

PERFORMANCE DATA [C09DE47]

OCTOBER 13, 2020

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Perf No: DM8501

Change Level: 03

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

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

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)	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	19.1	77.7	122.3	1,142.4	55.4	852.0
225.0	90	359	294	0.346	17.5	74.1	121.6	1,094.4	51.6	823.5
200.0	80	321	263	0.355	16.0	70.7	122.1	1,050.1	48.2	800.5
187.5	75	302	247	0.360	15.3	69.0	122.5	1,029.4	46.4	790.7
175.0	70	284	232	0.364	14.6	66.6	122.4	1,010.3	44.2	782.4
150.0	60	247	202	0.374	13.0	60.6	122.2	973.8	39.4	768.3
125.0	50	211	172	0.385	11.4	53.2	121.8	937.9	33.9	755.8
100.0	40	176	144	0.394	9.8	43.3	121.2	899.4	27.4	742.4
75.0	30	141	116	0.404	8.0	32.2	120.7	857.9	20.5	727.9
62.5	25	124	101	0.410	7.2	26.7	120.5	835.9	17.2	720.5
50.0	20	106	87	0.418	6.2	21.3	120.3	812.9	14.1	712.7
25.0	10	68.9	56	0.445	4.3	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

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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
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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
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

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Units Filter

RATED SPEED POTENTIAL SITE VARIATION: 1800 RPM

GENSET POWER WITH FAN ENGINE POWER	EKW	250.0	187.5	125.0	62.5	25.0
PERCENT LOAD	BHP	398	302	211	124	68.9
TOTAL NOX (AS NO2)	%	100	75	50	25	10
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 ENGINE POWER	EKW	250.0	187.5	125.0	62.5	25.0
PERCENT LOAD	BHP	398	302	211	124	68.9
TOTAL NOX (AS NO2)	%	100	75	50	25	10
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
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

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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.					

EPA EMERGENCY STATIONARY	2011 - ----			
Locality U.S. (INCL CALIF)	Agency EPA	Regulation STATIONARY	Tier/Stage EMERGENCY STATIONARY	Max Limits - G/BKW - HR CO: 3.5 NOx + HC: 4.0 PM: 0.20

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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 [Top](#)

Test Spec	Setting	Engine Arrangement	Engineering Model	Engineering Model Version	Start Effective Serial Number	End Effective Serial Number
OK6612	NAP	2575707	GS279	-	S9L00001	
OK6612	NAP	3950368	GS279	-	S9P00001	
4150078	PP5548	3950368	GS279	-	S9P00001	
4150078	PP5548	4529865	GS857	LS	S9P00001	
4581389	NAP	4883500	EE357	-	XGN00001	
4581389	NAP	4914586	EE357	-	XGN00001	
4150078	PP5548	5664658	PG350	G	RG300001	
4150078	PP5548	5664658	PG375	G	RE300001	

Performance Parameter Reference [Top](#)

Parameters Reference: DM9600 - 12

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 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.

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 : 07/10/19