board of Appeal within 90 calendar days of the date this decision is published. For information on the appeals process, go to www.portlandoregon.gov/bds/appealsinfo, call (503) 823-7300 or come in to the Development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

WINDSOR ENGINEERS

Alberta Alive – 8th Ave. Radiator Fan Airflow

Site Layout:

The building is to be located at the intersection of Alberta Street and 8th Avenue with the generator room on the northern façade.



PLAN - 8TH AVE

Figure 1: Site Layout

Generator Room Airflow:

The generator radiator fan takes suction on the generator room and discharges low on the sidewalk. Make-up air is drawn into the room via an intake louver above the discharge louver. A flue carries all combustion products to the roof.

The generator room layout is as per Figure 2 and Figure 3 below.

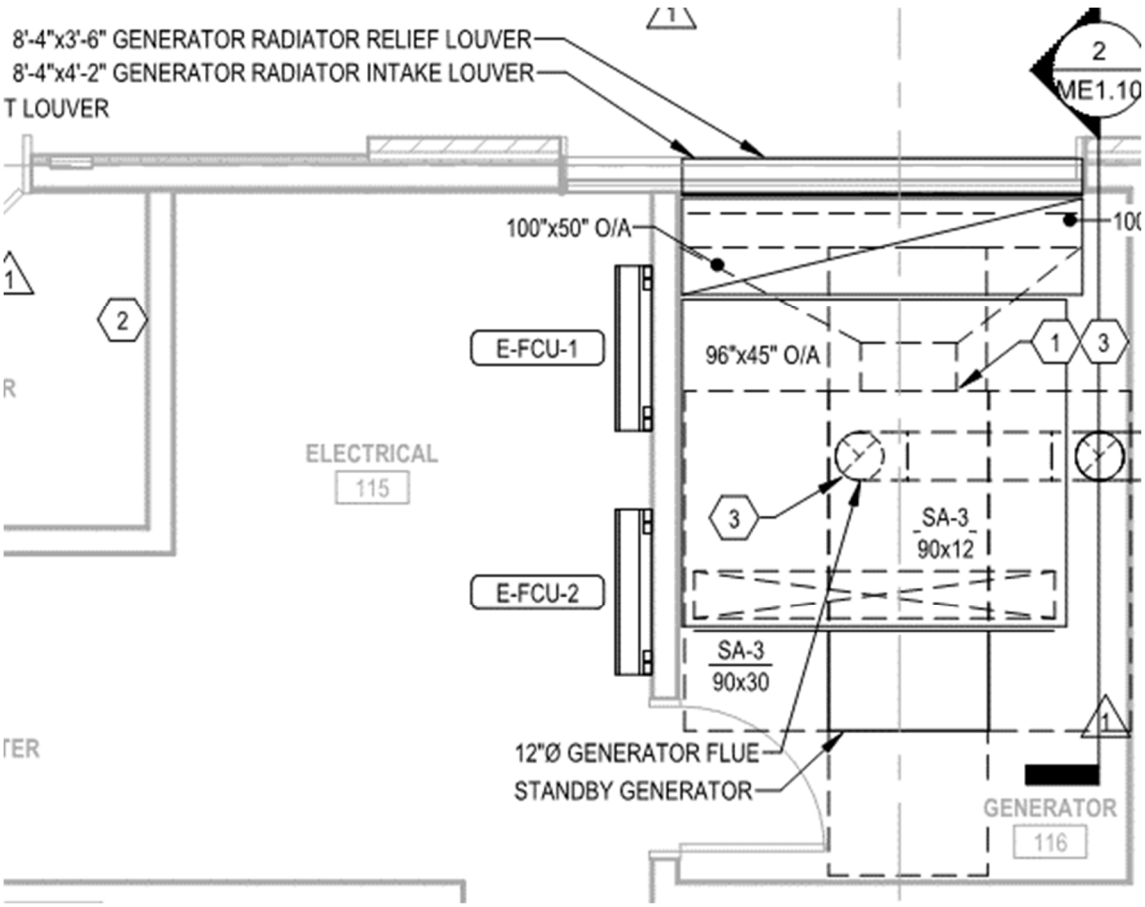


Figure 2: Generator Room Plan View

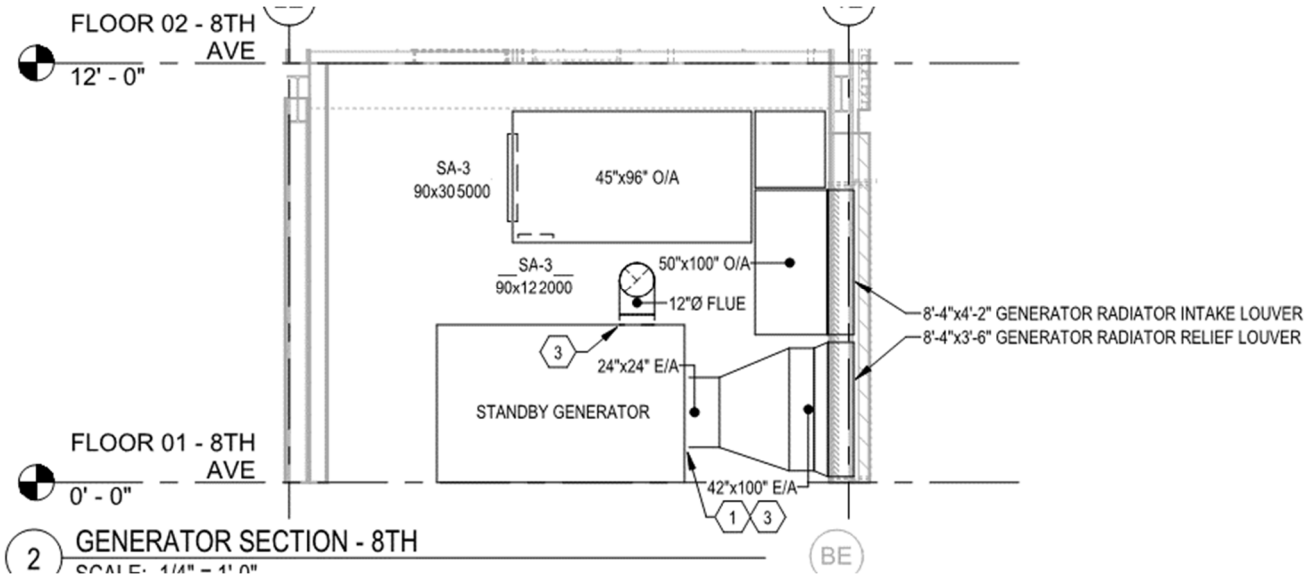


Figure 3: Generator Section View

System Design

The generator room is designed to draw air through the intake louver, ducted to the back of the generator room, 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 480 fpm through the intake louver and 480 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 recirculated from the outlet louver to the inlet louver.

Figure 4 shows the temperature of the air discharged from the outlet louver. The air stream approaches 113 F and stays low to the ground. There is little to no hot air moving from the outlet louver to the inlet louver, effectively keeping the two airstreams separate and maintaining the generator room below its 122 F limit.

