PERFORMANCE DATA[DM0636]

February 16, 2015

Performance Number: DM0636 **Change Level: 04**

SALES MODEL:	3412C	**COMBUSTION:**	DI
ENGINE POWER (BHP):	1,180	**ENGINE SPEED (RPM):**	1,800
GEN POWER WITH FAN (EKW):	800.0	**HERTZ:**	60
COMPRESSION RATIO:	13	**FAN POWER (HP):**	51.0
RATING LEVEL:	STANDBY	**ASPIRATION:**	TA
PUMP QUANTITY:	1	**AFTERCOOLER TYPE:**	JWAC
FUEL TYPE:	DIESEL	**AFTERCOOLER CIRCUIT TYPE:**	JW+OC+AC
MANIFOLD TYPE:	DRY	**AFTERCOOLER TEMP (F):**	196
GOVERNOR TYPE:	PEEC	**JACKET WATER TEMP (F):**	210.2
IGNITION TYPE:	CI	**TURBO CONFIGURATION:**	SERIES
REF EXH STACK DIAMETER (IN):	8	**TURBO QUANTITY:**	4
MAX OPERATING ALTITUDE (FT):	5,906	**TURBOCHARGER MODEL:**	TV9215-48T-2.00
		COMBUSTION STRATEGY:	LOW BSFC
		PISTON SPD @ RATED ENG SPD (FT/MIN):	1,800.0

INDUSTRY	SUBINDUSTRY	APPLICATION
ELECTRIC POWER	STANDARD	PACKAGED GENSET
OIL AND GAS	LAND PRODUCTION	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	ENGINE OUTLET TEMP
EKW	%	BHP	PSI	LB/BHP-HR	GAL/HR	IN-HG	DEG F	DEG F	DEG F
800.0	100	1,180	315	0.348	58.6	79.1	211.8	1,283.7	964.0
720.0	90	1,065	284	0.343	52.2	66.4	204.3	1,245.0	952.7
640.0	80	952	254	0.342	46.5	55.4	197.6	1,210.5	941.2
600.0	75	895	239	0.342	43.8	50.3	194.8	1,193.1	935.2
560.0	70	839	224	0.342	41.0	45.4	192.2	1,175.5	928.8
480.0	60	727	194	0.343	35.7	36.5	187.7	1,137.2	910.9
400.0	50	616	164	0.347	30.6	28.5	183.7	1,094.5	887.7
320.0	40	507	135	0.356	25.7	21.4	180.1	1,041.7	854.2
240.0	30	397	106	0.369	20.9	15.1	176.7	970.6	803.7
200.0	25	341	91	0.376	18.3	12.2	175.1	921.8	767.1
160.0	20	285	76	0.387	15.7	9.5	173.5	863.9	722.3
80.0	10	170	45	0.439	10.6	4.8	171.9	713.1	600.4

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
800.0	100	1,180	81	413.1	2,457.6	6,889.2	10,905.9	11,316.3	2,379.1	2,132.3
720.0	90	1,065	68	387.5	2,210.4	6,147.3	9,651.9	10,017.3	2,140.0	1,918.0
640.0	80	952	56	353.8	1,970.3	5,434.3	8,457.4	8,783.1	1,907.3	1,709.4
600.0	75	895	51	337.2	1,856.9	5,097.6	7,898.1	8,204.4	1,796.8	1,610.4
560.0	70	839	46	320.5	1,747.9	4,774.0	7,360.4	7,647.6	1,690.6	1,515.2
480.0	60	727	37	287.8	1,546.6	4,177.2	6,355.9	6,605.5	1,498.4	1,343.0
400.0	50	616	29	255.9	1,366.5	3,622.9	5,418.0	5,632.0	1,322.0	1,184.9
320.0	40	507	22	225.2	1,199.7	3,103.1	4,516.7	4,697.0	1,161.2	1,040.7
240.0	30	397	16	194.2	1,040.9	2,582.1	3,617.4	3,763.7	1,004.9	900.6
200.0	25	341	13	177.8	962.7	2,319.4	3,157.7	3,286.2	929.6	833.2
160.0	20	285	10	161.9	886.9	2,053.8	2,690.8	2,800.9	854.3	765.7
80.0	10	170	4	133.9	766.9	1,577.6	1,855.1	1,929.6	731.7	655.8

