DEPARTMENT OF VETERANS AFFAIRS
Medical Center
Martinsburg, WV 25401

RECEIVED
SEP 12 2016
WV DEP / DIV OF AIR QUALITY

In Reply Refer To: 613 /001S

September 1, 2016

Director
West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street, SE
Charleston, WV 25304-2345

To Whom It May Concern,

In accordance with the facilities air emissions Permit to Modify R13-3204 and 45 CSR 13, we are submitting this request for a Class I administrative update to our existing permit due to an emergency generator replacement.

In late May 2016 the facility replaced the 270 brake horse power (bhp) Perkins mobile emergency generator set (Permitted Emission Unit EG-8E) with the 320 bhp Caterpillar mobile emergency generator set (Emission Unit EG-15). The replacement unit (EG-15) produces approximately 62% less emissions than EG-8E as demonstrated by the attached Emergency Generator Engine Data Sheets. In addition, the replacement unit also meets the requirements of 40 CFR 60 Subpart IIII. Also attached are the EPA Certificate of Conformity and performance data sheets for emissions unit EG-15.

If you have any questions or need any additional information, please contact Robert Moore, GEMS Program Manager, at (304) 263-0811, ext. 3412 or at Robert.Moore10@va.gov.

Timothy J. Cooke
Medical Center Director

CC: Mr. Edward Andrews, WVDEP, Division of Air Quality
Mr. Joseph Kreger, WVDEP, Division of Air Quality

EMERGENCY GENERATOR ENGINE DATA SHEET

Source Identification Number[1]		EG-07 (307)		EG-08 (Removed)		EG-09 (217A)	
Engine Manufacturer and Model		Cummings		Perkins		Cummings	
Manufacturer's Rated bhp/rpm		200		270		350	
Source Status[2]		ES		ES		ES	
Date Installed/Modified/Removed[3]		07/1975		Circa 2005/5-2016		10/1981	
Engine Manufactured/Reconstruction Date[4]		N/A		N/A		N/A	
Is this a Certified Stationary Spark Ignition Engine according to 40CFR60 Subpart IIII? (Yes or No)[5]		Yes		Yes		Yes	
Is this a Certified Stationary Spark Ignition Engine according to 40CFR60 Subpart JJJJ? (Yes or No)[6]		Yes		Yes		Yes	
Engine, Fuel and Combustion Data	Engine Type[7]	LB4S		LB4S		LB4S	
	APCD Type[8]	A/F		A/F		A/F	
	Fuel Type[9]	2FO		2FO		2FO	
	H_2S (gr/100 scf)	0.9		0.9		0.9	
	Operating bhp/rpm	200		270		350	
	BSFC (Btu/bhp-hr)	43,152		6,187		6,363	
	Fuel throughput (ft^3/hr)	1.6		2.1		1.8	
	Fuel throughput ($MMft^3$/yr)	72E+10		14E+10		18E+10	
	Operation (hrs/yr)	500		500		500	
Reference[10]	Potential Emissions[11]	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
	NO_X	6.2	1.55	8.3	2.08	10.9	0.28
	CO	1.3	0.33	1.8	0.45	2.3	0.06
	VOC	0.49	0.12	0.67	0.17	0.87	0.02
	SO_2	0.41	0.10	0.55	0.14	0.72	0.02
	PM_{10}	0.44	0.11	0.59	0.15	0.77	0.02
	Formaldehyde (Total Aldehydes)	0.09	0.02	0.03	0.01	0.16	0.004

EMERGENCY GENERATOR ENGINE DATA SHEET

Source Identification Number[1]		EG-13 (320)		EG-14 (504)		EG-15 (317)	
Engine Manufacturer and Model		Allis Chambers		Cummings		Caterpillar	
Manufacturer's Rated bhp/rpm		225		460		320	
Source Status[2]		ES		ES		ES	
Date Installed/Modified/Removed[3]				11/1993			
Engine Manufactured/Reconstruction Date[4]		N/A		N/A		N/A	
Is this a Certified Stationary Spark Ignition Engine according to 40CFR60 Subpart IIII? (Yes or No)[5]		Yes		Yes		Yes	
Is this a Certified Stationary Spark Ignition Engine according to 40CFR60 Subpart JJJJ? (Yes or No)[6]		Yes		Yes		Yes	
Engine, Fuel and Combustion Data	Engine Type[7]	LB4S		LB4S		LB4S	
	APCD Type[8]	A/F		A/F		A/F	
	Fuel Type[9]	2FO		2FO		2FO	
	H_2S (gr/100 scf)	0.9		0.9		0.9	
	Operating bhp/rpm	225		460		235	
	BSFC (Btu/bhp-hr)	8,043		18,762		9,477	
	Fuel throughput (ft^3/hr)	1.6		1.8		2.1	
	Fuel throughput ($MMft^3$/yr)	15E+10		73E+10		18E+10	
	Operation (hrs/yr)	500		500		500	
Reference[10]	Potential Emissions[11]	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
MD	NO_X	7.0	1.75	14	3.5	2.54	.635
MD	CO	1.5	0.375	3.1	0.59	.32	0.08
AP	VOC	0.56	0.01	1.1	0.275	0.79	0.20
AP	SO_2	0.46	0.14	0.94	0.235	0.66	0.165
MD	PM_{10}	0.50	0.125	1.0	0.25	0.07	0.02
AP	Formaldehyde (Total Aldehydes)	0.10	0.03	0.21	0.05	0.15	0.04