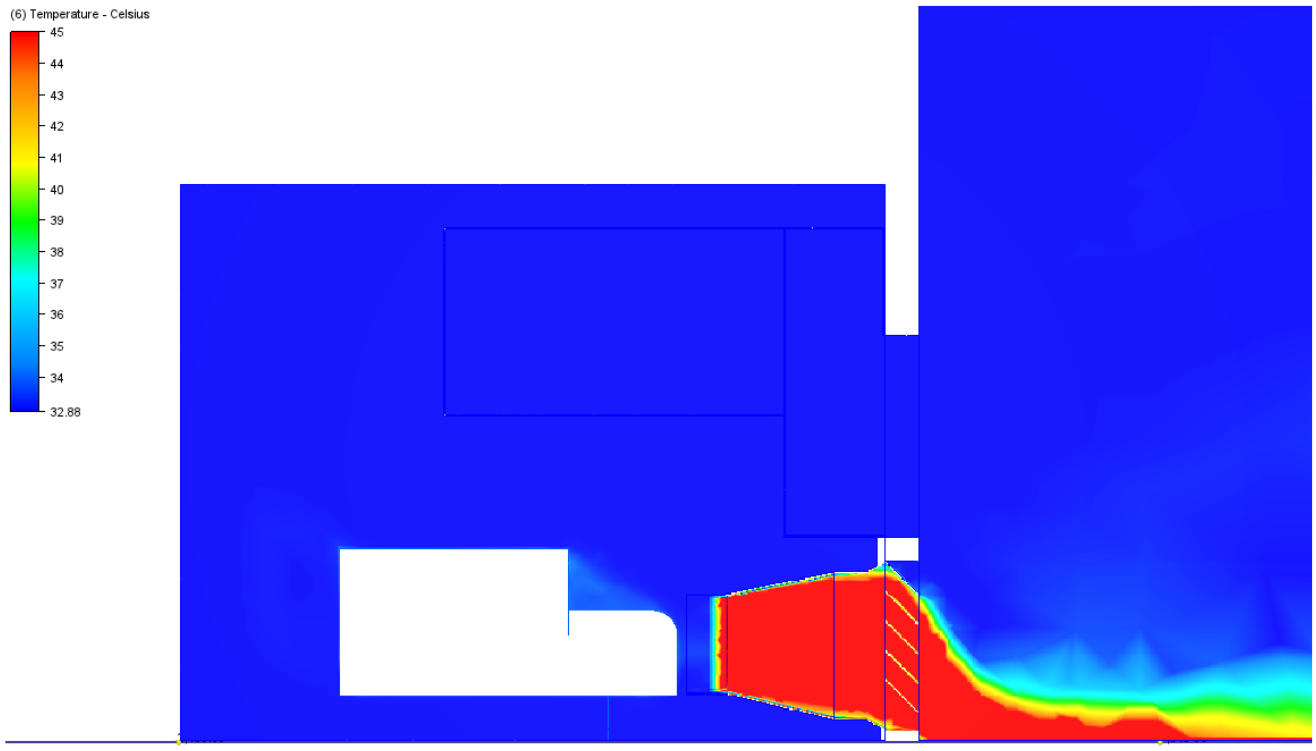


Figure 4: Temperature Profile, Section View

Model Results: Velocity

CFD analysis shows the outlet louver pushes the radiator fan discharge air low to the ground where it stays away from the face of the building.

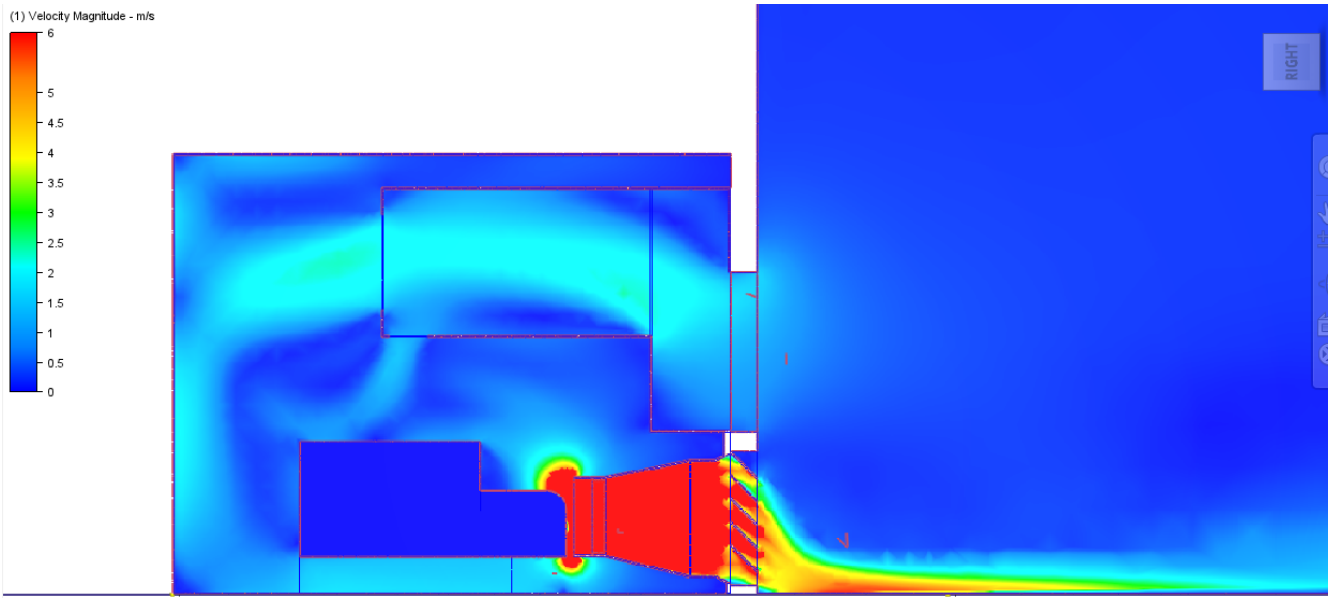


Figure 5: Velocity Section View Centered on Generator

Three feet in front of the building there is a localized high velocity area where airspeeds approach 1200 fpm (6 m/s). Figure 6 shows that this quickly dissipates to below 780 fpm (4m/s) within six feet of the building wall and stays localized to the region in front of the generator room.

