

Performance Number: DM9030

Change Level: 01

SALES MODEL:	C32	COMBUSTION:	DIRECT INJECTION
BRAND:	CAT	ENGINE SPEED (RPM):	2,100
MACHINE SALES MODEL:		PEAK TORQUE SPEED (RPM):	1,400
ENGINE POWER (BKW):	708.5	ASPIRATION:	TA
PEAK TORQUE (NM):	4,338.0	AFTERCOOLER TYPE:	ATAAC
COMPRESSION RATIO:	16.5	AFTERCOOLER CIRCUIT TYPE:	JW+OC, AC
RATING LEVEL:	B-RATING	INLET MANIFOLD AIR TEMP (C):	49
PUMP QUANTITY:	1	JACKET WATER TEMP (C):	99
FUEL TYPE:	DIESEL	TURBO CONFIGURATION:	PARALLEL
MANIFOLD TYPE:	DRY	TURBO QUANTITY:	2
ELECTRONICS TYPE:	ADEM4	TURBOCHARGER MODEL:	GTA5008BL-56T-1.41
IGNITION TYPE:	CI	CERTIFICATION YEAR:	2006
INJECTOR TYPE:	EUI	PISTON SPD @ RATED ENG SPD (M/SEC):	11.3
REF EXH STACK DIAMETER (MM):	203		
MAX OPERATING ALTITUDE (M):	3,048		

INDUSTRY	SUBINDUSTRY	APPLICATION
INDUSTRIAL	GENERAL INDUSTRIAL	INDUSTRIAL
INDUSTRIAL	CONSTRUCTION	INDUSTRIAL
INDUSTRIAL	MATERIAL HANDLING	INDUSTRIAL
OIL AND GAS	LAND DRILLING	INDUSTRIAL
INDUSTRIAL	AGRICULTURE	INDUSTRIAL
INDUSTRIAL	MINING	INDUSTRIAL
OIL AND GAS	WELL SERVICING	INDUSTRIAL
OIL AND GAS	LAND PRODUCTION	INDUSTRIAL
INDUSTRIAL	FORESTRY	INDUSTRIAL

General Performance Data

ENGINE SPEED	ENGINE POWER	ENGINE TORQUE	BRAKE MEAN EFF PRES (BMEP)	BRAKE SPEC FUEL CONSUMPTN (BSFC)	ISO BRAKE SPEC FUEL CONSUMPTN (BSFC)	VOL FUEL CONSUMPTN (VFC)	ISO VOL FUEL CONSUMPTN (VFC)
RPM	BKW	NM	KPA	G/BKW-HR	G/BKW-HR	L/HR	L/HR
2,100	708	3,222	1,261	214.8	210.7	179.0	175.6
2,000	708	3,383	1,324	212.0	208.0	176.7	173.4
1,900	708	3,561	1,394	208.8	204.8	174.0	170.7
1,800	708	3,759	1,471	205.0	201.1	170.9	167.6
1,700	701	3,938	1,542	202.7	198.8	167.1	164.0
1,600	686	4,094	1,603	201.0	197.2	162.2	159.1
1,500	665	4,234	1,657	199.6	195.8	156.1	153.2
1,400	636	4,338	1,698	198.9	195.1	148.8	146.0
1,300	583	4,282	1,676	199.5	195.7	136.8	134.2
1,200	509	4,049	1,585	201.5	197.7	120.6	118.3
1,100	456	3,958	1,549	205.4	201.5	110.2	108.1