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460

2005 Model Year Certificate of Conformity

Manufacturer:	**CATERPILLAR INC.**			
Engine Family:	**5CPXL08.8ESL**			
Certificate Number:	**CPX-NR7-05-04**			
Intended Service Class:	**NR 7 (225-450 KW)**			
Fuel Type:	**DIESEL**			
FELs: g/kW-hr	NMHC+NOx: **N/A**	NOx: **N/A**	PM: **N/A**	
Effective Date:	**12/20/2005**			
Date Issued:	DEC 2 0 2005			

Merrylin Zaw-Mon, Director
Compliance and Innovative Strategies Division
Office of Transportation and Air Quality

Pursuant to Section 213 of the Clean Air Act (42 U.S.C. section 7547) and 40 CFR Part 89, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following nonroad engines, by engine family, more fully described in the documentation required by 40 CFR Part 89 and produced in the stated model year.

This certificate of conformity covers only those new nonroad compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 89 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 89.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 89.129-96 and 89.506-96 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 89. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void ab initio for other reasons specified in 40 CFR Part 89.

This certificate does not cover nonroad engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

PERFORMANCE DATA[DM8501]

February 9, 2016

Performance Number: DM8501

Change Level: 03

SALES MODEL:	C9	**COMBUSTION:**	DI
ENGINE POWER (BHP):	398	**ENGINE SPEED (RPM):**	1,800
GEN POWER W/O FAN (EKW):	265.0	**HERTZ:**	60
GEN POWER WITH FAN (EKW):	250.0	**FAN POWER (HP):**	30.2
COMPRESSION RATIO:	16.1	**ASPIRATION:**	TA
RATING LEVEL:	STANDBY	**AFTERCOOLER TYPE:**	ATAAC
PUMP QUANTITY:	1	**AFTERCOOLER CIRCUIT TYPE:**	JW+OC, ATAAC
FUEL TYPE:	DIESEL	**INLET MANIFOLD AIR TEMP (F):**	122
MANIFOLD TYPE:	DRY	**JACKET WATER TEMP (F):**	192.2
GOVERNOR TYPE:	ELEC	**TURBO CONFIGURATION:**	SINGLE
CAMSHAFT TYPE:	STANDARD	**TURBO QUANTITY:**	1
IGNITION TYPE:	CI	**TURBOCHARGER MODEL:**	S310-1.25
INJECTOR TYPE:	EUI	**CERTIFICATION YEAR:**	2005
REF EXH STACK DIAMETER (IN):	4	**PISTON SPD @ RATED ENG SPD (FT/MIN):**	1,759.8
MAX OPERATING ALTITUDE (FT):	3,281		

INDUSTRY	SUBINDUSTRY	APPLICATION
ELECTRIC POWER	STANDARD	PACKAGED GENSET
OIL AND GAS	LAND PRODUCTION	PACKAGED GENSET

General Performance Data

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	BRAKE MEAN EFF PRES (BMEP)	BRAKE SPEC FUEL CONSUMPTN (BSFC)	VOL FUEL CONSUMPTN (VFC)	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	ENGINE OUTLET TEMP
EKW	%	BHP	PSI	LB/BHP-HR	GAL/HR	IN-HG	DEG F	DEG F	IN-HG	DEG F
250.0	100	398	326	0.341	19.4	77.7	122.3	1,142.4	55.4	852.0
225.0	90	359	294	0.346	17.7	74.1	121.6	1,094.4	51.6	823.5
200.0	80	321	263	0.355	16.3	70.7	122.1	1,050.1	48.2	800.5
187.5	75	302	247	0.360	15.6	69.0	122.5	1,029.4	46.4	790.7
175.0	70	284	232	0.364	14.8	66.6	122.4	1,010.3	44.2	782.4
150.0	60	247	202	0.374	13.2	60.6	122.2	973.8	39.4	768.3
125.0	50	211	172	0.385	11.6	53.2	121.8	937.9	33.9	755.8
100.0	40	176	144	0.394	9.9	43.3	121.2	899.4	27.4	742.4
75.0	30	141	116	0.404	8.1	32.2	120.7	857.9	20.5	727.9
62.5	25	124	101	0.410	7.3	26.7	120.5	835.9	17.2	720.5
50.0	20	106	87	0.418	6.3	21.3	120.3	812.9	14.1	712.7
25.0	10	68.9	56	0.445	4.4	12.1	120.5	671.3	9.1	612.1