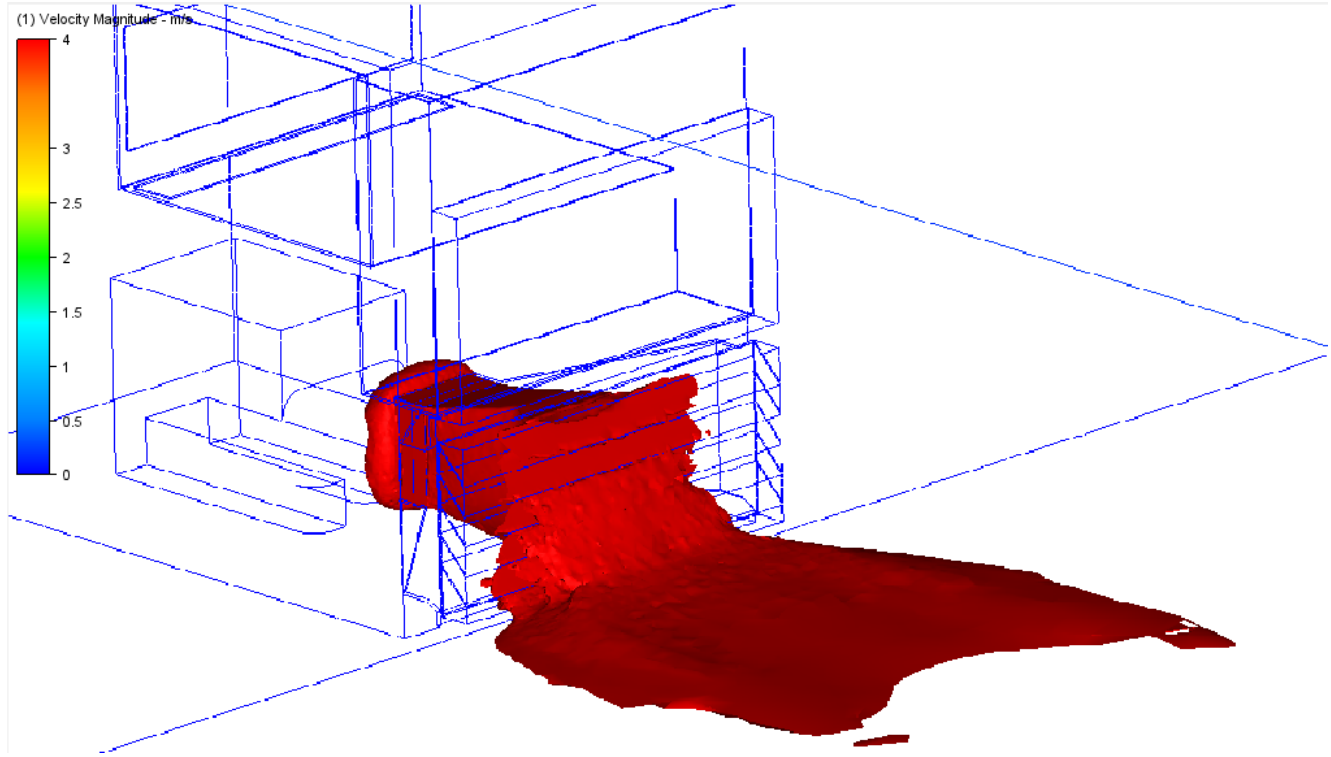


Figure 6: Velocity 3D View of Air Stream Regions Greater than 780 fpm

This airstream dissipates and slows to approximately 500 fpm (2.5 m/s) at 10 feet from the building.