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	1,180	28,890	7,450	48,624	28,207	3,497	8,360	50,051	126,739	135,009
720.0	90	1,065	25,818	6,085	43,105	24,851	3,281	6,824	45,169	112,853	120,216
640.0	80	952	23,088	5,687	37,988	21,724	3,060	5,175	40,354	100,577	107,140
600.0	75	895	21,748	5,488	35,562	20,226	2,951	4,467	37,965	94,623	100,798
560.0	70	839	20,416	5,289	33,211	18,824	2,843	3,810	35,577	88,727	94,516
480.0	60	727	17,799	4,777	28,775	16,093	2,627	2,616	30,839	77,139	82,173
400.0	50	616	15,298	4,379	24,624	13,592	2,383	1,649	26,131	66,145	70,461
320.0	40	507	12,939	4,263	20,611	11,142	2,147	882	21,483	55,716	59,351
240.0	30	397	10,565	4,150	16,584	8,631	1,915	282	16,815	45,215	48,165
200.0	25	341	9,305	3,958	14,491	7,292	1,755	41	14,457	39,651	42,238
160.0	20	285	8,029	3,755	12,414	5,926	1,588	-169	12,070	34,053	36,275
80.0	10	170	5,475	3,414	8,440	3,371	1,236	-510	7,190	23,022	24,525

PERFORMANCE DATA[DM0636]

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	1,180	895	616	341	170
TOTAL NOX (AS NO2)		G/HR	8,493	6,471	4,317	2,062	1,175
TOTAL CO		G/HR	1,881	1,073	711	763	819
TOTAL HC		G/HR	310	166	136	164	379
PART MATTER		G/HR	315.1	187.0	171.6	134.7	84.1
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	3,379.8	3,452.5	3,260.9	2,620.9	2,471.3
TOTAL CO	(CORR 5% O2)	MG/NM3	748.4	572.0	535.0	978.3	2,404.9
TOTAL HC	(CORR 5% O2)	MG/NM3	111.9	80.1	95.3	197.9	1,317.8
PART MATTER	(CORR 5% O2)	MG/NM3	103.5	82.1	109.0	145.9	134.3
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	1,558	1,577	1,487	1,174	1,164
TOTAL CO	(CORR 5% O2)	PPM	593	453	436	776	1,427
TOTAL HC	(CORR 5% O2)	PPM	197	142	166	340	1,355
TOTAL NOX (AS NO2)		G/HP-HR	7.20	7.23	7.01	6.05	6.93
TOTAL CO		G/HP-HR	1.59	1.20	1.15	2.24	4.83
TOTAL HC		G/HP-HR	0.26	0.19	0.22	0.48	2.23
PART MATTER		G/HP-HR	0.27	0.21	0.28	0.40	0.50
TOTAL NOX (AS NO2)		LB/HR	18.72	14.27	9.52	4.55	2.59
TOTAL CO		LB/HR	4.15	2.37	1.57	1.68	1.81
TOTAL HC		LB/HR	0.68	0.37	0.30	0.36	0.83
PART MATTER		LB/HR	0.69	0.41	0.38	0.30	0.19

