

PERFORMANCE DATA[DM8500]

November 12, 2014

Performance Number: DM8500

Change Level: 04

SALES MODEL:	C9	COMBUSTION:	DI
ENGINE POWER (BHP):	448	ENGINE SPEED (RPM):	1,800
GEN POWER W/O FAN (EKW):	294.0	HERTZ:	60
GEN POWER WITH FAN (EKW):	275.0	FAN POWER (HP):	45.7
COMPRESSION RATIO:	16.1	ASPIRATION:	TA
RATING LEVEL:	PRIME	AFTERCOOLER TYPE:	ATAAC
PUMP QUANTITY:	1	AFTERCOOLER CIRCUIT TYPE:	JW+OC, ATAAC
FUEL TYPE:	DIESEL	INLET MANIFOLD AIR TEMP (F):	120
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

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
275.0	100	448	367	0.332	21.3	79.4	124.4	1,214.4	88.4	924.2
247.5	90	404	331	0.340	19.7	76.7	121.7	1,152.9	80.8	888.3
220.0	80	363	297	0.344	17.8	71.7	121.3	1,095.8	73.6	859.6
206.2	75	343	281	0.345	16.9	69.4	121.2	1,068.8	70.2	847.0
192.5	70	323	264	0.349	16.1	67.1	121.2	1,044.4	66.9	836.9
165.0	60	284	232	0.363	14.7	62.7	121.1	998.7	60.5	819.4
137.5	50	246	201	0.380	13.3	58.6	121.2	951.3	54.6	799.7
110.0	40	207	170	0.394	11.7	51.9	121.3	897.4	49.4	772.8
82.5	30	169	138	0.402	9.7	40.7	121.6	830.5	45.1	732.0
68.8	25	149	122	0.406	8.7	34.7	121.7	791.4	43.2	705.4
55.0	20	129	106	0.412	7.6	28.5	121.8	747.9	41.6	674.4
27.5	10	88.4	72	0.429	5.4	16.6	120.7	631.5	38.8	578.4

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
275.0	100	448	80	429.5	891.8	2,379.6	3,867.8	4,016.6	845.4	774.2
247.5	90	404	78	414.2	882.5	2,282.0	3,809.0	3,946.3	832.4	765.9
220.0	80	363	73	392.9	848.8	2,142.0	3,647.4	3,771.6	798.3	737.6
206.2	75	343	70	381.6	832.5	2,066.3	3,570.0	3,688.2	777.5	719.7
192.5	70	323	68	372.9	816.7	2,008.1	3,494.5	3,607.1	761.5	706.2
165.0	60	284	64	358.1	785.8	1,908.9	3,348.6	3,450.6	733.8	682.9
137.5	50	246	59	340.7	755.8	1,795.0	3,207.8	3,300.3	700.8	654.4
110.0	40	207	53	311.6	702.9	1,611.2	2,970.6	3,052.5	642.7	602.0
82.5	30	169	41	270.6	609.6	1,346.3	2,562.5	2,630.7	555.5	521.7
68.8	25	149	35	248.2	558.6	1,203.1	2,341.0	2,401.9	507.7	477.4
55.0	20	129	29	224.3	505.9	1,055.7	2,113.5	2,166.8	457.7	430.9
27.5	10	88.4	17	173.1	404.6	769.8	1,680.0	1,717.9	364.6	345.1