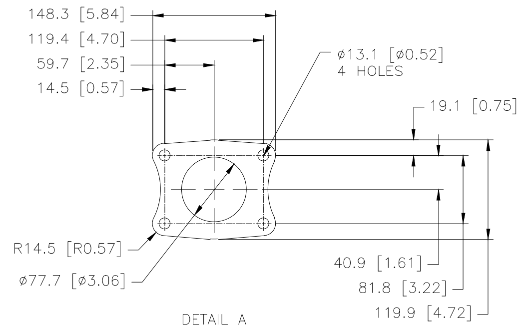
1200 fpm is the equivalent of a “Moderate Breeze” on the Beaufort Wind Scale. This wind would raise dust and loose paper in front of the generator room. The 780 fpm out in the courtyard is a “Gentle Breeze” on this scale and would move leaves and small twigs.

Conclusions

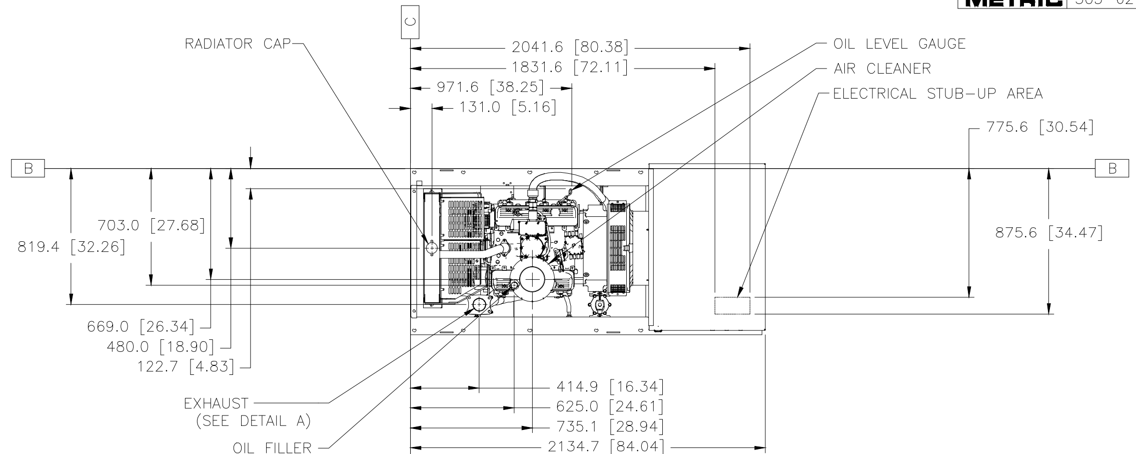
The velocity of the airstream at the outlet louver is sufficient to move the radiator discharge air far enough from the building to prevent recirculation back into the inlet louver.

There is a localized region in front of the generator room where air speeds would exceed those of a “Gentle Breeze”, but velocities never exceed that of a “Moderate Breeze”.

