PERFORMANCE DATA[EM0025]

May 10, 2013

Performance Number: EM0025 **Change Level: 03**

SALES MODEL:	C27	**COMBUSTION:**	DI
ENGINE POWER (BHP):	950	**ENGINE SPEED (RPM):**	1,800
PEAK TORQUE (FT-LB):	3,206.2	**PEAK TORQUE SPEED (RPM):**	1,400
COMPRESSION RATIO:	16.5	**TORQUE RISE (%):**	16
APPLICATION:	INDUSTRIAL	**ASPIRATION:**	TA
RATING LEVEL:	INDUSTRIAL C - INTERMITTENT	**AFTERCOOLER TYPE:**	ATAAC
SUB APPLICATION:	GENERAL INDUSTRIAL	**AFTERCOOLER CIRCUIT TYPE:**	JW+OC, ATAAC
PUMP QUANTITY:	1	**INLET MANIFOLD AIR TEMP (F):**	120
FUEL TYPE:	DIESEL	**JACKET WATER TEMP (F):**	210.2
MANIFOLD TYPE:	DRY	**TURBO CONFIGURATION:**	PARALLEL
GOVERNOR TYPE:	ADEM4	**TURBO QUANTITY:**	2
ELECTRONICS TYPE:	ADEM4	**TURBOCHARGER MODEL:**	GTB4708BL-1.42
IGNITION TYPE:	CI	**CERTIFICATION YEAR:**	2008
INJECTOR TYPE:	EUI	**PISTON SPD @ RATED ENG SPD (FT/MIN):**	1,800.0
REF EXH STACK DIAMETER (IN):	10		
MAX OPERATING ALTITUDE (FT):	4,806		

General Performance Data

ENGINE SPEED	ENGINE POWER	ENGINE TORQUE	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
RPM	BHP	LB-FT	PSI	LB/BHP-HR	GAL/HR	IN-HG	DEG F	DEG F	IN-HG	DEG F
1,800	950	2,772	253	0.351	47.6	50.4	112.1	1,175.8	20.8	914.1
1,700	935	2,889	264	0.347	46.3	48.4	107.8	1,197.8	18.7	940.6
1,600	915	3,003	275	0.343	44.9	45.7	103.4	1,227.1	16.5	973.1
1,500	888	3,109	284	0.341	43.2	41.9	98.9	1,266.4	14.2	1,016.2
1,400	853	3,202	293	0.338	41.2	35.7	94.6	1,316.4	11.4	1,086.2
1,300	787	3,180	291	0.339	38.1	27.7	90.1	1,370.9	8.2	1,172.8

ENGINE SPEED	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)
RPM	BHP	IN-HG	DEG F	CFM	CFM	LB/HR	LB/HR	FT3/MIN	FT3/MIN
1,800	950	54	332.4	1,987.4	5,379.7	8,813.0	9,146.7	1,925.4	1,755.3
1,700	935	51	323.3	1,858.3	5,103.0	8,162.9	8,487.1	1,791.8	1,627.9
1,600	915	48	312.2	1,722.9	4,793.1	7,498.5	7,812.7	1,644.8	1,487.5
1,500	888	44	297.4	1,559.5	4,425.0	6,727.4	7,030.0	1,474.1	1,324.5
1,400	853	37	277.6	1,339.7	3,978.0	5,725.0	6,013.4	1,265.3	1,124.6
1,300	787	29	253.1	1,083.3	3,471.6	4,569.3	4,836.5	1,045.6	918.4

Heat Rejection Data

ENGINE SPEED	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
RPM	BHP	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN
1,800	950	16,497	5,122	39,227	21,926	5,445	7,775	40,286	102,236	108,907
1,700	935	16,153	5,275	37,749	21,379	5,293	7,043	39,649	99,384	105,868
1,600	915	16,034	5,234	36,273	20,859	5,131	6,270	38,802	96,327	102,613
1,500	888	16,098	5,215	34,496	20,191	4,941	5,349	37,659	92,763	98,816
1,400	853	16,186	5,432	32,153	19,276	4,708	4,196	36,191	88,391	94,159
1,300	787	15,716	6,468	28,667	17,554	4,361	2,984	33,376	81,869	87,211

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Emissions Data

RATED SPEED POTENTIAL SITE VARIATION: 1800 RPM

ENGINE POWER		BHP	950	713	475	238	95.0
PERCENT LOAD		%	100	75	50	25	10
TOTAL NOX (AS NO2)		G/HR	4,527	3,430	2,554	1,325	692
TOTAL CO		G/HR	686	598	549	556	612
TOTAL HC		G/HR	59	66	79	89	120
PART MATTER		G/HR	49.0	69.8	99.4	87.3	67.4
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	2,225.7	2,278.5	2,481.8	2,274.8	2,134.0
TOTAL CO	(CORR 5% O2)	MG/NM3	341.8	396.4	538.5	962.7	1,896.5
TOTAL HC	(CORR 5% O2)	MG/NM3	24.8	38.1	67.5	133.8	320.6
PART MATTER	(CORR 5% O2)	MG/NM3	19.8	39.1	83.1	133.1	190.7
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	1,084	1,110	1,209	1,108	1,039
TOTAL CO	(CORR 5% O2)	PPM	273	317	431	770	1,517
TOTAL HC	(CORR 5% O2)	PPM	46	71	126	250	599
TOTAL NOX (AS NO2)		G/HP-HR	4.81	4.84	5.40	5.59	7.30
TOTAL CO		G/HP-HR	0.73	0.84	1.16	2.35	6.46
TOTAL HC		G/HP-HR	0.06	0.09	0.17	0.38	1.26
PART MATTER		G/HP-HR	0.05	0.10	0.21	0.37	0.71
TOTAL NOX (AS NO2)		LB/HR	9.98	7.56	5.63	2.92	1.52
TOTAL CO		LB/HR	1.51	1.32	1.21	1.23	1.35
TOTAL HC		LB/HR	0.13	0.15	0.18	0.20	0.26
PART MATTER		LB/HR	0.11	0.15	0.22	0.19	0.15