Heat Rejection Data

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	REJECTION TO JACKET WATER	REJECTION TO ATMOSPHERE	REJECTION TO EXH	EXHUAUST 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
275.0	100	448	6,431	1,009	17,454	9,814	2,431	4,726	18,994	45,636	48,614
247.5	90	404	6,005	999	16,338	8,995	2,248	4,462	17,152	42,202	44,956
220.0	80	363	5,540	902	14,972	8,106	2,039	3,967	15,393	38,276	40,774
206.2	75	343	5,312	742	14,345	7,717	1,933	3,722	14,538	36,291	38,659
192.5	70	323	5,123	712	13,799	7,382	1,843	3,522	13,695	34,593	36,850
165.0	60	284	4,802	817	12,821	6,787	1,683	3,177	12,040	31,596	33,657
137.5	50	246	4,515	894	11,860	6,200	1,525	2,820	10,411	28,631	30,499
110.0	40	207	4,195	922	10,499	5,374	1,333	2,264	8,790	25,036	26,669
82.5	30	169	3,784	1,161	8,507	4,167	1,107	1,529	7,156	20,781	22,137
68.8	25	149	3,535	1,292	7,457	3,531	990	1,186	6,327	18,583	19,796
55.0	20	129	3,267	1,368	6,401	2,899	869	867	5,484	16,323	17,388
27.5	10	88.4	2,678	1,336	4,271	1,603	619	352	3,748	11,627	12,386

Emissions Data

RATED SPEED POTENTIAL SITE VARIATION: 1800 RPM

GENSET POWER WITH FAN	EKW	275.0	206.2	137.5	68.8	27.5
PERCENT LOAD	%	100	75	50	25	10
ENGINE POWER	BHP	448	343	246	149	88.4
TOTAL NOX (AS NO2)	G/HR	1,722	941	513	289	221
TOTAL CO	G/HR	187	177	246	203	190
TOTAL HC	G/HR	49	59	82	76	66
PART MATTER	G/HR	25.7	36.0	68.4	44.0	29.3
TOTAL NOX (AS NO2)	(CORR 5% O2) MG/NM3	2,133.0	1,467.6	1,028.2	886.7	1,190.1
TOTAL CO	(CORR 5% O2) MG/NM3	194.3	244.8	430.9	578.9	914.8
TOTAL HC	(CORR 5% O2) MG/NM3	43.9	71.2	124.4	182.5	263.9
PART MATTER	(CORR 5% O2) MG/NM3	20.5	45.0	105.9	98.2	121.9
TOTAL NOX (AS NO2)	(CORR 5% O2) PPM	1,039	715	501	432	580
TOTAL CO	(CORR 5% O2) PPM	155	196	345	463	732
TOTAL HC	(CORR 5% O2) PPM	82	133	232	341	493
TOTAL NOX (AS NO2)	G/HP-HR	3.87	2.76	2.10	1.94	2.49
TOTAL CO	G/HP-HR	0.42	0.52	1.01	1.36	2.15
TOTAL HC	G/HP-HR	0.11	0.17	0.34	0.51	0.75
PART MATTER	G/HP-HR	0.06	0.11	0.28	0.29	0.33
TOTAL NOX (AS NO2)	LB/HR	3.80	2.07	1.13	0.64	0.49
TOTAL CO	LB/HR	0.41	0.39	0.54	0.45	0.42
TOTAL HC	LB/HR	0.11	0.13	0.18	0.17	0.15
PART MATTER	LB/HR	0.06	0.08	0.15	0.10	0.06