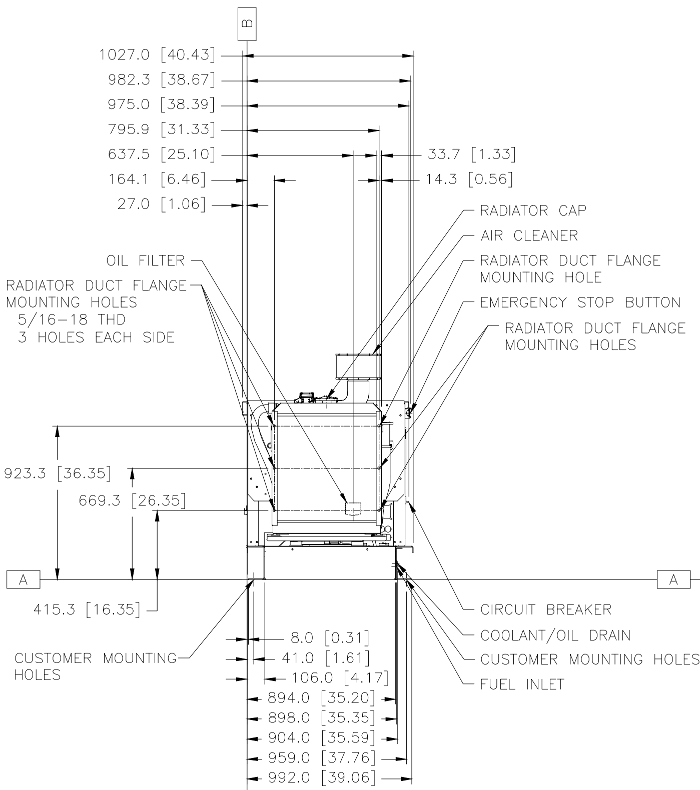
METRIC 503-6276



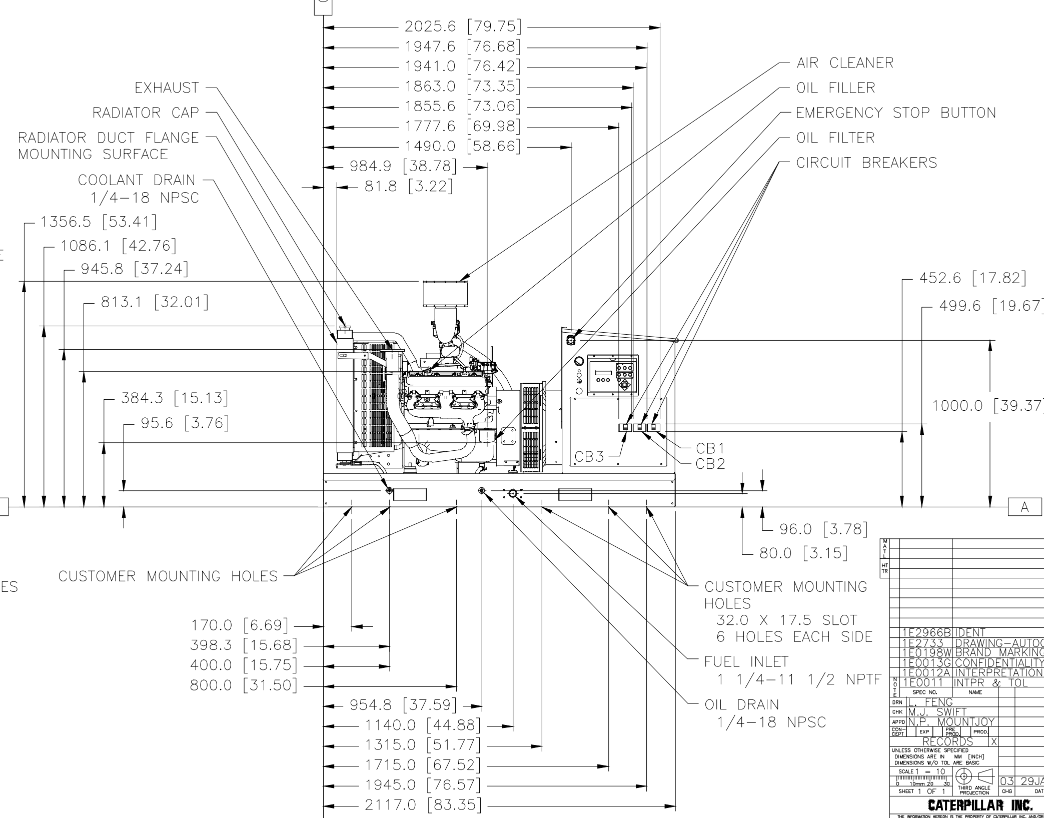
DETAIL A
DETAIL OF EXHAUST FLANGE
SCALE 1=2



TOP VIEW



FRONT VIEW



LEFT SIDE VIEW

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

1E2966B IDENT
1E2733 DRAWING-AUTOCAD
1E0198W BRAND MARKINGS
1E0013G CONFIDENTIALITY
1E0012A INTERPRETATION
1E0011 INTPR & TOL
SPEC NO. NAME

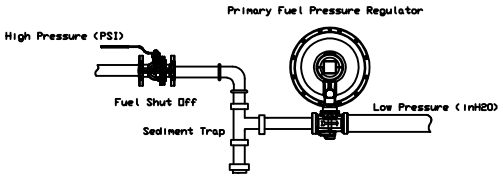
DRN L. FENG
CHK M.J. SWIFT
APPD N.P. MOUNTJOY
RECORDS X

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM [INCH]
SCALE 1 = 10
SHEET 1 OF 1
THIRD ANGLE PROJECTION
03 29JAN18

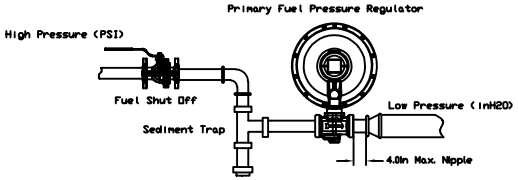
CATERPILLAR INC.

