PERFORMANCE DATA[DM7696]

January 11, 2018

Performance Number: DM7696 **Change Level: 02**

SALES MODEL:	C27	**COMBUSTION:**	DI
BRAND:	CAT	**ENGINE SPEED (RPM):**	1,800
ENGINE POWER (BHP):	1,214	**HERTZ:**	60
GEN POWER WITH FAN (EKW):	800.0	**FAN POWER (HP):**	39.3
COMPRESSION RATIO:	16.5	**ADDITIONAL PARASITICS (HP):**	52.2
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:	ADEM4	**JACKET WATER TEMP (F):**	210.2
ELECTRONICS TYPE:	ADEM4	**TURBO CONFIGURATION:**	PARALLEL
IGNITION TYPE:	CI	**TURBO QUANTITY:**	2
INJECTOR TYPE:	EUI	**TURBOCHARGER MODEL:**	GTA5008BS-56T-1.60
REF EXH STACK DIAMETER (IN):	10	**CERTIFICATION YEAR:**	2010
MAX OPERATING ALTITUDE (FT):	7,999	**PISTON SPD @ RATED ENG SPD (FT/MIN):**	1,800.0

INDUSTRY	SUBINDUSTRY	APPLICATION
OIL AND GAS	LAND PRODUCTION	PACKAGED GENSET
ELECTRIC POWER	STANDARD	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
800.0	100	1,214	324	0.330	57.3	58.6	120.5	1,230.6	41.1	952.5
720.0	90	1,100	294	0.334	52.5	53.7	115.2	1,195.3	37.5	932.4
640.0	80	988	264	0.339	47.8	48.4	113.4	1,168.6	33.4	919.7
600.0	75	932	249	0.341	45.4	45.5	113.0	1,155.3	31.2	913.8
560.0	70	876	234	0.342	42.9	42.2	111.6	1,138.9	28.8	906.0
480.0	60	765	204	0.344	37.6	34.9	107.3	1,095.6	23.9	882.8
400.0	50	654	175	0.346	32.3	27.3	102.5	1,039.6	19.1	850.4
320.0	40	545	145	0.349	27.1	20.4	98.3	967.7	14.9	804.3
240.0	30	436	116	0.355	22.1	14.5	95.0	875.5	11.4	739.0
200.0	25	380	101	0.359	19.5	11.7	93.6	822.1	9.9	699.4
160.0	20	324	86	0.366	17.0	9.1	92.4	763.2	8.5	654.7
80.0	10	210	56	0.402	12.0	5.1	92.2	626.6	6.3	544.7

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
800.0	100	1,214	61	362.1	2,216.4	6,011.7	9,543.1	9,944.2	2,093.1	1,894.9
720.0	90	1,100	57	341.6	2,124.9	5,659.3	9,125.9	9,493.8	1,998.8	1,815.5
640.0	80	988	51	320.7	2,001.3	5,260.8	8,572.1	8,906.9	1,875.2	1,707.1
600.0	75	932	48	309.9	1,930.4	5,042.0	8,257.4	8,575.1	1,805.0	1,645.1
560.0	70	876	44	295.4	1,851.1	4,797.3	7,907.3	8,207.3	1,727.2	1,576.0
480.0	60	765	37	264.1	1,678.1	4,260.9	7,148.0	7,411.6	1,560.5	1,427.2
400.0	50	654	29	233.3	1,497.7	3,697.0	6,361.6	6,588.0	1,387.5	1,272.0
320.0	40	545	22	203.3	1,329.0	3,157.0	5,630.4	5,820.5	1,228.0	1,129.6
240.0	30	436	16	173.6	1,175.4	2,643.8	4,970.3	5,124.7	1,084.4	1,003.3
200.0	25	380	13	158.7	1,102.8	2,392.1	4,660.7	4,797.2	1,014.7	942.2
160.0	20	324	10	143.8	1,032.8	2,142.5	4,363.5	4,482.1	945.3	881.3
80.0	10	210	6	121.2	926.9	1,716.6	3,911.4	3,995.6	840.3	792.1

