PERFORMANCE DATA [516DRU7]

DECEMBER 03, 2020

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Perf No: EM1896 **Change Level:** 02

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

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SALES MODEL:	3516C	**COMBUSTION:**	DIRECT INJECTION
BRAND:	CAT	**ENGINE SPEED (RPM):**	1,800
ENGINE POWER (BHP):	2,937	**HERTZ:**	60
GEN POWER WITH FAN (EKW):	2,000.0	**FAN POWER (HP):**	114.0
COMPRESSION RATIO:	14.7	**ASPIRATION:**	TA
RATING LEVEL:	STANDBY	**AFTERCOOLER TYPE:**	ATAAC
PUMP QUANTITY:	1	**AFTERCOOLER CIRCUIT TYPE:**	JW+OC, ATAAC
FUEL TYPE:	DIESEL	**INLET MANIFOLD AIR TEMP (F):**	122
MANIFOLD TYPE:	DRY	**JACKET WATER TEMP (F):**	219.2
GOVERNOR TYPE:	ADEM3	**TURBO CONFIGURATION:**	PARALLEL
ELECTRONICS TYPE:	ADEM3	**TURBO QUANTITY:**	4
CAMSHAFT TYPE:	STANDARD	**TURBOCHARGER MODEL:**	GTA5518BN-56T-1.12
IGNITION TYPE:	CI	**CERTIFICATION YEAR:**	2006
INJECTOR TYPE:	EUI	**CRANKCASE BLOWBY RATE (FT3/HR):**	2,937.9
FUEL INJECTOR:	3920220	**FUEL RATE (RATED RPM) NO LOAD (GAL/HR):**	13.6
UNIT INJECTOR TIMING (IN):	64.34	**PISTON SPD @ RATED ENG SPD (FT/MIN):**	2,244.1
REF EXH STACK DIAMETER (IN):	12		
MAX OPERATING ALTITUDE (FT):	3,117		

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

General Performance Data Top

Note(s)

THIS STANDBY RATING IS FOR A STANDBY ONLY ENGINE ARRANGEMENT. RERATING THE ENGINE TO A PRIME OR CONTINUOUS RATING IS NOT PERMITTED.

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
2,000.0	100	2,937	307	0.329	136.2	78.3	121.2	1,118.5	71.5	752.1
1,800.0	90	2,641	276	0.331	123.3	73.1	119.6	1,067.5	65.7	716.0
1,600.0	80	2,353	246	0.337	111.6	68.0	118.2	1,027.0	60.0	693.3
1,500.0	75	2,212	231	0.340	106.1	65.2	117.5	1,008.1	57.2	684.6
1,400.0	70	2,071	216	0.344	100.5	62.3	116.8	989.4	54.4	676.9
1,200.0	60	1,795	188	0.352	88.9	55.5	115.4	952.0	48.0	662.8
1,000.0	50	1,521	159	0.357	76.5	46.5	113.7	913.4	40.1	654.0
800.0	40	1,250	131	0.357	62.9	34.8	111.8	863.8	30.3	655.0
600.0	30	977	102	0.365	50.2	24.2	110.6	803.8	22.0	650.0
500.0	25	839	88	0.374	44.2	19.7	110.2	767.0	18.7	641.7
400.0	20	699	73	0.388	38.3	15.7	109.8	724.6	15.7	629.0
200.0	10	411	43	0.450	26.1	9.0	109.1	596.9	10.9	552.8

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
2,000.0	100	2,937	83	454.3	6,548.9	15,292.8	28,512.8	29,478.4	6,205.0	5,738.7
1,800.0	90	2,641	77	428.8	6,318.7	14,243.0	27,390.5	28,264.7	5,956.5	5,533.7
1,600.0	80	2,353	72	404.5	6,073.3	13,331.0	26,220.6	27,012.9	5,685.0	5,301.6
1,500.0	75	2,212	69	392.7	5,932.2	12,897.9	25,568.0	26,319.7	5,542.0	5,176.6
1,400.0	70	2,071	66	380.9	5,777.2	12,448.0	24,862.1	25,573.8	5,384.8	5,037.5
1,200.0	60	1,795	59	353.9	5,397.2	11,422.5	23,141.0	23,771.1	5,003.4	4,694.0
1,000.0	50	1,521	50	318.8	4,857.3	10,138.7	20,731.5	21,274.5	4,476.2	4,208.4
800.0	40	1,250	38	271.1	4,090.0	8,488.8	17,357.1	17,803.6	3,744.5	3,524.2
600.0	30	977	27	225.0	3,394.1	6,989.6	14,328.5	14,684.4	3,097.0	2,920.6
500.0	25	839	22	204.1	3,103.5	6,328.1	13,075.2	13,388.4	2,825.1	2,668.8
400.0	20	699	18	184.1	2,840.4	5,696.0	11,947.2	12,218.4	2,572.5	2,435.7
200.0	10	411	11	148.5	2,409.4	4,478.2	10,105.7	10,290.7	2,174.6	2,076.8