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP	WET INLET AIR VOL FLOW RATE	ENGINE OUTLET WET EXH GAS VOL FLOW RATE	WET INLET AIR MASS FLOW RATE	WET EXH GAS MASS FLOW RATE	WET EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)	DRY EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)
EKW	%	BHP	IN-HG	DEG F	CFM	CFM	LB/HR	LB/HR	FT3/MIN	FT3/MIN
250.0	100	398	79	425.2	889.8	2,245.6	3,863.5	3,999.1	841.8	776.8
225.0	90	359	75	407.9	866.1	2,131.2	3,753.5	3,877.8	816.6	756.7
200.0	80	321	72	390.0	845.5	2,029.1	3,641.7	3,755.4	791.7	736.4
187.5	75	302	70	380.5	833.2	1,976.5	3,583.9	3,692.5	777.2	724.2
175.0	70	284	67	370.2	815.6	1,915.7	3,500.2	3,603.4	758.3	707.7
150.0	60	247	61	346.6	770.3	1,777.1	3,290.5	3,382.8	711.5	666.0
125.0	50	211	54	318.8	711.6	1,616.1	3,025.9	3,107.0	653.7	613.6
100.0	40	176	44	280.7	631.2	1,409.7	2,668.7	2,738.1	576.6	542.5
75.0	30	141	33	236.6	539.6	1,189.0	2,266.0	2,323.1	492.3	464.1
62.5	25	124	27	214.1	493.0	1,076.6	2,063.6	2,114.4	448.5	423.3
50.0	20	106	22	191.5	447.1	961.4	1,865.3	1,909.6	403.2	380.9
25.0	10	68.9	13	150.2	365.7	720.7	1,521.7	1,552.4	330.6	314.7

Heat Rejection Data

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	REJECTION TO JACKET WATER	REJECTION TO ATMOSPHERE	REJECTION TO EXH	EXHUAST RECOVERY TO 350F	FROM OIL COOLER	FROM AFTERCOOLER	WORK ENERGY	LOW HEAT VALUE ENERGY	HIGH HEAT VALUE ENERGY
EKW	%	BHP	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN
250.0	100	398	5,928	1,004	15,772	8,470	2,214	4,686	16,886	41,564	44,276
225.0	90	359	5,517	890	14,624	7,716	2,028	4,305	15,231	38,081	40,566
200.0	80	321	5,156	844	13,650	7,085	1,859	3,906	13,615	34,894	37,171
187.5	75	302	4,986	796	13,203	6,804	1,775	3,702	12,819	33,332	35,507
175.0	70	284	4,811	750	12,693	6,507	1,688	3,474	12,026	31,686	33,754
150.0	60	247	4,487	657	11,600	5,894	1,508	2,957	10,466	28,319	30,167
125.0	50	211	4,177	565	10,395	5,241	1,323	2,387	8,931	24,835	26,456
100.0	40	176	3,834	664	8,956	4,456	1,131	1,704	7,458	21,230	22,615
75.0	30	141	3,407	764	7,418	3,634	932	1,052	5,989	17,489	18,630
62.5	25	124	3,174	722	6,658	3,239	829	773	5,246	15,560	16,575
50.0	20	106	2,926	591	5,915	2,861	723	532	4,490	13,570	14,455
25.0	10	68.9	2,390	520	4,011	1,661	501	182	2,923	9,412	10,026

Emissions Data

RATED SPEED POTENTIAL SITE VARIATION: 1800 RPM

GENSET POWER WITH FAN		EKW	250.0	187.5	125.0	62.5	25.0
PERCENT LOAD		%	100	75	50	25	10
ENGINE POWER		BHP	398	302	211	124	68.9
TOTAL NOX (AS NO2)		G/HR	1,242	714	452	281	222
TOTAL CO		G/HR	270	271	211	284	268
TOTAL HC		G/HR	69	88	92	70	71
PART MATTER		G/HR	62.6	66.0	49.0	49.0	34.1
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	1,637.5	1,170.5	991.8	1,015.1	1,417.8
TOTAL CO	(CORR 5% O2)	MG/NM3	323.2	403.0	429.8	928.3	1,469.7
TOTAL HC	(CORR 5% O2)	MG/NM3	71.2	113.1	157.9	211.5	370.0
PART MATTER	(CORR 5% O2)	MG/NM3	63.7	84.4	84.3	148.3	155.0
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	798	570	483	494	691
TOTAL CO	(CORR 5% O2)	PPM	259	322	344	743	1,176
TOTAL HC	(CORR 5% O2)	PPM	133	211	295	395	691
TOTAL NOX (AS NO2)		G/HP-HR	3.14	2.38	2.16	2.27	3.22
TOTAL CO		G/HP-HR	0.68	0.90	1.01	2.30	3.89
TOTAL HC		G/HP-HR	0.17	0.29	0.44	0.57	1.03
PART MATTER		G/HP-HR	0.16	0.22	0.23	0.40	0.49
TOTAL NOX (AS NO2)		LB/HR	2.74	1.57	1.00	0.62	0.49
TOTAL CO		LB/HR	0.59	0.60	0.47	0.63	0.59
TOTAL HC		LB/HR	0.15	0.19	0.20	0.15	0.16
PART MATTER		LB/HR	0.14	0.15	0.11	0.11	0.08

