PERFORMANCE DATA [MJE04356]

FEBRUARY 15, 2023

(MJE04356)-ENGINE (GDE00150)-GENERATOR (GDS00918)-GENSET

For Help Desk Phone Numbers Click here

Perf No: DM9068 **Change Level:** 02

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

View PDF

SALES MODEL:	C27	**COMBUSTION:**	DIRECT INJECTION
BRAND:	CAT	**ENGINE SPEED (RPM):**	1,800
MACHINE SALES MODEL:		**HERTZ:**	60
ENGINE POWER (BHP):	1,214	**FAN POWER (HP):**	37.5
GEN POWER WITH FAN (EKW):	800.0	**ASPIRATION:**	TA
COMPRESSION RATIO:	16.5	**AFTERCOOLER TYPE:**	ATAAC
RATING LEVEL:	STANDBY	**AFTERCOOLER CIRCUIT TYPE:**	JW+OC, ATAAC
PUMP QUANTITY:	1	**INLET MANIFOLD AIR TEMP (F):**	120
FUEL TYPE:	DIESEL	**JACKET WATER TEMP (F):**	210.2
MANIFOLD TYPE:	DRY	**TURBO CONFIGURATION:**	PARALLEL
GOVERNOR TYPE:	ADEM4	**TURBO QUANTITY:**	2
ELECTRONICS TYPE:	ADEM4	**TURBOCHARGER MODEL:**	GTA5008BS-56T-1.60
IGNITION TYPE:	CI	**COMBUSTION STRATEGY:**	LOW BSFC
INJECTOR TYPE:	EUI	**PISTON SPD @ RATED ENG SPD (FT/MIN):**	1,800.0
REF EXH STACK DIAMETER (IN):	8		
MAX OPERATING ALTITUDE (FT):	8,091		

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

General Performance Data Top

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	BRAKE MEAN EFF PRES (BMEP)	BRAKE SPEC FUEL CONSUMPTN (BSFC)	ISO BRAKE SPEC FUEL CONSUMPTN (BSFC)	VOL FUEL CONSUMPTN (VFC)	ISO VOL FUEL CONSUMPTN (VFC)
EKW	%	BHP	PSI	LB/BHP-HR	LB/BHP-HR	GAL/HR	GAL/HR
800.0	100	1,189	317	0.326	0.318	54.6	53.3
720.0	90	1,071	286	0.329	0.321	49.6	48.5
640.0	80	956	255	0.327	0.319	44.1	43.0
600.0	75	898	240	0.326	0.319	41.3	40.3
560.0	70	841	224	0.327	0.319	38.8	37.8
480.0	60	726	194	0.329	0.321	33.7	32.9
400.0	50	613	164	0.333	0.325	28.8	28.1
320.0	40	503	134	0.339	0.331	24.0	23.4
240.0	30	392	105	0.349	0.341	19.3	18.8
200.0	25	336	90	0.357	0.349	16.9	16.5
160.0	20	278	74	0.370	0.361	14.5	14.2
80.0	10	161	43	0.431	0.421	9.8	9.5

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
800.0	100	1,189	55.8	117.7	1,233.4	38.6	966.9	59	341.1
720.0	90	1,071	46.5	110.9	1,184.7	32.0	935.3	49	319.3
640.0	80	956	38.9	102.8	1,137.1	26.6	908.8	41	287.7
600.0	75	898	35.4	99.7	1,113.2	24.3	895.8	38	271.5
560.0	70	841	32.0	97.8	1,088.6	22.1	881.6	34	257.0
480.0	60	726	25.8	94.3	1,036.7	18.2	850.1	27	228.9
400.0	50	613	20.2	91.0	980.8	14.8	814.6	21	202.2
320.0	40	503	15.1	88.1	905.7	11.8	760.2	16	176.6

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
240.0	30	392	10.6	85.3	811.5	9.3	687.7	12	152.4
200.0	25	336	8.5	83.8	756.7	8.3	644.2	10	140.8
160.0	20	278	6.6	82.3	693.8	7.3	593.3	8	130.2
80.0	10	161	3.5	79.0	539.2	5.6	465.1	5	113.0