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

800.0	100	1,214	18,785	6,240	45,257	25,637	6,549	9,235	51,468	122,961	130,984
720.0	90	1,100	18,137	5,061	42,000	23,586	6,007	8,276	46,664	112,779	120,138
640.0	80	988	17,141	4,437	38,642	21,600	5,462	7,119	41,902	102,550	109,241
600.0	75	932	16,243	4,573	36,868	20,559	5,186	6,513	39,533	97,376	103,729
560.0	70	876	15,133	4,950	34,899	19,383	4,898	5,822	37,162	91,965	97,965
480.0	60	765	13,933	4,599	30,563	16,728	4,301	4,488	32,445	80,759	86,028
400.0	50	654	12,297	4,489	26,024	13,914	3,694	3,331	27,748	69,364	73,890
320.0	40	545	10,665	4,336	21,575	11,109	3,103	2,367	23,120	58,261	62,063
240.0	30	436	9,960	3,213	17,222	8,311	2,521	1,564	18,469	47,340	50,429
200.0	25	380	9,576	2,592	15,113	6,955	2,231	1,215	16,122	41,885	44,618
160.0	20	324	9,057	2,021	13,057	5,639	1,939	898	13,745	36,402	38,778
80.0	10	210	7,177	1,693	9,288	3,167	1,375	455	8,885	25,814	27,498

Emissions Data

RATED SPEED POTENTIAL SITE VARIATION: 1800 RPM

GENSET POWER WITH FAN		EKW	800.0	600.0	400.0	200.0	80.0
PERCENT LOAD		%	100	75	50	25	10
ENGINE POWER		BHP	1,214	932	654	380	210
TOTAL NOX (AS NO2)		G/HR	7,541	4,507	2,865	1,989	1,253
TOTAL CO		G/HR	517	644	630	514	567
TOTAL HC		G/HR	66	83	90	71	85
PART MATTER		G/HR	55.4	52.1	86.3	99.7	101.9
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	3,121.8	2,374.5	2,149.1	2,626.2	2,606.8
TOTAL CO	(CORR 5% O2)	MG/NM3	215.2	343.4	483.1	717.2	1,372.2
TOTAL HC	(CORR 5% O2)	MG/NM3	23.7	38.9	59.2	87.9	183.2
PART MATTER	(CORR 5% O2)	MG/NM3	18.9	22.9	55.1	113.5	210.1
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	1,521	1,157	1,047	1,279	1,270
TOTAL CO	(CORR 5% O2)	PPM	172	275	386	574	1,098
TOTAL HC	(CORR 5% O2)	PPM	44	73	111	164	342
TOTAL NOX (AS NO2)		G/HP-HR	6.27	4.86	4.40	5.25	6.00
TOTAL CO		G/HP-HR	0.43	0.69	0.97	1.36	2.72
TOTAL HC		G/HP-HR	0.05	0.09	0.14	0.19	0.41
PART MATTER		G/HP-HR	0.05	0.06	0.13	0.26	0.49
TOTAL NOX (AS NO2)		LB/HR	16.63	9.94	6.32	4.38	2.76
TOTAL CO		LB/HR	1.14	1.42	1.39	1.13	1.25
TOTAL HC		LB/HR	0.15	0.18	0.20	0.16	0.19
PART MATTER		LB/HR	0.12	0.11	0.19	0.22	0.22