RATED SPEED NOMINAL DATA: 1800 RPM

GENSET POWER WITH FAN		EKW	250.0	187.5	125.0	62.5	25.0
PERCENT LOAD		%	100	75	50	25	10
ENGINE POWER		BHP	398	302	211	124	68.9
TOTAL NOX (AS NO2)		G/HR	1,150	661	419	260	205
TOTAL CO		G/HR	144	145	113	152	144
TOTAL HC		G/HR	36	47	48	37	38
TOTAL CO2		KG/HR	193	155	115	71	43
PART MATTER		G/HR	32.1	33.9	25.1	25.1	17.5
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	1,516.2	1,083.8	918.3	939.9	1,312.7
TOTAL CO	(CORR 5% O2)	MG/NM3	172.8	215.5	229.8	496.4	785.9
TOTAL HC	(CORR 5% O2)	MG/NM3	37.7	59.9	83.6	111.9	195.8
PART MATTER	(CORR 5% O2)	MG/NM3	32.6	43.3	43.2	76.0	79.5
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	739	528	447	458	639
TOTAL CO	(CORR 5% O2)	PPM	138	172	184	397	629
TOTAL HC	(CORR 5% O2)	PPM	70	112	156	209	365
TOTAL NOX (AS NO2)		G/HP-HR	2.91	2.20	2.00	2.11	2.98
TOTAL CO		G/HP-HR	0.36	0.48	0.54	1.23	2.08
TOTAL HC		G/HP-HR	0.09	0.15	0.23	0.30	0.55

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February 9, 2016

PART MATTER	G/HP-HR	0.08	0.11	0.12	0.20	0.25
TOTAL NOX (AS NO2)	LB/HR	2.54	1.46	0.92	0.57	0.45
TOTAL CO	LB/HR	0.32	0.32	0.25	0.34	0.32
TOTAL HC	LB/HR	0.08	0.10	0.11	0.08	0.08
TOTAL CO2	LB/HR	425	342	255	156	94
PART MATTER	LB/HR	0.07	0.07	0.06	0.06	0.04
OXYGEN IN EXH	%	10.2	11.6	12.7	13.7	15.0
DRY SMOKE OPACITY	%	0.5	0.8	0.8	1.4	0.9
BOSCH SMOKE NUMBER		0.39	0.67	0.66	1.21	0.84

Regulatory Information

EPA TIER 3		2006 - 2010		
GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO THE EPA ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 89 SUBPART D AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THE "MAX LIMITS" SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE NON-ROAD REGULATIONS.				
Locality	**Agency**	**Regulation**	**Tier/Stage**	**Max Limits - G/BKW - HR**
U.S. (INCL CALIF)	EPA	NON-ROAD	TIER 3	CO: 3.5 NOx + HC: 4.0 PM: 0.20

EPA EMERGENCY STATIONARY		2011 - —		
GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO THE EPA ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 60 SUBPART IIII AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THE "MAX LIMITS" SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE EMERGENCY STATIONARY REGULATIONS.				
Locality	**Agency**	**Regulation**	**Tier/Stage**	**Max Limits - G/BKW - HR**
U.S. (INCL CALIF)	EPA	STATIONARY	EMERGENCY STATIONARY	CO: 3.5 NOx + HC: 4.0 PM: 0.20

Altitude Derate Data

ALTITUDE CORRECTED POWER CAPABILITY (BHP)

AMBIENT OPERATING TEMP (F)	30	40	50	60	70	80	90	100	110	120	130	140	NORMAL
ALTITUDE (FT)													
0	398	398	398	398	398	398	398	398	398	398	398	398	398
1,000	398	398	398	398	398	398	398	398	398	398	395	389	398
2,000	398	398	398	398	398	398	398	398	394	387	380	374	398
3,000	398	398	398	398	398	398	393	386	379	372	366	360	398
4,000	398	398	398	398	392	385	378	371	365	358	352	346	396
5,000	398	398	392	384	377	370	363	357	351	345	339	333	384
6,000	392	384	377	370	363	356	349	343	337	331	326	320	372
7,000	377	369	362	355	349	342	336	330	324	318	313	308	360
8,000	362	355	348	341	335	329	323	317	311	306	301	296	348
9,000	348	341	334	328	322	316	310	304	299	294	289	284	337
10,000	334	327	321	315	309	303	297	292	287	282	277	273	325
11,000	320	314	308	302	296	291	285	280	275	271	266	262	314
12,000	307	301	295	290	284	279	274	269	264	260	255	251	304
13,000	295	289	283	278	272	267	263	258	253	249	245	241	293
14,000	282	277	271	266	261	256	252	247	243	239	235	231	283
15,000	271	265	260	255	250	246	241	237	233	229	225	221	273

Cross Reference

Engine Arrangement			
Arrangement Number	**Effective Serial Number**	**Engineering Model**	**Engineering Model Version**
2575707	S9L00001	GS279	-
3950368	S9P00001	GS279	-
4529865	S9P00001	GS857	LS