ENGINE SPEED	ENGINE POWER	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	ENGINE OUTLET TEMP	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP
RPM	BKW	KPA	DEG C	DEG C	KPA	DEG C	KPA	DEG C
2,100	708	125.8	49.0	593.3	137.3	466.5	145	145.3
2,000	708	127.1	47.4	560.7	128.9	451.9	140	139.3
1,900	708	127.1	47.3	578.0	121.1	463.9	139	138.9
1,800	708	125.4	48.3	623.3	113.9	495.5	139	140.6
1,700	701	121.5	48.0	620.9	103.4	498.4	132	135.5
1,600	686	118.6	46.9	618.5	93.7	502.9	127	131.5
1,500	665	113.7	45.3	630.0	86.6	519.1	120	126.6
1,400	636	105.9	42.2	644.8	77.9	534.2	112	122.1
1,300	583	95.6	38.7	645.5	67.3	537.6	101	115.7
1,200	509	82.0	34.6	635.1	55.0	531.1	86	107.3
1,100	456	72.7	27.1	638.0	44.2	526.1	78	103.9

General Performance Data (Continued)

ENGINE SPEED	ENGINE POWER	WET INLET AIR VOL FLOW RATE	ENGINE OUTLET WET EXH GAS VOL FLOW	WET INLET AIR MASS FLOW RATE	WET EXH GAS MASS FLOW RATE	ENGINE OUTLET WET EXH VOL FLOW RATE	ENGINE OUTLET DRY EXH VOL FLOW RATE
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**PERFORMANCE DATA[DM9030]**

January 18, 2024

		RATE				(0 DEG C AND 101 KPA)	(0 DEG C AND 101 KPA)
RPM	BKW	M3/MIN	M3/MIN	KG/HR	KG/HR	M3/MIN	M3/MIN
2,100	708	65.9	168.0	4,572.0	4,727.6	62.0	57.1
2,000	708	63.8	160.2	4,423.2	4,574.2	60.4	55.5
1,900	708	60.9	154.9	4,219.3	4,367.8	57.4	52.7
1,800	708	56.9	151.1	3,944.1	4,093.5	53.7	49.0
1,700	701	53.0	141.6	3,660.8	3,804.7	50.1	45.6
1,600	686	49.9	133.3	3,428.3	3,567.1	46.9	42.6
1,500	665	46.4	125.9	3,173.5	3,307.7	43.4	39.3
1,400	636	42.2	116.3	2,867.0	2,995.3	39.4	35.5
1,300	583	37.8	104.4	2,556.5	2,674.2	35.2	31.6
1,200	509	33.0	90.3	2,227.5	2,330.5	30.7	27.6
1,100	456	28.9	78.5	1,948.9	2,041.1	26.8	24.1

**Heat Rejection Data**

ENGINE SPEED	ENGINE POWER	REJECTION TO JACKET WATER	REJECTION TO ATMOSPHERE	REJECTION TO EXH	EXH RECOVERY TO 177C	FROM OIL COOLER	FROM AFTERCOOLER	WORK ENERGY	LOW HEAT VALUE ENERGY	HIGH HEAT VALUE ENERGY
RPM	BKW	KW	KW	KW	KW	KW	KW	KW	KW	KW
2,100	708	284	167	662	404	96.3	121	708	1,809	1,927
2,000	708	275	161	630	370	94.2	114	708	1,769	1,884
1,900	708	275	155	630	370	93.9	109	708	1,762	1,877
1,800	708	283	150	648	387	94.5	102	708	1,775	1,891
1,700	701	276	148	615	364	91.3	89.8	701	1,715	1,827
1,600	686	267	146	578	347	87.8	81.6	686	1,649	1,757
1,500	665	264	144	552	339	85.0	74.4	665	1,596	1,700
1,400	636	259	141	521	321	81.1	65.3	636	1,523	1,623
1,300	583	244	136	468	290	74.4	56.1	583	1,397	1,488
1,200	509	220	128	399	248	65.2	46.7	509	1,224	1,304
1,100	456	203	126	341	214	58.4	41.6	456	1,096	1,168