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
2,000.0	100	2,937	43,150	7,564	101,696	49,615	15,778	38,240	124,558	296,234	315,563
1,800.0	90	2,641	40,179	7,175	92,069	43,106	14,280	34,105	111,977	268,102	285,596
1,600.0	80	2,353	37,427	6,907	84,225	38,510	12,931	30,201	99,774	242,774	258,615
1,500.0	75	2,212	36,092	6,791	80,632	36,523	12,286	28,303	93,784	230,664	245,715
1,400.0	70	2,071	34,737	6,671	77,064	34,629	11,640	26,432	87,835	218,548	232,809
1,200.0	60	1,795	31,877	6,341	69,432	30,722	10,302	22,179	76,103	193,426	206,048
1,000.0	50	1,521	28,631	6,026	60,835	26,675	8,865	17,129	64,508	166,434	177,294
800.0	40	1,250	24,910	5,810	50,784	22,387	7,288	11,280	53,005	136,837	145,766
600.0	30	977	21,252	5,496	41,420	18,139	5,820	6,677	41,431	109,268	116,397
500.0	25	839	19,405	5,303	37,082	16,055	5,124	4,986	35,574	96,210	102,488
400.0	20	699	17,492	5,098	32,738	13,986	4,431	3,593	29,634	83,193	88,622
200.0	10	411	13,286	4,670	23,481	8,473	3,022	1,516	17,448	56,745	60,447

Sound Data Top

Note(s)

SOUND PRESSURE DATA FOR THIS RATING CAN BE FOUND IN PERFORMANCE NUMBER - DM8779.

Emissions Data Top

Units Filter All Units

RATED SPEED POTENTIAL SITE VARIATION: 1800 RPM

GENSET POWER WITH FAN ENGINE POWER		EKW BHP	2,000.0 2,937	1,500.0 2,212	1,000.0 1,521	500.0 839	200.0 411
PERCENT LOAD		**%**	**100**	**75**	**50**	**25**	**10**
TOTAL NOX (AS NO2)		G/HR	19,256	10,318	5,811	4,222	2,933
TOTAL CO		G/HR	1,581	854	894	1,773	1,794
TOTAL HC		G/HR	422	514	512	410	442
PART MATTER		G/HR	105.4	99.5	122.5	256.7	203.2
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	3,305.2	2,333.8	1,849.4	2,378.8	2,855.1
TOTAL CO	(CORR 5% O2)	MG/NM3	258.0	181.8	272.6	895.6	1,714.4
TOTAL HC	(CORR 5% O2)	MG/NM3	59.5	93.5	131.7	194.1	379.0
PART MATTER	(CORR 5% O2)	MG/NM3	14.6	18.4	34.4	119.9	161.2
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	1,610	1,137	901	1,159	1,391
TOTAL CO	(CORR 5% O2)	PPM	206	145	218	716	1,371
TOTAL HC	(CORR 5% O2)	PPM	111	175	246	362	708
TOTAL NOX (AS NO2)		G/HP-HR	6.56	4.67	3.82	5.03	7.13
TOTAL CO		G/HP-HR	0.54	0.39	0.59	2.11	4.36
TOTAL HC		G/HP-HR	0.14	0.23	0.34	0.49	1.08
PART MATTER		G/HP-HR	0.04	0.04	0.08	0.31	0.49
TOTAL NOX (AS NO2)		LB/HR	42.45	22.75	12.81	9.31	6.47
TOTAL CO		LB/HR	3.48	1.88	1.97	3.91	3.95
TOTAL HC		LB/HR	0.93	1.13	1.13	0.90	0.98
PART MATTER		LB/HR	0.23	0.22	0.27	0.57	0.45