RATED SPEED NOMINAL DATA: 1800 RPM

GENSET POWER WITH FAN		EKW	800.0	600.0	400.0	200.0	80.0
PERCENT LOAD		%	100	75	50	25	10
ENGINE POWER		BHP	1,214	932	654	380	210
TOTAL NOX (AS NO2)		G/HR	6,233	3,725	2,368	1,644	1,036
TOTAL CO		G/HR	276	344	337	275	303
TOTAL HC		G/HR	35	44	48	37	45
TOTAL CO2		KG/HR	563	445	315	188	116
PART MATTER		G/HR	28.4	26.7	44.2	51.1	52.3
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	2,580.0	1,962.4	1,776.1	2,170.4	2,154.4
TOTAL CO	(CORR 5% O2)	MG/NM3	115.1	183.6	258.3	383.5	733.8
TOTAL HC	(CORR 5% O2)	MG/NM3	12.5	20.6	31.3	46.5	96.9
PART MATTER	(CORR 5% O2)	MG/NM3	9.7	11.8	28.3	58.2	107.7
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	1,257	956	865	1,057	1,049
TOTAL CO	(CORR 5% O2)	PPM	92	147	207	307	587
TOTAL HC	(CORR 5% O2)	PPM	23	38	58	87	181
TOTAL NOX (AS NO2)		G/HP-HR	5.18	4.02	3.63	4.34	4.96
TOTAL CO		G/HP-HR	0.23	0.37	0.52	0.72	1.45
TOTAL HC		G/HP-HR	0.03	0.05	0.07	0.10	0.22
PART MATTER		G/HP-HR	0.02	0.03	0.07	0.13	0.25
TOTAL NOX (AS NO2)		LB/HR	13.74	8.21	5.22	3.62	2.28
TOTAL CO		LB/HR	0.61	0.76	0.74	0.61	0.67
TOTAL HC		LB/HR	0.08	0.10	0.11	0.08	0.10
TOTAL CO2		LB/HR	1,240	982	694	414	255
PART MATTER		LB/HR	0.06	0.06	0.10	0.11	0.12
OXYGEN IN EXH		%	8.9	10.0	11.1	13.1	15.4
DRY SMOKE OPACITY		%	0.2	1.1	2.6	4.3	5.3
BOSCH SMOKE NUMBER			0.14	0.39	0.96	1.51	1.69

Regulatory Information

EPA TIER 2		2006 - 2010		
Locality	**Agency**	**Regulation**	**Tier/Stage**	**Max Limits - G/BKW - HR**
U.S. (INCL CALIF)	EPA	NON-ROAD	TIER 2	CO: 3.5 NOx + HC: 6.4 PM: 0.20

EPA EMERGENCY STATIONARY		2011 - ----		
Locality	**Agency**	**Regulation**	**Tier/Stage**	**Max Limits - G/BKW - HR**
U.S. (INCL CALIF)	EPA	STATIONARY	EMERGENCY STATIONARY	CO: 3.5 NOx + HC: 6.4 PM: 0.20

Altitude Derate Data

ALTITUDE CORRECTED POWER CAPABILITY (BHP)

AMBIENT OPERATING TEMP (F)	50	60	70	80	90	100	110	120	130	NORMAL
ALTITUDE (FT)										
0	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214
1,000	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
3,000	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
5,000	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	1,197	1,214
7,000	1,214	1,214	1,214	1,214	1,214	1,212	1,191	1,170	1,150	1,214
8,000	1,214	1,214	1,214	1,207	1,185	1,164	1,144	1,124	1,105	1,214
9,000	1,214	1,204	1,181	1,159	1,138	1,118	1,098	1,079	1,061	1,214
10,000	1,178	1,155	1,134	1,113	1,092	1,073	1,054	1,036	1,018	1,195
11,000	1,130	1,109	1,088	1,067	1,048	1,029	1,011	994	977	1,154
12,000	1,084	1,063	1,043	1,024	1,005	987	970	953	937	1,115
13,000	1,039	1,019	1,000	981	964	946	930	914	898	1,077
14,000	996	977	958	940	923	907	891	876	861	1,039
15,000	954	935	918	901	884	869	853	839	824	1,003

Cross Reference

Test Spec	Setting	Engine Arrangement	Engineering Model	Engineering Model Version	Start Effective Serial Number	End Effective Serial Number
0K7925	PP5660	2671232	GS327	-	MJE00001	
3704841	GG0523	3495619	GS603	LS	MJE00001	
0K4031	GG0383	3541450	GS582	-	PEN00001	

Performance Parameter Reference

Parameters Reference:DM9600-10

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%

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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.
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 deg C (84.2 deg F), 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.

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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

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