Test Specification Data						
Test Spec	**Setting**	**Effective Serial Number**	**Engine Arrangement**	**Governor Type**	**Default Low Idle Speed**	**Default High Idle Speed**
0K6612		S9L00001	2575707			
0K6612		S9P00001	3950368			
4150078	PP5548	S9P00001	3950368			
4150078	PP5548	S9P00001	4529865			

Performance Parameter Reference

Parameters Reference:DM9600-08
PERFORMANCE DEFINITIONS

PERFORMANCE DEFINITIONS DM9600

APPLICATION:
Engine performance tolerance values below are representative of a

PERFORMANCE DATA[DM8501]

typical production engine tested in a calibrated dynamometer test cell at SAE J1995 standard reference conditions. Caterpillar maintains ISO9001:2000 certified quality management systems for engine test Facilities to assure accurate calibration of test equipment. Engine test data is corrected in accordance with SAE J1995. Additional reference material SAE J1228, J1349, ISO 8665, 3046-1:2002E, 3046-3:1989, 1585, 2534, 2288, and 9249 may apply in part or are similar to SAE J1995. Special engine rating request (SERR) test data shall be noted.

PERFORMANCE PARAMETER TOLERANCE FACTORS:

Power	+/- 3%
Torque	+/- 3%
Exhaust stack temperature	+/- 8%
Inlet airflow	+/- 5%
Intake manifold pressure-gage	+/- 10%
Exhaust flow	+/- 6%
Specific fuel consumption	+/- 3%
Fuel rate	+/- 5%
Specific DEF consumption	+/- 3%
DEF rate	+/- 5%
Heat rejection	+/- 5%
Heat rejection exhaust only	+/- 10%
Heat rejection CEM only	+/- 10%

Heat Rejection values based on using treated water.

Torque is included for truck and industrial applications, do not use for Gen Set or steady state applications.

On C7 - C18 engines, at speeds of 1100 RPM and under these values are provided for reference only, and may not meet the tolerance listed.

These values do not apply to C280/3600. For these models, see the tolerances listed below.

C280/3600 HEAT REJECTION TOLERANCE FACTORS:

Heat rejection	+/- 10%
Heat rejection to Atmosphere	+/- 50%
Heat rejection to Lube Oil	+/- 20%
Heat rejection to Aftercooler	+/- 5%

TEST CELL TRANSDUCER TOLERANCE FACTORS:

Torque	+/- 0.5%
Speed	+/- 0.2%
Fuel flow	+/- 1.0%
Temperature	+/- 2.0 C degrees
Intake manifold pressure	+/- 0.1 kPa

OBSERVED ENGINE PERFORMANCE IS CORRECTED TO SAE J1995 REFERENCE AIR AND FUEL CONDITIONS.

REFERENCE ATMOSPHERIC INLET AIR
FOR 3500 ENGINES AND SMALLER
SAE J1228 AUG2002 for marine engines, and J1995 JAN2014 for other engines, reference atmospheric pressure is 100 KPA (29.61 in hg), and standard temperature is 25deg C (77 deg F) at 30% relative humidity at the stated aftercooler water temp, or inlet manifold temp.

FOR 3600 ENGINES
Engine rating obtained and presented in accordance with ISO 3046/1 and SAE J1995 JANJAN2014 reference atmospheric pressure is 100 KPA (29.61 in hg), and standard temperature is 25deg C (77 deg F) at 30% relative humidity and 150M altitude at the stated aftercooler water temperature.

MEASUREMENT LOCATION FOR INLET AIR TEMPERATURE
Location for air temperature measurement air cleaner inlet at stabilized operating conditions.

PERFORMANCE DATA[DM8501]

REFERENCE EXHAUST STACK DIAMETER
The Reference Exhaust Stack Diameter published with this dataset is only used for the calculation of Smoke Opacity values displayed in this dataset. This value does not necessarily represent the actual stack diameter of the engine due to the variety of exhaust stack adapter options available. Consult the price list, engine order or general dimension drawings for the actual stack diameter size ordered or options available.

REFERENCE FUEL
DIESEL
Reference fuel is #2 distillate diesel with a 35API gravity;
A lower heating value is 42,780 KJ/KG (18,390 BTU/LB) when used at 29 (84.2), where the density is 838.9 G/Liter (7.001 Lbs/Gal).

GAS
Reference natural gas fuel has a lower heating value of 33.74 KJ/L (905 BTU/CU Ft). Low BTU ratings are based on 18.64 KJ/L (500 BTU/CU FT) lower heating value gas. Propane ratings are based on 87.56 KJ/L (2350 BTU/CU Ft) lower heating value gas.