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	1,180	895	616	341	170
TOTAL NOX (AS NO2)		G/HR	7,019	5,348	3,568	1,704	971
TOTAL CO		G/HR	1,006	574	380	408	438
TOTAL HC		G/HR	164	88	72	87	200
TOTAL CO2		KG/HR	591	437	306	182	105
PART MATTER		G/HR	161.6	95.9	88.0	69.1	43.1
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	2,793.2	2,853.3	2,695.0	2,166.0	2,042.4
TOTAL CO	(CORR 5% O2)	MG/NM3	400.2	305.9	286.1	523.2	1,286.0
TOTAL HC	(CORR 5% O2)	MG/NM3	59.2	42.4	50.4	104.7	697.2
PART MATTER	(CORR 5% O2)	MG/NM3	53.1	42.1	55.9	74.8	68.9
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	1,288	1,303	1,229	970	962
TOTAL CO	(CORR 5% O2)	PPM	317	242	233	415	763
TOTAL HC	(CORR 5% O2)	PPM	104	75	88	180	717
TOTAL NOX (AS NO2)		G/HP-HR	5.95	5.97	5.79	5.00	5.73
TOTAL CO		G/HP-HR	0.85	0.64	0.62	1.20	2.58
TOTAL HC		G/HP-HR	0.14	0.10	0.12	0.26	1.18
PART MATTER		G/HP-HR	0.14	0.11	0.14	0.20	0.25
TOTAL NOX (AS NO2)		LB/HR	15.47	11.79	7.87	3.76	2.14
TOTAL CO		LB/HR	2.22	1.27	0.84	0.90	0.97
TOTAL HC		LB/HR	0.36	0.19	0.16	0.19	0.44
TOTAL CO2		LB/HR	1,302	963	674	401	231
PART MATTER		LB/HR	0.36	0.21	0.19	0.15	0.10
OXYGEN IN EXH		%	9.7	9.9	10.5	12.1	14.5

Regulatory Information

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

Altitude Derate Data

ALTITUDE CORRECTED POWER CAPABILITY (BHP)

AMBIENT OPERATING TEMP (F)	30	40	50	60	70	80	90	100	110	120	130	NORMAL
ALTITUDE (FT)												
0	1,180	1,180	1,180	1,180	1,180	1,180	1,180	1,180	1,180	1,180	1,180	1,180
1,000	1,180	1,180	1,180	1,180	1,180	1,180	1,180	1,180	1,180	1,180	1,180	1,180
2,000	1,180	1,180	1,180	1,180	1,180	1,180	1,180	1,180	1,180	1,180	1,156	1,180
3,000	1,180	1,180	1,180	1,180	1,180	1,180	1,180	1,180	1,180	1,180	1,086	1,180
4,000	1,180	1,180	1,180	1,180	1,180	1,180	1,180	1,180	1,169	1,149	1,003	1,180
5,000	1,180	1,180	1,180	1,180	1,180	1,180	1,167	1,146	1,126	1,107	920	1,180
6,000	1,180	1,180	1,180	1,180	1,166	1,145	1,124	1,104	1,084	1,066	838	1,177
7,000	1,180	1,180	1,167	1,145	1,123	1,102	1,082	1,063	1,044	1,026	755	1,141
8,000	1,169	1,146	1,123	1,102	1,081	1,061	1,042	1,023	1,005	988	684	1,105
9,000	1,125	1,103	1,081	1,060	1,040	1,021	1,002	985	967	951	614	1,071
10,000	1,083	1,061	1,040	1,020	1,001	982	964	947	931	914	555	1,038
11,000	1,041	1,020	1,000	981	963	945	928	911	895	880	507	1,005
12,000	1,001	981	962	943	925	908	892	876	860	846	460	973
13,000	962	943	924	907	890	873	857	842	827	813	425	942
14,000	925	906	888	871	855	839	824	809	795	781	389	912
15,000	888	870	853	837	821	806	791	777	763	750	354	882

Cross Reference

Engine Arrangement			
Arrangement Number	**Effective Serial Number**	**Engineering Model**	**Engineering Model Version**
1483596	1EZ00001	GS014	-
1668587	1EZ00001	GS014	-

Test Specification Data						
Test Spec	**Setting**	**Effective Serial Number**	**Engine Arrangement**	**Governor Type**	**Default Low Idle Speed**	**Default High Idle Speed**
2T9787	PP4110	1EZ00001	1483596	ELEC		
2T9787	PP4110	1EZ00001	1668587	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

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