Perf No: EM1694 **Change Level:** 02

General Heat Rejection Emissions Regulatory Altitude Derate Cross Reference Perf Param Ref

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SALES MODEL:	C13	**COMBUSTION:**	DIRECT INJECTION
BRAND:	CAT	**ENGINE SPEED (RPM):**	1,800
ENGINE POWER (BHP):	609	**HERTZ:**	60
GEN POWER WITH FAN (EKW):	400.0	**FAN POWER (HP):**	20.1
COMPRESSION RATIO:	16.3	**ADDITIONAL PARASITICS (HP):**	10.4
RATING LEVEL:	STANDBY	**ASPIRATION:**	TA
PUMP QUANTITY:	1	**AFTERCOOLER TYPE:**	ATAAC
FUEL TYPE:	DIESEL	**AFTERCOOLER CIRCUIT TYPE:**	JW+OC, ATAAC
MANIFOLD TYPE:	DRY	**INLET MANIFOLD AIR TEMP (F):**	120
GOVERNOR TYPE:	ELEC	**JACKET WATER TEMP (F):**	192.2
ELECTRONICS TYPE:	ADEM4	**TURBO CONFIGURATION:**	SINGLE
CAMSHAFT TYPE:	STANDARD	**TURBO QUANTITY:**	1
IGNITION TYPE:	CI	**TURBOCHARGER MODEL:**	GTA5002BS 1.60A/R
INJECTOR TYPE:	EUI	**CERTIFICATION YEAR:**	2015
REF EXH STACK DIAMETER (IN):	5	**PISTON SPD @ RATED ENG SPD (FT/MIN):**	1,854.3
MAX OPERATING ALTITUDE (FT):	1,640		

INDUSTRY	SUB INDUSTRY	APPLICATION
ELECTRIC POWER	STANDARD	PACKAGED GENSET

General Performance Data Top

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	BRAKE MEAN EFF PRES (BMEP)	BRAKE SPEC FUEL CONSUMPTN (BSFC)	VOL FUEL CONSUMPTN (VFC)
EKW	%	BHP	PSI	LB/BHP-HR	GAL/HR
400.0	100	609	351	0.326	28.0
360.0	90	546	315	0.326	25.1
320.0	80	486	280	0.355	24.3
300.0	75	457	263	0.367	23.6
280.0	70	428	247	0.373	22.5
240.0	60	372	214	0.381	20.0
200.0	50	316	182	0.387	17.3
160.0	40	261	151	0.389	14.3
120.0	30	206	119	0.390	11.3
100.0	25	178	102	0.392	9.8
80.0	20	149	86	0.396	8.3
40.0	10	90.8	52	0.427	5.5

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	ENGINE OUTLET TEMP	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP
EKW	%	BHP	IN-HG	DEG F	DEG F	IN-HG	DEG F	IN-HG	DEG F
400.0	100	609	56.6	117.0	1,287.5	38.0	1,058.8	61	357.2
360.0	90	546	50.2	112.8	1,239.3	32.8	1,026.2	54	330.0
320.0	80	486	53.7	115.3	1,243.0	36.2	1,014.2	58	344.8
300.0	75	457	54.1	115.3	1,242.2	36.6	1,006.9	59	347.3
280.0	70	428	51.8	113.2	1,230.3	34.6	994.7	56	338.9
240.0	60	372	45.8	108.4	1,193.6	30.2	964.8	50	314.6
200.0	50	316	37.8	103.0	1,140.2	25.0	927.6	41	280.3

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	ENGINE OUTLET TEMP	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP
160.0	40	261	27.4	96.5	1,080.7	18.9	889.3	30	234.0
120.0	30	206	17.1	90.3	998.9	12.9	840.0	19	186.1
100.0	25	178	12.4	87.5	948.6	10.3	810.6	14	163.5
80.0	20	149	8.5	85.3	886.6	8.2	770.9	10	143.6
40.0	10	90.8	3.6	82.6	689.5	5.6	609.6	5	114.6

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	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	CFM	CFM	LB/HR	LB/HR	FT3/MIN	FT3/MIN
400.0	100	609	978.1	2,936.2	4,292.2	4,490.4	950.7	854.7
360.0	90	546	915.9	2,656.6	3,998.8	4,176.7	879.0	792.5
320.0	80	486	970.5	2,788.5	4,248.8	4,421.0	930.2	846.5
300.0	75	457	982.7	2,801.1	4,301.0	4,468.6	939.1	857.4
280.0	70	428	963.1	2,705.2	4,203.1	4,362.5	914.6	836.0
240.0	60	372	901.9	2,463.5	3,915.9	4,057.6	850.3	779.2
200.0	50	316	812.5	2,156.6	3,510.3	3,632.6	764.3	702.0
160.0	40	261	687.0	1,781.4	2,955.8	3,057.3	649.3	597.7
120.0	30	206	559.5	1,398.1	2,396.3	2,476.6	528.9	488.0
100.0	25	178	501.9	1,216.0	2,144.3	2,213.9	470.7	434.8
80.0	20	149	454.1	1,050.9	1,934.8	1,994.0	419.9	388.7
40.0	10	90.8	397.9	789.9	1,686.8	1,725.7	363.2	341.4