ENGINE POWER (NET) IS THE CORRECTED FLYWHEEL POWER (GROSS) LESS EXTERNAL AUXILIARY LOAD
Engine corrected gross output includes the power required to drive standard equipment; lube oil, scavenge lube oil, fuel transfer, common rail fuel, separate circuit aftercooler and jacket water pumps. Engine net power available for the external (flywheel) load is calculated by subtracting the sum of auxiliary load from the corrected gross flywheel out put power. Typical auxiliary loads are radiator cooling fans, hydraulic pumps, air compressors and battery charging alternators. For Tier 4 ratings additional Parasitic losses would also include Intake, and Exhaust Restrictions.

ALTITUDE CAPABILITY
Altitude capability is the maximum altitude above sea level at standard temperature and standard pressure at which the engine could develop full rated output power on the current performance data set.

Standard temperature values versus altitude could be seen on TM2001.

When viewing the altitude capability chart the ambient temperature is the inlet air temp at the compressor inlet.

Engines with ADEM MEUI and HEUI fuel systems operating at conditions above the defined altitude capability derate for atmospheric pressure and temperature conditions outside the values defined, see TM2001.

Mechanical governor controlled unit injector engines require a setting change for operation at conditions above the altitude defined on the engine performance sheet. See your Caterpillar technical representative for non standard ratings.

REGULATIONS AND PRODUCT COMPLIANCE
TMI Emissions information is presented at 'nominal' and 'Potential Site Variation' values for standard ratings. No tolerances are applied to the emissions data. These values are subject to change at any time. The controlling federal and local emission requirements need to be verified by your Caterpillar technical representative.

Customer's may have special emission site requirements that need to be verified by the Caterpillar Product Group engineer.

EMISSIONS DEFINITIONS:
Emissions : DM1176

PERFORMANCE DATA[DM8501]

HEAT REJECTION DEFINITIONS:
Diesel Circuit Type and HHV Balance : DM9500

HIGH DISPLACEMENT (HD) DEFINITIONS:
3500: EM1500

RATING DEFINITIONS:
Agriculture : TM6008

Fire Pump : TM6009

Generator Set : TM6035

Generator (Gas) : TM6041

Industrial Diesel : TM6010

Industrial (Gas) : TM6040

Irrigation : TM5749

Locomotive : TM6037

Marine Auxiliary : TM6036

Marine Prop (Except 3600) : TM5747

Marine Prop (3600 only) : TM5748

MSHA : TM6042

Oil Field (Petroleum) : TM6011

Off-Highway Truck : TM6039

On-Highway Truck : TM6038

SOUND DEFINITIONS:
Sound Power : DM8702

Sound Pressure : TM7080

Date Released : 7/7/15

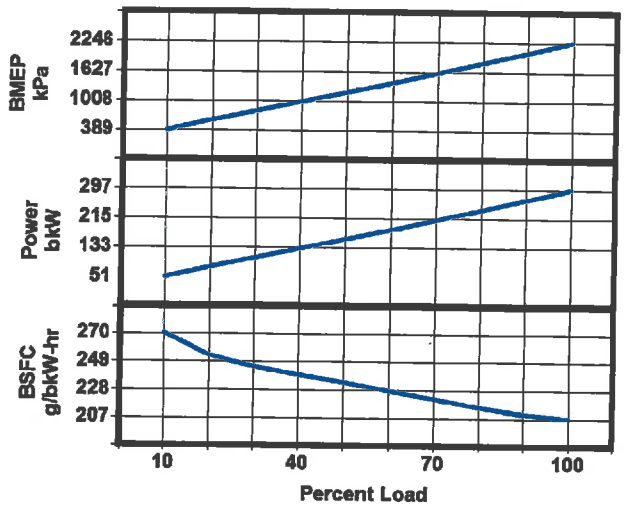
ELECTRIC POWER - Performance Data Sheet
STANDARD

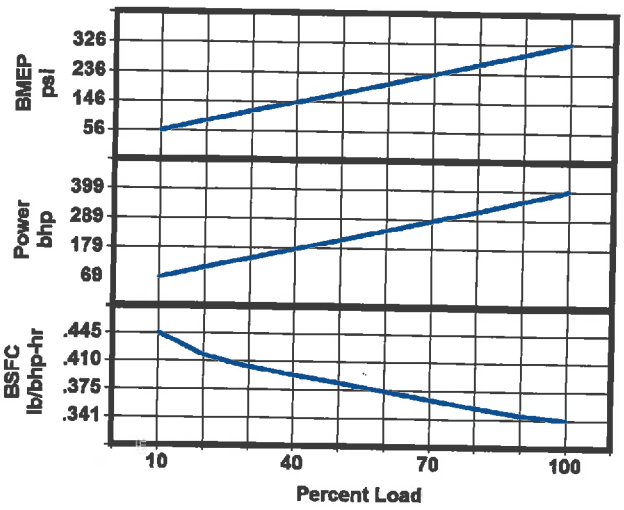
C9 ACERT DITA
250 ekW/60 Hz/1800 rpm/0.8 Power Factor

Rating Type: STANDBY

Performance Number: DM8501-03

Emissions: U.S. EPA Certified for Stationary Emergency Use Only (Tier 3 Nonroad Equivalent Emission Standards)