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
800.0	100	1,189	2,045.6	5,607.3	8,795.2	9,182.8	1,932.5	1,744.0
720.0	90	1,071	1,943.7	5,208.3	8,367.5	8,719.6	1,835.7	1,661.1
640.0	80	956	1,764.9	4,616.5	7,565.9	7,878.5	1,658.6	1,503.2
600.0	75	898	1,671.9	4,320.0	7,147.8	7,440.9	1,567.0	1,421.3
560.0	70	841	1,592.6	4,067.9	6,797.1	7,071.9	1,491.2	1,354.1
480.0	60	726	1,443.3	3,586.4	6,139.9	6,378.9	1,346.3	1,226.2
400.0	50	613	1,305.4	3,132.8	5,537.8	5,742.2	1,208.8	1,105.3
320.0	40	503	1,178.8	2,697.9	4,989.5	5,159.8	1,087.4	1,000.1
240.0	30	392	1,065.6	2,283.1	4,502.6	4,639.2	978.4	906.8
200.0	25	336	1,013.5	2,081.6	4,280.5	4,400.3	927.1	863.2
160.0	20	278	966.9	1,886.4	4,081.8	4,184.7	880.9	824.3
80.0	10	161	892.9	1,518.0	3,765.9	3,835.1	807.1	764.7

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
800.0	100	1,189	19,633	5,785	42,865	24,314	6,328	7,869	50,407	118,806	126,559
720.0	90	1,071	18,402	5,123	39,030	21,816	5,749	6,984	45,435	107,931	114,974
640.0	80	956	16,695	5,059	34,199	18,771	5,104	5,603	40,524	95,827	102,080
600.0	75	898	15,545	5,359	31,818	17,293	4,786	4,919	38,086	89,863	95,726
560.0	70	841	14,857	5,242	29,699	15,982	4,489	4,332	35,646	84,277	89,776
480.0	60	726	13,631	4,687	25,676	13,512	3,906	3,310	30,806	73,326	78,110
400.0	50	613	12,080	4,223	21,942	11,250	3,335	2,464	25,999	62,622	66,709
320.0	40	503	10,575	3,791	18,167	8,866	2,781	1,767	21,316	52,210	55,616
240.0	30	392	9,089	3,236	14,487	6,503	2,232	1,211	16,612	41,900	44,634
200.0	25	336	8,346	2,886	12,696	5,346	1,957	977	14,230	36,737	39,134
160.0	20	278	7,563	2,567	10,914	4,175	1,682	784	11,808	31,575	33,635
80.0	10	161	5,308	2,605	7,383	1,781	1,131	514	6,808	21,232	22,617

Emissions Data Top

Units Filter All Units

DIESEL

RATED SPEED NOMINAL DATA: 1800 RPM

GENSET POWER WITH FAN ENGINE POWER		EKW BHP	800.0 1,189	600.0 898	400.0 613	200.0 336	80.0 161
PERCENT LOAD		%	100	75	50	25	10
TOTAL NOX (AS NO2)		G/HR	7,128	5,463	3,922	2,279	1,246
TOTAL CO		G/HR	294	239	219	223	304
TOTAL HC		G/HR	21	28	50	43	55
TOTAL CO2		KG/HR	547	410	284	166	96
PART MATTER		G/HR	13.2	12.9	16.3	12.2	11.3
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	3,189.8	3,044.5	3,145.8	3,142.5	2,932.7
TOTAL CO	(CORR 5% O2)	MG/NM3	131.2	133.8	176.6	312.0	785.3
TOTAL HC	(CORR 5% O2)	MG/NM3	8.1	13.6	35.3	53.9	123.4
PART MATTER	(CORR 5% O2)	MG/NM3	4.8	6.0	11.0	15.0	25.5
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	1,554	1,483	1,532	1,531	1,428

GENSET POWER WITH FAN ENGINE POWER		EKW BHP	800.0 1,189	600.0 898	400.0 613	200.0 336	80.0 161
PERCENT LOAD		**%**	**100**	**75**	**50**	**25**	**10**
TOTAL CO	(CORR 5% O2)	PPM	105	107	141	250	628
TOTAL HC	(CORR 5% O2)	PPM	15	25	66	101	230
TOTAL NOX (AS NO2)		G/HP-HR	6.05	6.13	6.42	6.81	7.78
TOTAL CO		G/HP-HR	0.25	0.27	0.36	0.67	1.90
TOTAL HC		G/HP-HR	0.02	0.03	0.08	0.13	0.34
PART MATTER		G/HP-HR	0.01	0.01	0.03	0.04	0.07
TOTAL NOX (AS NO2)		LB/HR	15.71	12.04	8.65	5.03	2.75
TOTAL CO		LB/HR	0.65	0.53	0.48	0.49	0.67
TOTAL HC		LB/HR	0.05	0.06	0.11	0.09	0.12
TOTAL CO2		LB/HR	1,205	904	627	367	211
PART MATTER		LB/HR	0.03	0.03	0.04	0.03	0.02
OXYGEN IN EXH		%	8.7	9.0	10.3	13.0	15.8
DRY SMOKE OPACITY		%	0.8	1.1	2.0	2.0	1.6
BOSCH SMOKE NUMBER			0.20	0.44	0.90	0.91	0.73