**Emissions Data**

DIESEL

**RATED SPEED NOMINAL DATA: 2100 RPM**

ENGINE POWER	BKW	708	531	354	177	70.8
PERCENT LOAD	%	100	75	50	25	10
TOTAL NOX (AS NO2)	G/HR	3,973	2,461	1,584	1,276	839
TOTAL CO	G/HR	301	332	350	385	399
TOTAL HC	G/HR	55	63	61	51	75
TOTAL CO2	KG/HR	482	372	258	152	94
PART MATTER	G/HR	37.9	59.2	87.1	68.3	40.3
TOTAL NOX (AS NO2) (CORR 5% O2)	MG/NM3	1,867.6	1,518.8	1,411.3	1,882.7	1,966.1
TOTAL CO (CORR 5% O2)	MG/NM3	139.4	203.2	310.3	568.5	936.1
TOTAL HC (CORR 5% O2)	MG/NM3	22.3	33.5	47.2	65.4	151.4
PART MATTER (CORR 5% O2)	MG/NM3	14.0	31.5	68.2	90.6	87.0
TOTAL NOX (AS NO2) (CORR 5% O2)	PPM	910	740	687	917	958
TOTAL CO (CORR 5% O2)	PPM	112	163	248	455	749
TOTAL HC (CORR 5% O2)	PPM	42	62	88	122	283
TOTAL NOX (AS NO2)	G/HP-HR	4.21	3.48	3.35	5.39	8.86
TOTAL CO	G/HP-HR	0.32	0.47	0.74	1.62	4.21
TOTAL HC	G/HP-HR	0.06	0.09	0.13	0.22	0.79
PART MATTER	G/HP-HR	0.04	0.08	0.18	0.29	0.43
TOTAL NOX (AS NO2)	LB/HR	8.76	5.43	3.49	2.81	1.85
TOTAL CO	LB/HR	0.66	0.73	0.77	0.85	0.88
TOTAL HC	LB/HR	0.12	0.14	0.14	0.11	0.16
TOTAL CO2	LB/HR	1,063	820	569	334	207
PART MATTER	LB/HR	0.08	0.13	0.19	0.15	0.09
OXYGEN IN EXH	%	10.9	12.6	14.3	15.6	17.1
BOSCH SMOKE		0.51	0.94	1.65	1.79	1.28

NUMBER

RATED SPEED POTENTIAL SITE VARIATION: 2100 RPM

ENGINE POWER	BKW	708	531	354	177	70.8
PERCENT LOAD	%	100	75	50	25	10
TOTAL NOX (AS NO2)	G/HR	4,808	2,978	1,917	1,544	1,016
TOTAL CO	G/HR	562	620	655	719	746
TOTAL HC	G/HR	104	119	116	96	141
PART MATTER	G/HR	73.9	115.4	169.9	133.2	78.7
TOTAL NOX (AS NO2) (CORR 5% O2)	MG/NM3	2,259.8	1,837.7	1,707.7	2,278.1	2,378.9
TOTAL CO (CORR 5% O2)	MG/NM3	260.7	380.0	580.2	1,063.1	1,750.5
TOTAL HC (CORR 5% O2)	MG/NM3	42.2	63.3	89.2	123.5	286.2
PART MATTER (CORR 5% O2)	MG/NM3	27.4	61.4	133.1	176.7	169.6
TOTAL NOX (AS NO2) (CORR 5% O2)	PPM	1,101	895	832	1,110	1,159
TOTAL CO (CORR 5% O2)	PPM	209	304	464	850	1,400
TOTAL HC (CORR 5% O2)	PPM	79	118	167	231	534
TOTAL NOX (AS NO2)	G/HP-HR	5.09	4.21	4.06	6.52	10.72
TOTAL CO	G/HP-HR	0.60	0.88	1.39	3.04	7.87
TOTAL HC	G/HP-HR	0.11	0.17	0.25	0.41	1.49
PART MATTER	G/HP-HR	0.08	0.16	0.36	0.56	0.83
TOTAL NOX (AS NO2)	LB/HR	10.60	6.57	4.23	3.40	2.24
TOTAL CO	LB/HR	1.24	1.37	1.44	1.59	1.64
TOTAL HC	LB/HR	0.23	0.26	0.26	0.21	0.31
PART MATTER	LB/HR	0.16	0.25	0.37	0.29	0.17

Regulatory Information

EPA TIER 2	2006 - 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 2	CO: 3.5 NOx + HC: 6.4 PM: 0.20

IMO II	2011 - ---
GASEOUS EMISSIONS DATA MEASUREMENTS ARE CONSISTENT WITH THOSE DESCRIBED IN REGULATION 13 OF REVISED ANNEX VI OF MARPOL 73/78 AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THIS ENGINE CONFORMS TO INTERNATIONAL MARINE ORGANIZATION'S (IMO) MARINE COMPRESSION-IGNITION EMISSION REGULATIONS.	