Metric

Gen Power ekW	Percent Load	Engine Power bkW	Engine BMEP kPa	BSFC g/bkW-hr	Fuel Rate L/hr
250	100	296.9	2247	207.1	73.3
225	90	267.8	2027	210.4	67.2
200	80	239.4	1812	215.7	61.5
188	75	225.4	1706	218.8	58.8
175	70	211.5	1601	221.7	55.9
150	60	184.0	1393	227.7	49.9
125	50	157.1	1189	234.0	43.8
100	40	131.2	993	239.5	37.4
75	30	105.3	797	245.7	30.8
63	25	92.3	698	249.6	27.4
50	20	79.0	598	254.3	23.9
25	10	51.4	389	270.9	16.6

English

Gen Power kVA	Percent Load	Engine Power bhp	Engine BMEP psi	BSFC lb/bhp-hr	Fuel Rate gph
313	100	398	326	.341	19.4
281	90	359	294	.346	17.7
250	80	321	263	.355	16.3
234	75	302	247	.360	15.5
219	70	284	232	.364	14.8
188	60	247	202	.374	13.2
156	50	211	172	.385	11.6
125	40	176	144	.394	9.9
94	30	141	116	.404	8.1
78	25	124	.101	.410	7.3
63	20	106	87	.418	6.3
31	10	69	56	.445	4.4

Gen Power ekW	Intake Manifold Temp °C	Intake Manifold Press kPa	Intake Air Flow m³/min	Exhaust Manifold Temp °C	Exhaust Stack Temp °C	Exhaust Gas Flow m³/min
250	50.2	262.4	25.2	616.9	455.5	63.6
225	49.8	250.3	24.5	590.2	439.7	60.4
200	50.1	238.7	23.9	565.6	426.9	57.5
188	50.3	233.0	23.6	554.1	421.5	56.0
175	50.2	224.8	23.1	543.5	416.9	54.3
150	50.1	204.6	21.8	523.2	409.0	50.3
125	49.9	179.6	20.2	503.3	402.1	45.8
100	49.6	146.2	17.9	481.9	394.6	39.9
75	49.3	108.9	15.3	458.8	386.6	33.7
63	49.1	90.2	14.0	446.6	382.5	30.5
50	49.1	72.0	12.7	433.8	378.2	27.2
25	49.1	40.9	10.4	355.2	322.3	20.4

Gen Power kVA	Intake Manifold Temp °F	Intake Manifold Press in Hg	Intake Air Flow cfm	Exhaust Manifold Temp °F	Exhaust Stack Temp °F	Exhaust Gas Flow cfm
313	122.3	77.7	889.8	1142.4	852.0	2245.6
281	121.6	74.1	866.1	1094.4	823.5	2131.2
250	122.1	70.7	845.5	1050.1	800.5	2029.1
234	122.5	69.0	833.2	1029.4	790.7	1976.5
219	122.4	66.6	815.6	1010.3	782.4	1915.7
188	122.2	60.6	770.3	973.8	768.3	1777.1
156	121.8	53.2	711.6	937.9	755.8	1616.1
125	121.2	43.3	631.2	899.4	742.4	1409.7
94	120.7	32.2	539.6	857.9	727.9	1189.0
78	120.5	26.7	493.0	835.9	720.5	1076.6
63	120.3	21.3	447.1	812.9	712.7	961.4
31	120.5	12.1	365.7	671.3	612.1	720.7

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ELECTRIC POWER - Performance Data Sheet
STANDARD

C9 ACERT DITA
250 ekW/60 Hz/1800 rpm/0.8 Power Factor

Rating Type: STANDBY

Performance Number: DM8501-03

Emissions: U.S. EPA Certified for Stationary Emergency Use Only (Tier 3 Nonroad Equivalent Emission Standards)

Heat Rejection Data

Metric

Gen Power ekW	Percent Load	Rejection to Jacket Water kW	Rejection to Atmos kW	Rejection to Exhaust kW	From Oil Cooler kW
250	100	104.2	17.7	277.3	38.9
225	90	97.0	15.6	257.2	35.7
200	80	90.7	14.8	240.0	32.7
188	75	87.7	14.0	232.2	31.2
175	70	84.6	13.2	223.2	29.7
150	60	78.9	11.5	204.0	26.5
125	50	73.5	9.9	182.8	23.3
100	40	67.4	11.7	157.5	19.9
75	30	59.9	13.4	130.4	16.4
63	25	55.8	12.7	117.1	14.6
50	20	51.5	10.4	104.0	12.7
25	10	42.0	9.1	70.5	8.8

English

Gen Power kVA	Percent Load	Rejection to Jacket Water Btu/min	Rejection to Atmos Btu/min	Rejection to Exhaust Btu/min	From Oil Cooler Btu/min
313	100	5927.8	1003.9	15772.2	2213.8
281	90	5516.9	889.8	14624.0	2028.3
250	80	5155.8	843.8	13650.1	1858.5
234	75	4985.6	796.3	13202.9	1775.3
219	70	4811.2	749.6	12693.0	1687.7
188	60	4486.7	656.7	11599.8	1508.3
156	50	4177.3	565.0	10395.2	1322.8
125	40	3833.5	663.5	8955.5	1130.7
94	30	3406.7	764.1	7418.4	931.5
78	25	3174.4	722.4	6658.5	828.7
63	20	2926.3	591.5	5915.1	722.8
31	10	2390.3	520.0	4010.9	501.3