INSTALLATION-COMPOSITE
5.7LNA OPEN GENSET
503-6276 E

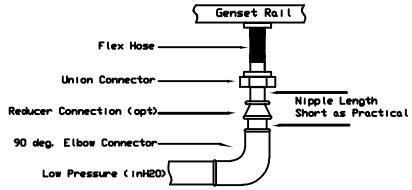
020816C



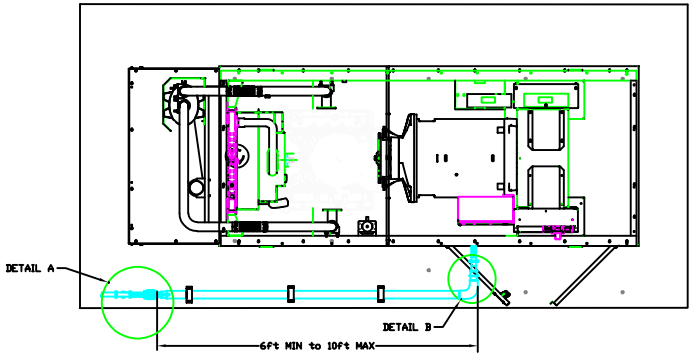
DETAIL A
Straight Pipe Run



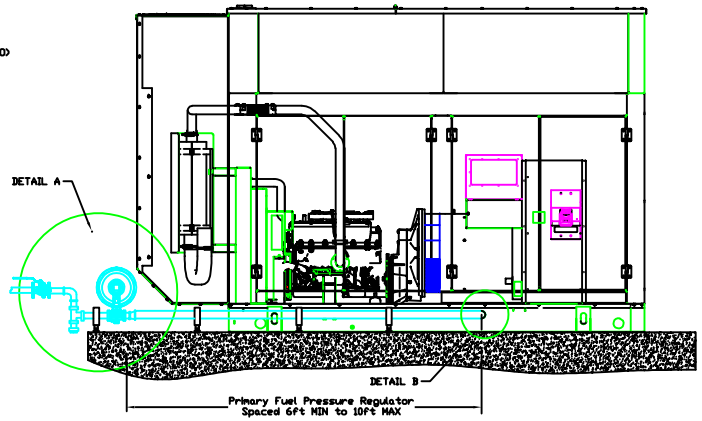
DETAIL A-1
Bell-Up Pipe Run



DETAIL B
Flex Hose Connection



TOP VIEW



SIDE VIEW

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.

6inH20 to 14inH20 Spring Rate.

Orifice Size dependent upon CFH Flow Rate requirement of Genset.

Output Pressure to be set at 13.0inH20.

Maximum Allowable Pressure Drop from a static condition to full load, shall not be equal to or greater than 2.0inH20.

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.