Altitude Derate Data

STANDARD

ALTITUDE CORRECTED POWER CAPABILITY (BKW)

AMBIENT OPERATING TEMP (C)	0	5	10	15	20	25	30	35	40	45	50	55	60	NORMAL
ALTITUDE (M)														
0	708	708	708	708	708	708	708	708	708	708	708	708	708	708
250	708	708	708	708	708	708	708	708	708	708	708	708	708	708
500	708	708	708	708	708	708	708	708	708	708	708	708	708	708
750	708	708	708	708	708	708	708	708	708	708	708	708	708	708
1,000	708	708	708	708	708	708	708	708	708	708	708	708	708	708
1,250	708	708	708	708	708	708	708	708	708	708	708	708	708	708
1,500	708	708	708	708	708	708	708	708	708	708	708	708	708	708
1,750	708	708	708	708	708	708	708	708	708	708	708	708	708	708
2,000	708	708	708	708	708	708	708	708	708	708	699	688	688	708
2,250	708	708	708	708	708	708	708	708	708	698	688	677	667	708
2,500	708	708	708	708	708	708	708	699	688	677	666	656	646	708
2,750	708	708	708	708	708	700	688	677	666	656	646	636	626	708
3,000	708	708	708	702	690	678	667	656	646	635	626	616	607	708
3,250	708	704	692	680	668	657	646	635	625	615	606	597	588	693

3,500	694	682	670	658	647	636	625	615	606	596	587	578	569	675
3,750	672	660	648	637	626	616	606	596	586	577	568	559	551	657
4,000	651	639	628	617	606	596	586	577	568	559	550	542	531	640
4,250	630	618	607	597	587	577	567	558	549	541	532	524	503	623
4,500	609	598	588	578	568	558	549	540	531	523	515	503	481	607

Cross Reference

Test Spec	Setting	Engine Arrangement	Engineering Model	Engineering Model Version	Start Effective Serial Number	End Effective Serial Number
0K4955	PP5639	2638150	E820	-	TLD00001	
0K4956	PP5640	2638150	E820	-	TLD00001	
NAP	NAP	3505525	E820	-	TLD00001	
NAP	NAP	3505546	E820	-	SMP00001	
NAP	NAP	3531666	E820	-	TLD00001	
4369523	GG0906	4400242	E820	-	TLD00001	
4369524	GG0907	4400242	E820	-	TLD00001	
0K4955	PP5639	4515991	E820	-	TLD00001	
0K4956	PP5640	4515991	E820	-	TLD00001	
4369523	GG0906	4515992	E820	-	TLD00001	
4369524	GG0907	4515993	E820	-	TLD00001	

Supplementary Data

Type	Classification	Performance Number
CHART	BSFC CONTOUR PLOT	EM1284

Performance Parameter Reference

<b>Parameters Reference:DM9600-14</b> PERFORMANCE DEFINITIONS
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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.  
On 3500 and C175 engines, at speeds below Peak Torque 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:

# PERFORMANCE DATA[DM9030]

January 18, 2024

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

# PERFORMANCE DATA[DM9030]

January 18, 2024

limit.

## WET & DRY EXHAUST/EMISSIONS DESCRIPTION:

Wet - Total exhaust flow or concentration of total exhaust flow

Dry - Total exhaust flow minus water vapor or concentration of exhaust flow with water vapor excluded

## 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 : 10/27/21