Heat Rejection Data Top

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	REJECTION TO JACKET WATER	REJECTION TO ATMOSPHERE	REJECTION TO EXH	EXHAUST 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
400.0	100	609	8,952	2,925	23,022	13,776	3,243	4,130	25,831	60,887	64,860
360.0	90	546	8,186	2,654	20,622	12,177	2,905	3,479	23,152	54,534	58,093
320.0	80	486	7,906	2,618	21,212	12,600	2,812	3,904	20,601	52,796	56,241
300.0	75	457	7,710	2,546	21,145	12,570	2,738	3,995	19,365	51,406	54,761
280.0	70	428	7,378	2,442	20,304	12,022	2,604	3,800	18,150	48,885	52,075
240.0	60	372	6,706	2,418	18,182	10,623	2,315	3,233	15,765	43,469	46,305
200.0	50	316	6,033	2,483	15,558	8,900	1,999	2,492	13,418	37,535	39,984
160.0	40	261	5,465	2,508	12,515	6,965	1,660	1,628	11,079	31,161	33,194
120.0	30	206	4,843	2,208	9,534	5,102	1,312	920	8,725	24,624	26,230
100.0	25	178	4,472	1,897	8,187	4,276	1,137	653	7,535	21,350	22,743
80.0	20	149	4,040	1,542	6,945	3,504	965	452	6,327	18,124	19,307
40.0	10	90.8	2,963	1,112	4,536	1,834	634	216	3,852	11,904	12,681

Emissions Data Top

Units Filter All Units

DIESEL

RATED SPEED NOMINAL DATA: 1800 RPM

GENSET POWER WITH FAN ENGINE POWER		EKW BHP	400.0 609	300.0 457	200.0 316	100.0 178	40.0 90.8
PERCENT LOAD		%	100	75	50	25	10
TOTAL NOX (AS NO2)		G/HR	2,757	989	544	534	343
TOTAL CO		G/HR	741	456	592	620	414
TOTAL HC		G/HR	6	18	30	30	43
TOTAL CO2		KG/HR	275	236	172	98	55
PART MATTER		G/HR	31.4	33.7	19.4	16.5	22.7
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	2,297.5	963.2	721.7	1,293.0	1,373.1

GENSET POWER WITH FAN ENGINE POWER		EKW BHP	400.0 609	300.0 457	200.0 316	100.0 178	40.0 90.8
PERCENT LOAD		**%**	**100**	**75**	**50**	**25**	**10**
TOTAL CO	(CORR 5% O2)	MG/NM3	615.3	450.6	793.8	1,542.8	1,663.2
TOTAL HC	(CORR 5% O2)	MG/NM3	4.0	15.1	34.9	67.5	179.3
PART MATTER	(CORR 5% O2)	MG/NM3	21.1	27.1	21.7	34.3	97.2
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	1,119	469	352	630	669
TOTAL CO	(CORR 5% O2)	PPM	492	361	635	1,234	1,331
TOTAL HC	(CORR 5% O2)	PPM	7	28	65	126	335
TOTAL NOX (AS NO2)		G/HP-HR	4.61	2.19	1.73	3.02	3.80
TOTAL CO		G/HP-HR	1.24	1.01	1.88	3.50	4.57
TOTAL HC		G/HP-HR	0.01	0.04	0.10	0.17	0.48
PART MATTER		G/HP-HR	0.05	0.07	0.06	0.09	0.25
TOTAL NOX (AS NO2)		LB/HR	6.08	2.18	1.20	1.18	0.76
TOTAL CO		LB/HR	1.63	1.00	1.31	1.37	0.91
TOTAL HC		LB/HR	0.01	0.04	0.07	0.07	0.10
TOTAL CO2		LB/HR	605	520	378	215	121
PART MATTER		LB/HR	0.07	0.07	0.04	0.04	0.05
OXYGEN IN EXH		%	7.4	9.6	10.8	11.8	14.4
DRY SMOKE OPACITY		%	1.7	1.1	1.0	2.9	2.0
BOSCH SMOKE NUMBER			1.11	0.75	0.70	1.72	1.27