RATED SPEED NOMINAL DATA: 1800 RPM

GENSET POWER WITH FAN	EKW	275.0	206.2	137.5	68.8	27.5
PERCENT LOAD	%	100	75	50	25	10
ENGINE POWER	BHP	448	343	246	149	88.4
TOTAL NOX (AS NO2)	G/HR	1,594	871	475	267	204
TOTAL CO	G/HR	100	95	132	109	102
TOTAL HC	G/HR	26	31	43	40	35
TOTAL CO2	KG/HR	211	169	132	86	54
PART MATTER	G/HR	13.2	18.5	35.1	22.6	15.0
TOTAL NOX (AS NO2)	(CORR 5% O2) MG/NM3	1,975.0	1,358.9	952.0	821.0	1,102.0
TOTAL CO	(CORR 5% O2) MG/NM3	103.9	130.9	230.4	309.6	489.2
TOTAL HC	(CORR 5% O2) MG/NM3	23.2	37.7	65.8	96.6	139.6
PART MATTER	(CORR 5% O2) MG/NM3	10.5	23.1	54.3	50.4	62.5
TOTAL NOX (AS NO2)	(CORR 5% O2) PPM	962	662	464	400	537
TOTAL CO	(CORR 5% O2) PPM	83	105	184	248	391
TOTAL HC	(CORR 5% O2) PPM	43	70	123	180	261
TOTAL NOX (AS NO2)	G/HP-HR	3.59	2.55	1.94	1.79	2.31
TOTAL CO	G/HP-HR	0.23	0.28	0.54	0.73	1.15
TOTAL HC	G/HP-HR	0.06	0.09	0.18	0.27	0.40
PART MATTER	G/HP-HR	0.03	0.05	0.14	0.15	0.17
TOTAL NOX (AS NO2)	LB/HR	3.52	1.92	1.05	0.59	0.45
TOTAL CO	LB/HR	0.22	0.21	0.29	0.24	0.22
TOTAL HC	LB/HR	0.06	0.07	0.10	0.09	0.08
TOTAL CO2	LB/HR	466	372	290	189	119
PART MATTER	LB/HR	0.03	0.04	0.08	0.05	0.03
OXYGEN IN EXH	%	9.8	11.5	12.7	13.6	14.8
DRY SMOKE OPACITY	%	0.3	0.5	1.0	0.8	0.8
BOSCH SMOKE NUMBER		0.04	0.32	0.94	0.76	0.68

Regulatory Information

EPA TIER 3		2005 - 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	448	448	448	448	448	448	448	448	448	448	448	448	448
1,000	448	448	448	448	448	448	448	448	448	448	445	437	448
2,000	448	448	448	448	448	448	448	448	443	436	428	421	448
3,000	448	448	448	448	448	448	442	434	427	419	412	405	448
4,000	448	448	448	448	441	433	425	418	410	403	397	390	446
5,000	448	448	441	433	425	417	409	402	395	388	381	375	432
6,000	442	433	424	416	408	401	393	386	380	373	367	361	418
7,000	424	416	408	400	392	385	378	371	365	358	352	347	405
8,000	408	400	392	384	377	370	363	357	350	344	339	333	392
9,000	392	384	376	369	362	355	349	343	337	331	325	320	379
10,000	376	368	361	354	347	341	335	329	323	318	312	307	366
11,000	361	353	347	340	333	327	321	316	310	305	300	295	354
12,000	346	339	332	326	320	314	308	303	297	292	287	283	342
13,000	332	325	319	313	307	301	296	290	285	280	275	271	330
14,000	318	312	305	300	294	289	283	278	273	269	264	260	319
15,000	305	299	293	287	282	276	271	267	262	257	253	249	308

Cross Reference

		Engine Arrangement	
Arrangement Number	Effective Serial Number	Engineering Model	Engineering Model Version
2531644	S9L00001	GS279	-
3950369	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
0K6615		S9L00001	2531644	ELEC		
0K6615		S9P00001	3950369	ELEC		
4150081	PP5623	S9P00001	3950369	ELEC		
4150081	PP5623	S9P00001	4529865	ELEC		

Performance Parameter Reference

Parameters Reference:DM9600-06

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.

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 (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. Log on to the Technology and Solutions Divisions (T&SD) web page (https://pdgt.cat.com/cda/layout) for information including federal regulation applicability and time lines for implementation. Information for labeling and tagging requirements is also provided.

NOTES:

Regulation watch covers regulations in effect and future regulation changes for world, federal, state and local. This page includes

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items on the watch list where a regulation change or product change might be pending and may need attention of the engine product group. For additional emissions information log on to the TMI web page.

Additional product information for specific market application is available.

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

HEAT REJECTION DEFINITIONS:

Diesel Circuit Type and HHV Balance : DM9500

EMISSIONS DEFINITIONS:

Emissions : DM1176

SOUND DEFINITIONS:

Sound Power : DM8702

Sound Pressure : TM7080

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

Date Released : 5/12/14