RATED SPEED NOMINAL DATA: 1800 RPM

GENSET POWER WITH FAN ENGINE POWER		EKW BHP	2,000.0 2,937	1,500.0 2,212	1,000.0 1,521	500.0 839	200.0 411
PERCENT LOAD		**%**	**100**	**75**	**50**	**25**	**10**
TOTAL NOX (AS NO2)		G/HR	16,047	8,598	4,842	3,518	2,444
TOTAL CO		G/HR	878	474	497	985	996
TOTAL HC		G/HR	317	386	385	308	333
TOTAL CO2		KG/HR	1,393	1,073	765	430	250
PART MATTER		G/HR	75.3	71.0	87.5	183.4	145.2
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	2,754.3	1,944.8	1,541.2	1,982.3	2,379.2
TOTAL CO	(CORR 5% O2)	MG/NM3	143.3	101.0	151.4	497.5	952.4
TOTAL HC	(CORR 5% O2)	MG/NM3	44.7	70.3	99.0	145.9	285.0
PART MATTER	(CORR 5% O2)	MG/NM3	10.4	13.1	24.6	85.6	115.2
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	1,342	947	751	966	1,159
TOTAL CO	(CORR 5% O2)	PPM	115	81	121	398	762
TOTAL HC	(CORR 5% O2)	PPM	83	131	185	272	532
TOTAL NOX (AS NO2)		G/HP-HR	5.46	3.89	3.18	4.19	5.94
TOTAL CO		G/HP-HR	0.30	0.21	0.33	1.17	2.42
TOTAL HC		G/HP-HR	0.11	0.17	0.25	0.37	0.81
PART MATTER		G/HP-HR	0.03	0.03	0.06	0.22	0.35
TOTAL NOX (AS NO2)		LB/HR	35.38	18.96	10.68	7.76	5.39
TOTAL CO		LB/HR	1.94	1.05	1.09	2.17	2.20
TOTAL HC		LB/HR	0.70	0.85	0.85	0.68	0.73
TOTAL CO2		LB/HR	3,070	2,365	1,687	949	552
PART MATTER		LB/HR	0.17	0.16	0.19	0.40	0.32
OXYGEN IN EXH		%	10.8	12.3	13.3	14.2	15.8
DRY SMOKE OPACITY		%	0.0	0.0	1.0	3.9	3.2
BOSCH SMOKE NUMBER			0.15	0.21	0.42	1.25	1.12

Regulatory Information Top

EPA EMERGENCY STATIONARY	**2011 - ----**

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: 6.4 PM: 0.20

Altitude Derate Data Top

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	2,937	2,937	2,937	2,937	2,937	2,937	2,937	2,937	2,937	2,937	2,849	2,731	2,937
1,000	2,937	2,937	2,937	2,937	2,937	2,937	2,937	2,937	2,937	2,931	2,820	2,702	2,937
2,000	2,937	2,937	2,937	2,937	2,937	2,937	2,937	2,927	2,876	2,826	2,761	2,614	2,937
3,000	2,937	2,937	2,937	2,937	2,937	2,926	2,873	2,822	2,772	2,724	2,673	2,526	2,937
4,000	2,849	2,849	2,849	2,849	2,849	2,820	2,768	2,719	2,671	2,625	2,581	2,438	2,849
5,000	2,752	2,752	2,752	2,752	2,752	2,716	2,667	2,619	2,573	2,529	2,486	2,350	2,752
6,000	2,659	2,659	2,659	2,659	2,659	2,616	2,569	2,523	2,478	2,436	2,379	2,261	2,659
7,000	2,570	2,570	2,570	2,570	2,567	2,519	2,473	2,429	2,386	2,345	2,261	2,144	2,570
8,000	2,484	2,484	2,484	2,484	2,471	2,425	2,381	2,338	2,297	2,257	2,144	2,027	2,484
9,000	2,401	2,401	2,401	2,401	2,377	2,333	2,291	2,250	2,211	2,144	2,027	1,909	2,401
10,000	2,321	2,321	2,321	2,321	2,287	2,245	2,204	2,165	2,127	2,027	1,909	1,792	2,321
11,000	2,244	2,244	2,244	2,242	2,200	2,159	2,120	2,082	2,027	1,909	1,792	1,703	2,244
12,000	2,171	2,171	2,171	2,156	2,115	2,076	2,038	1,997	1,880	1,792	1,674	1,586	2,171
13,000	2,100	2,100	2,100	2,072	2,033	1,995	1,959	1,850	1,762	1,674	1,586	1,498	2,100
14,000	2,027	2,027	2,027	1,991	1,954	1,917	1,821	1,733	1,645	1,557	1,439	1,351	2,027
15,000	1,938	1,938	1,938	1,913	1,877	1,792	1,703	1,615	1,498	1,410	1,292	1,204	1,938

Cross Reference Top

Test Spec	Setting	Engine Arrangement	Engineering Model	Engineering Model Version	Start Effective Serial Number	End Effective Serial Number
4577177	LL1859	5084279	GS334	-	SBJ02000	
4581557	LL6752	5157719	PG237	-	LY500001	

Supplementary Data Top

Type	Classification	Performance Number
SOUND	SOUND PRESSURE	DM8779

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