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)**

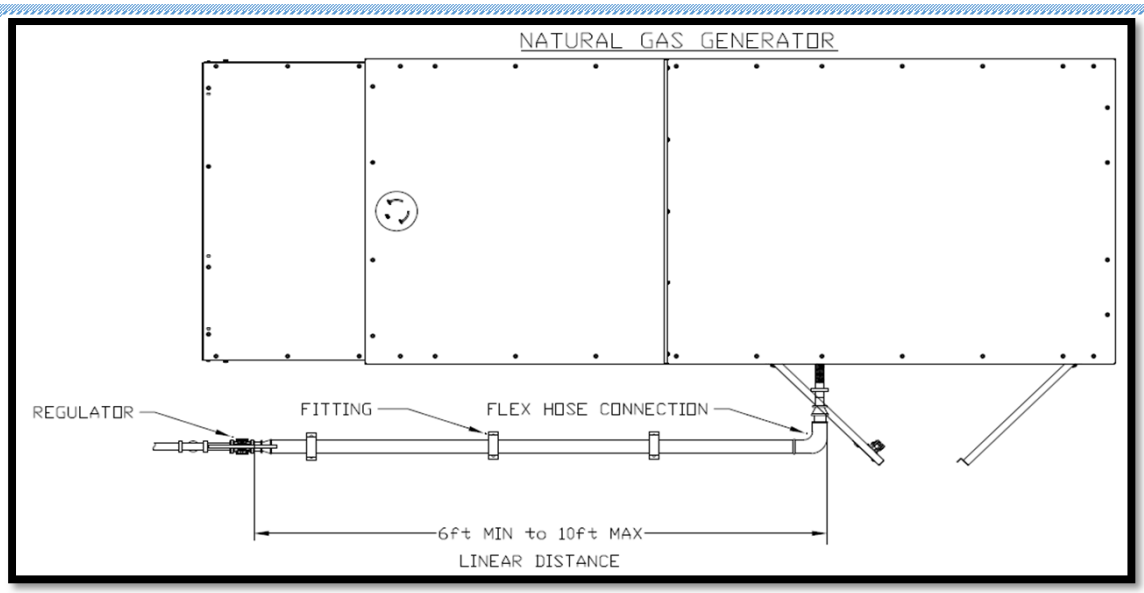
GASEOUS FUEL SUPPLY SYSTEM PIPING

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-H20 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-H20 or .22-.51 PSI)

PRIMARY PRESSURE REGULATOR

- The primary pressure regulator shall provide no more than a 2 In-H20 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-H20.
- EXAMPLE: If a unit has an operating fuel pressure range from 11 in-H20 to 14 in-H20, the primary fuel pressure regulator shall have an output pressure set point of 12-inH20.

INTERPRETING THE NATURAL GAS PIPE SIZING TABLE INFORMATION

8-LF of pipe with three (3) 90º 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
	90º 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.

Cat® DG60-2 GENERTOR SETS

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^3)	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® 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 Condenstation 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)

Cat® DG60-2 GENERTOR SETS

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, m^3/hr (ft^3/hr)	21.9 (774)	
75% load with fan, m^3/hr (ft^3/hr)	19.9 (703)	
50% load with fan, m^3/hr (ft^3/hr)	15.7 (555)	
Fuel Consumption with LP Vapor		
100% load with fan, m^3/hr (ft^3/hr)	8.7 (309)	
75% load with fan, m^3/hr (ft^3/hr))	7.7 (273)	
50% load with fan, m^3/hr (ft^3/hr)	6.1 (215)	
Cooling System[1]		
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, m^3/min (cfm)	4.9 (173)	
Exhaust System		
Exhaust stack gas temperature, °C (°F)	715 (1319)	
Exhaust gas flow rate, m^3/min (cfm)	15.8 (553)	
Exhaust system backpressure (maximum allowable), kPa (in. water)	10.2 (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)
Alternator[2]	**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

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

[2] Generator temperature rise is based on a 40°C (104°F) ambient per NEMA MG1-32.

[3] 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.™

www.Cat.com/electricpower

LEHE0999-03 (05/20)

CATERPILLAR®

GEN SET PACKAGE PERFORMANCE DATA [57LGE03]

OCTOBER 29, 2020

For Help Desk Phone Numbers Click here

Performance Number: EM1973

Change Level: 00

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

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

Reference Number: EM1973 EPA NSPS S.I. STATIONARY EMERGENCY

Parameters Reference:

Systems Data
Reference Number: EM1973

August 19, 2020
For Help Desk Phone Numbers
Click Here

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-H20
COOLING SYSTEM		
ENGINE ONLY COOLANT CAPACITY	2.1	GAL
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-H20
MANIFOLD TYPE	DRY	
MOUNTING SYSTEM		
DRY WEIGHT - ENGINE ONLY (REFERENCE VALUE)	432	LB

PACKAGE DATA [57LGE03]

OCTOBER 29, 2020

For Help Desk Phone Numbers Click here

Feature Code:	57LGE03	**Rating Type:**	STANDBY	**Sales model Package:**	DG60-2
Engine Sales Model:	5.7LNA	**Engine Arrangement Number:**	4830906	**Hertz:**	60
EKW W/F:	60.0	**Noise Reduction:**	0 dBA	**Back Pressure:**	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)		
	0 inH2O	1/2 inH2O	3/4 inH2O	0 inH2O	1/2 inH2O	3/4 inH2O	0 inH2O	1/2 inH2O	3/4 inH2O	0 inH2O	1/2 inH2O	3/4 inH2O	0 inH2O	1/2 inH2O	3/4 inH2O
100.0	7557	6956	6603	127	123	120	123	120	116	120	116	113	116	113	109
75.0	7557	6956	6603	132	129	125	129	125	122	125	122	118	122	118	114
50.0	7557	6956	6603	136	132	131	132	129	127	129	125	123	125	122	120
25.0	7557	6956	6603	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

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	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

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	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

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	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

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	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

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	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