RATED SPEED POTENTIAL SITE VARIATION: 1800 RPM

GENSET POWER WITH FAN ENGINE POWER		EKW BHP	800.0 1,189	600.0 898	400.0 613	200.0 336	80.0 161
PERCENT LOAD		**%**	**100**	**75**	**50**	**25**	**10**
TOTAL NOX (AS NO2)		G/HR	8,624	6,611	4,746	2,758	1,508
TOTAL CO		G/HR	550	447	409	417	568
TOTAL HC		G/HR	40	52	95	81	104
PART MATTER		G/HR	25.7	25.1	31.7	23.8	22.0
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	3,859.6	3,683.8	3,806.4	3,802.5	3,548.5
TOTAL CO	(CORR 5% O2)	MG/NM3	245.4	250.1	330.2	583.5	1,468.6
TOTAL HC	(CORR 5% O2)	MG/NM3	15.3	25.7	66.7	101.9	233.3
PART MATTER	(CORR 5% O2)	MG/NM3	9.3	11.6	21.4	29.2	49.7
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	1,880	1,794	1,854	1,852	1,728
TOTAL CO	(CORR 5% O2)	PPM	196	200	264	467	1,175
TOTAL HC	(CORR 5% O2)	PPM	29	48	124	190	435
TOTAL NOX (AS NO2)		G/HP-HR	7.32	7.42	7.77	8.25	9.42
TOTAL CO		G/HP-HR	0.47	0.50	0.67	1.25	3.55
TOTAL HC		G/HP-HR	0.03	0.06	0.16	0.24	0.65
PART MATTER		G/HP-HR	0.02	0.03	0.05	0.07	0.14
TOTAL NOX (AS NO2)		LB/HR	19.01	14.57	10.46	6.08	3.32
TOTAL CO		LB/HR	1.21	0.98	0.90	0.92	1.25
TOTAL HC		LB/HR	0.09	0.12	0.21	0.18	0.23
PART MATTER		LB/HR	0.06	0.06	0.07	0.05	0.05

Regulatory Information Top

NON-CERTIFIED	**1970 - 2100**
THIS ENGINE RATING IS NOT EMISSIONS CERTIFIED BY ANY DOMESTIC OR FOREIGN AGENCY.	

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	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214
1,000	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214
2,000	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214
3,000	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214
4,000	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214
5,000	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214
6,000	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,201	1,181	1,214
7,000	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,195	1,174	1,154	1,135	1,214
8,000	1,214	1,214	1,214	1,214	1,214	1,212	1,190	1,168	1,148	1,128	1,109	1,090	1,214
9,000	1,214	1,214	1,214	1,208	1,185	1,164	1,142	1,122	1,102	1,083	1,065	1,047	1,214
10,000	1,214	1,206	1,182	1,160	1,138	1,117	1,096	1,077	1,058	1,040	1,022	1,005	1,199
11,000	1,181	1,157	1,134	1,113	1,092	1,071	1,052	1,033	1,015	998	981	964	1,159
12,000	1,132	1,110	1,088	1,067	1,047	1,028	1,009	991	973	957	940	925	1,119
13,000	1,086	1,064	1,043	1,023	1,004	985	967	950	933	917	902	886	1,081
14,000	1,040	1,020	1,000	980	962	944	927	910	894	879	864	850	1,043

AMBIENT OPERATING TEMP (F)	30	40	50	60	70	80	90	100	110	120	130	140	NORMAL
15,000	996	976	957	939	921	904	888	872	856	842	827	814	1,006

Cross Reference Top

Test Spec	Setting	Engine Arrangement	Engineering Model	Engineering Model Version	Start Effective Serial Number	End Effective Serial Number
0K7489	PP5668	2804140	GS327	-	MJE00001	
3704843	GG0525	3495622	GS603	LS	MJE00001	
0K4171	GG0497	3678012	GS582	-	PEN00001	
3704843	GG0525	3884920	GS603	-	MJE00001	
3704843	GG0525	3884921	GS603	-	MJE00001	
3704843	GG0525	3944678	GS603	-	MJE00001	
3704843	GG0525	3953458	GS603	-	MJE00001	
3704843	GG0525	5998597	PG394	-	MJE00001	

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