RATED SPEED POTENTIAL SITE VARIATION: 1800 RPM

GENSET POWER WITH FAN ENGINE POWER		EKW BHP	400.0 609	300.0 457	200.0 316	100.0 178	40.0 90.8
PERCENT LOAD		**%**	**100**	**75**	**50**	**25**	**10**
TOTAL NOX (AS NO2)		G/HR	2,977	1,068	588	577	371
TOTAL CO		G/HR	1,386	852	1,107	1,159	773
TOTAL HC		G/HR	11	34	57	58	82
PART MATTER		G/HR	61.3	65.7	37.7	32.1	44.3
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	2,481.2	1,040.3	779.4	1,396.4	1,483.0
TOTAL CO	(CORR 5% O2)	MG/NM3	1,150.6	842.7	1,484.4	2,885.1	3,110.1
TOTAL HC	(CORR 5% O2)	MG/NM3	7.5	28.5	66.0	127.6	338.9
PART MATTER	(CORR 5% O2)	MG/NM3	41.1	52.9	42.2	66.9	189.6
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	1,209	507	380	680	722
TOTAL CO	(CORR 5% O2)	PPM	920	674	1,188	2,308	2,488
TOTAL HC	(CORR 5% O2)	PPM	14	53	123	238	633
TOTAL NOX (AS NO2)		G/HP-HR	4.98	2.36	1.87	3.26	4.10
TOTAL CO		G/HP-HR	2.32	1.88	3.52	6.55	8.55
TOTAL HC		G/HP-HR	0.02	0.08	0.18	0.33	0.90
PART MATTER		G/HP-HR	0.10	0.15	0.12	0.18	0.49
TOTAL NOX (AS NO2)		LB/HR	6.56	2.36	1.30	1.27	0.82
TOTAL CO		LB/HR	3.05	1.88	2.44	2.55	1.71
TOTAL HC		LB/HR	0.02	0.07	0.13	0.13	0.18
PART MATTER		LB/HR	0.14	0.14	0.08	0.07	0.10

Regulatory Information Top

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 Top

STANDARD

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	609	609	609	609	609	609	609	609	609	600	590	580	609
1,000	609	609	609	609	609	609	609	598	588	578	568	558	609
2,000	609	609	609	609	609	597	587	576	566	556	547	538	607
3,000	609	609	609	597	586	575	564	554	545	535	526	517	588
4,000	609	597	586	574	564	553	543	533	524	515	506	498	570

AMBIENT OPERATING TEMP (F)	30	40	50	60	70	80	90	100	110	120	130	140	NORMAL
5,000	586	575	563	552	542	532	522	513	504	495	487	479	552
6,000	564	552	542	531	521	511	502	493	484	476	468	460	534
7,000	542	531	520	510	501	492	483	474	466	458	450	442	517
8,000	520	510	500	490	481	472	464	455	447	440	432	425	500
9,000	500	490	480	471	462	454	445	437	430	422	415	408	484
10,000	480	470	461	452	444	435	427	420	412	405	398	392	467
11,000	460	451	442	434	426	418	410	403	396	389	382	376	452
12,000	442	433	424	416	408	401	393	386	380	373	367	361	437
13,000	424	415	407	399	392	384	377	371	364	358	352	346	422
14,000	406	398	390	382	375	368	362	355	349	343	337	331	407
15,000	389	381	374	366	359	353	346	340	334	328	323	318	393

Cross Reference Top

Test Spec	Setting	Engine Arrangement	Engineering Model	Engineering Model Version	Start Effective Serial Number	End Effective Serial Number
0K9333	PP7710	4343726	PG045	LS	PW300001	

Performance Parameter Reference Top

Parameters Reference: DM9600 - 14

PERFORMANCE DEFINITIONS

PERFORMANCE DEFINITIONS DM9600

APPLICATION: Engine performance tolerance values below are representative of a 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.
On 3500 and C175 engines, at speeds below Peak Torque 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.

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 15 deg C (59 deg F), where the density is 850 G/Liter (7.0936 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.

EMISSION CYCLE LIMITS: Cycle emissions Max Limits apply to cycle-weighted averages only. Emissions at individual load points may exceed the cycle-weighted limit.

WET & DRY EXHAUST/EMISSIONS DESCRIPTION: Wet - Total exhaust flow or concentration of total exhaust flow Dry - Total exhaust flow minus water vapor or concentration of exhaust flow with water vapor excluded

EMISSIONS DEFINITIONS: Emissions : DM1176

EMISSION CYCLE DEFINITIONS
1. For constant-speed marine engines for ship main propulsion, including,diesel-electric drive, test cycle E2 shall be applied, for controllable-pitch propeller sets test cycle E2 shall be applied.
2. For propeller-law-operated main and propeller-law-operated auxiliary engines the test cycle E3 shall be applied.
3. For constant-speed auxiliary engines test cycle D2 shall be applied.
4. For variable-speed, variable-load auxiliary engines, not included above, test cycle C1 shall be applied.

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 : 10/27/21