RATED SPEED NOMINAL DATA: 1800 RPM

ENGINE POWER		BHP	950	713	475	238	95.0
PERCENT LOAD		%	100	75	50	25	10
TOTAL NOX (AS NO2)		G/HR	3,741	2,834	2,111	1,095	572
TOTAL CO		G/HR	367	320	294	297	327
TOTAL HC		G/HR	31	35	42	47	63
TOTAL CO2		KG/HR	476	353	238	134	75
PART MATTER		G/HR	25.1	35.8	51.0	44.8	34.6
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	1,839.4	1,883.1	2,051.1	1,880.0	1,763.7
TOTAL CO	(CORR 5% O2)	MG/NM3	182.8	212.0	288.0	514.8	1,014.2
TOTAL HC	(CORR 5% O2)	MG/NM3	13.1	20.1	35.7	70.8	169.6
PART MATTER	(CORR 5% O2)	MG/NM3	10.1	20.0	42.6	68.3	97.8
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	896	917	999	916	859
TOTAL CO	(CORR 5% O2)	PPM	146	170	230	412	811
TOTAL HC	(CORR 5% O2)	PPM	24	38	67	132	317
TOTAL NOX (AS NO2)		G/HP-HR	3.98	4.00	4.46	4.62	6.03
TOTAL CO		G/HP-HR	0.39	0.45	0.62	1.26	3.45
TOTAL HC		G/HP-HR	0.03	0.05	0.09	0.20	0.67
PART MATTER		G/HP-HR	0.03	0.05	0.11	0.19	0.36
TOTAL NOX (AS NO2)		LB/HR	8.25	6.25	4.65	2.41	1.26
TOTAL CO		LB/HR	0.81	0.71	0.65	0.66	0.72
TOTAL HC		LB/HR	0.07	0.08	0.09	0.10	0.14
TOTAL CO2		LB/HR	1,048	777	526	296	166
PART MATTER		LB/HR	0.06	0.08	0.11	0.10	0.08
OXYGEN IN EXH		%	9.9	10.8	11.9	14.5	17.0
DRY SMOKE OPACITY		%	1.0	2.1	3.4	3.8	3.2
BOSCH SMOKE NUMBER			0.37	0.73	1.24	1.40	1.20

Regulatory Information

EPA TIER 2		2006 - 2010		
GASEOUS EMISSIONS DATA MEASUREMENTS ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 89 SUBPART D AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. GASEOUS EMISSIONS VALUES 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 2	CO: 3.5 NOx + HC: 6.4 PM: 0.20

EU STAGE IIIA		2009 - 2011		
GASEOUS EMISSION DATA MEASUREMENTS ARE CONSISTENT WITH THOSE DESCRIBED IN EU 97/68/EC, ECE REGULATION NO. 96 AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. GASEOUS EMISSION VALUES ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE NON-ROAD REGULATIONS.				
Locality	**Agency**	**Regulation**	**Tier/Stage**	**Max Limits - G/BKW - HR**
EUROPE	EU	LOCOMOTIVE	STAGE IIIA	CO: 3.5 NOx: 6.0 HC: 0.5 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	950	950	950	950	901	788	788	748	690	950
1,000	950	950	950	950	870	765	747	707	658	950
2,000	950	950	950	950	840	742	706	667	626	950
3,000	950	950	950	945	816	723	668	629	596	950
4,000	950	950	950	930	807	712	636	595	569	950
5,000	950	950	950	916	798	701	603	561	543	950
6,000	919	902	837	771	561	475	475	475	475	919
7,000	908	888	829	769	563	475	475	475	475	908
8,000	893	870	816	762	563	475	475	475	475	893
9,000	865	838	789	740	557	475	475	475	475	865
10,000	837	807	763	719	552	475	475	475	475	837
11,000	813	779	741	702	545	479	476	475	475	813
12,000	790	753	720	687	537	485	477	475	475	790
13,000	767	727	700	673	529	491	479	475	475	767
14,000	744	701	679	658	521	496	480	475	475	744
15,000	721	675	659	643	514	502	481	475	475	721

Cross Reference

Engine Arrangement			
Arrangement Number	**Effective Serial Number**	**Engineering Model**	**Engineering Model Version**
3220314	TWM00001	E819	-
3505507	TWM00001	E819	-

Test Specification Data						
Test Spec	**Setting**	**Effective Serial Number**	**Engine Arrangement**	**Governor Type**	**Default Low Idle Speed**	**Default High Idle Speed**
0K9430	PP6784	TWM00001	3220314	ADEM4		
0K9430	PP6784	TWM00001	3505507	ADEM4		

Performance Parameter Reference

Parameters Reference:DM9600-05

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%
Heat rejection	+/- 5%
Heat rejection exhaust only	+/- 10%

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 reference atmospheric pressure is 100 KPA (29.61 in hg) and standard temperature is 25 (77) at 60% relative humidity.

FOR 3600 ENGINES
Engine rating obtained and presented in accordance with ISO 3046/1 and SAE J1995 JAN90 standard reference conditions of 25, 100 KPA 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.

PERFORMANCE DATA[EM0025]

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.

ALTITUDE CAPABILITY
Altitude capability is the maximum altitude above sea level at standar d 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.

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 (http://tsd.cat.com/etsd/index.cfm?tech_id=2635ICAL) 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

PERFORMANCE DATA[EM0025]

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 : 11/23/11