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ELECTRIC POWER - Technical Spec Sheet
STANDARD

C9 ACERT
250 ekW/ 313 kVA/ 60 Hz/ 1800 rpm/ 208 V/ 0.8 Power Factor

Rating Type: STANDBY

Emissions: U.S. EPA Certified for Stationary Emergency Use Only (Tier 3 Nonroad Equivalent Emission Standards)

Image shown may not reflect actual configuration

C9 ACERT
250 ekW/ 313 kVA
60 Hz/ 1800 rpm/ 208 V

	Metric	English
Package Performance		
Genset Power Rating with Fan @ 0.8 Power Factor	250 ekW	
Genset Power Rating	313 kVA	
Aftercooler (Separate Circuit)	N/A	N/A
Fuel Consumption		
100% Load with Fan	73.3 L/hr	19.4 gal/hr
75% Load with Fan	58.8 L/hr	15.5 gal/hr
50% Load with Fan	43.8 L/hr	11.6 gal/hr
25% Load with Fan	27.4 L/hr	7.3 gal/hr
Cooling System[1]		
Engine Coolant Capacity	13.9 L	3.7 gal
Inlet Air		
Combustion Air Inlet Flow Rate	25.2 m^3/min	889.8 cfm
Max. Allowable Combustion Air Inlet Temp	50 ° C	122 ° F
Exhaust System		
Exhaust Stack Gas Temperature	455.5 ° C	852.0 ° F
Exhaust Gas Flow Rate	63.6 m^3/min	2245.6 cfm
Exhaust System Backpressure (Maximum Allowable)	10.0 kPa	40.0 in. water

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Rating Type: STANDBY

Emissions: U.S. EPA Certified for Stationary Emergency Use Only (Tier 3 Nonroad Equivalent Emission Standards)

Heat Rejection		
Heat Rejection to Jacket Water	104 kW	5928 Btu/min
Heat Rejection to Exhaust (Total)	277 kW	15772 Btu/min
Heat Rejection to Aftercooler	82 kW	4686 Btu/min
Heat Rejection to Atmosphere from Engine	18 kW	1004 Btu/min
Heat Rejection to Atmosphere from Generator	18 kW	1035 Btu/min

Alternator[2]	
Motor Starting Capability @ 30% Voltage Dip	641 skVA
Current	867 amps
Frame Size	LC5034J
Excitation	PM
Temperature Rise	150 ° C

Emissions (Nominal)[3]		
NOx	1516.2 mg/Nm³	2.9 g/hp-hr
CO	172.8 mg/Nm³	0.4 g/hp-hr
HC	37.7 mg/Nm³	0.1 g/hp-hr
PM	32.6 mg/Nm³	0.1 g/hp-hr

DEFINITIONS AND CONDITIONS

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

2. UL 2200 Listed packages may have oversized generators with a different temperature rise and motor starting characteristics. Generator temperature rise is based on a 40° C ambient per NEMA MG1-32.

3. Emissions data measurement procedures are consistent with those described in EPA CFR 40 Part 89, Subpart D & E and ISO8178-1 for measuring HC, CO, PM, NOx. Data shown is based on steady state operating conditions of 77° F, 28.42 in HG and number 2 diesel fuel with 35° API and LHV of 18,390 btu/lb. The nominal emissions data shown is subject to instrumentation, measurement, facility and engine to engine variations. Emissions data is based on 100% load and thus cannot be used to compare to EPA regulations which use values based on a weighted cycle.

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Rating Type: STANDBY

Emissions: U.S. EPA Certified for Stationary Emergency Use Only (Tier 3 Nonroad Equivalent Emission Standards)

Applicable Codes and Standards:
AS1359, CSA C22.2 No100-04, UL142,UL489, UL869, UL2200,
NFPA37, NFPA70, NFPA99, NFPA110, IBC, IEC60034-1, ISO3046, ISO8528,
NEMA MG1-22,NEMA MG1-33, 2006/95/EC, 2006/42/EC, 2004/108/EC.

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

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 fuel oil of 35° API [16° C (60° F)] gravity having an LHV of 42 780 kJ/kg (18,390 Btu/lb) when used at 29° C (85° F) and weighing 838.9 g/liter (7.001 lbs/U.S. gal.). Additional ratings may be available for specific customer requirements, contact your Cat representative for details. For information regarding Low Sulfur fuel and Biodiesel capability, please consult your Cat dealer.

www.Cat-ElectricPower.com

Performance No.: DM8501-03

Feature Code: C09DE47

Generator Arrangement: 4490589

Date: 07/04/2016

Source Country: U.S.

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