

Performance Number: EM2777

Change Level: 01

SALES MODEL:	C9.3B	COMBUSTION:	DIRECT INJECTION
BRAND:	CAT	ENGINE SPEED (RPM):	2,200
MACHINE SALES MODEL:		PEAK TORQUE SPEED (RPM):	1,400
ENGINE POWER (BHP):	416	TORQUE RISE (%):	41
PEAK TORQUE (FT-LB):	1,404.3	ASPIRATION:	TA
COMPRESSION RATIO:	17	AFTERCOOLER TYPE:	ATAAC
RATING LEVEL:	C-RATING	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:	GTB4088/0.84 - A/R
IGNITION TYPE:	CI	CERTIFICATION YEAR:	2017
INJECTOR TYPE:	CR	PISTON SPD @ RATED ENG SPD (FT/MIN):	2,150.9
REF EXH STACK DIAMETER (IN):	4		
MAX OPERATING ALTITUDE (FT):	7,080		

INDUSTRY	SubIndustry	APPLICATION
OIL AND GAS	WELL SERVICING	INDUSTRIAL
INDUSTRIAL	MINING	INDUSTRIAL
INDUSTRIAL	FORESTRY	INDUSTRIAL
OIL AND GAS	LAND PRODUCTION	INDUSTRIAL
INDUSTRIAL	MATERIAL HANDLING	INDUSTRIAL
INDUSTRIAL	CONSTRUCTION	INDUSTRIAL
INDUSTRIAL	AGRICULTURE	INDUSTRIAL
INDUSTRIAL	INDUSTRIAL POWER UNIT	INDUSTRIAL
INDUSTRIAL	GENERAL INDUSTRIAL	INDUSTRIAL

General Performance Data

Note(s)
INLET MANIFOLD AIR TEMPERATURE ("INLET MFLD TEMP") FOR THIS CONFIGURATION IS MEASURED AT THE OUTLET OF THE AFTERCOOLER.

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	BHP	LB-FT	PSI	LB/BHP-HR	LB/BHP-HR	GAL/HR	GAL/HR
2,200	416	992	264	0.351	0.348	20.6	20.4
2,100	416	1,040	277	0.346	0.342	20.2	20.1
2,000	416	1,092	291	0.341	0.338	20.0	19.8
1,900	416	1,149	306	0.335	0.332	19.6	19.5
1,800	416	1,213	323	0.331	0.328	19.4	19.2
1,700	408	1,260	335	0.327	0.324	18.8	18.6
1,600	399	1,308	348	0.323	0.320	18.2	18.0
1,500	387	1,354	360	0.319	0.316	17.4	17.2
1,400	374	1,404	374	0.317	0.314	16.7	16.6
1,300	331	1,335	355	0.314	0.311	14.6	14.5
1,200	289	1,266	337	0.313	0.310	12.8	12.6
1,100	251	1,197	319	0.315	0.312	11.1	11.0
1,000	209	1,099	292	0.318	0.315	9.4	9.3
900	171	1,000	266	0.327	0.324	7.9	7.8
800	137	902	240	0.358	0.354	6.9	6.8
700	101	754	201	0.378	0.375	5.3	5.3
600	69.4	607	162	0.361	0.357	3.5	3.5

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	BHP	IN-HG	DEG F	DEG F	IN-HG	DEG F	IN-HG	DEG F
2,200	416	60.8	121.9	1,174.0	99.2	850.6	65	402.9
2,100	416	65.1	122.4	1,148.6	100.9	820.5	69	409.3
2,000	416	67.2	122.1	1,152.8	97.4	827.0	71	408.1
1,900	416	68.4	121.0	1,156.4	92.8	834.0	72	406.9
1,800	416	69.5	120.8	1,162.7	88.1	843.6	73	406.4
1,700	408	69.6	121.9	1,161.0	81.2	848.5	73	400.5
1,600	399	68.8	121.5	1,169.4	74.2	862.6	71	396.3
1,500	387	66.7	120.8	1,180.3	66.2	881.8	69	389.7
1,400	374	64.6	121.3	1,204.8	58.9	914.9	67	386.1
1,300	331	54.7	121.4	1,195.6	45.3	939.8	56	358.0
1,200	289	46.3	116.6	1,190.0	35.4	964.8	48	331.6
1,100	251	38.9	118.3	1,196.4	27.2	994.9	40	304.1
1,000	209	30.3	114.7	1,189.2	19.6	1,021.0	31	266.8
900	171	23.6	114.2	1,187.6	14.5	1,051.4	24	235.8
800	137	15.8	112.2	1,118.7	9.5	1,026.9	16	185.8
700	101	10.0	112.0	1,030.2	6.1	961.7	10	152.6

600	69.4	7.1	113.7	998.6	4.0	927.4	7	138.3
-----	------	-----	-------	-------	-----	-------	---	-------

ENGINE SPEED	ENGINE POWER	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	CFM	CFM	LB/HR	LB/HR	FT3/MIN	FT3/MIN
2,200	416	924.6	1,659.1	4,036.0	4,181.8	622.6	570.4
2,100	416	926.6	1,637.8	4,042.2	4,186.0	629.0	577.0
2,000	416	904.0	1,621.3	3,935.1	4,076.9	619.5	567.7
1,900	416	875.8	1,597.5	3,804.4	3,943.7	607.2	555.7
1,800	416	846.6	1,576.6	3,668.1	3,805.7	594.8	543.5
1,700	408	807.4	1,542.9	3,483.1	3,616.4	579.9	529.1
1,600	399	760.4	1,501.6	3,267.9	3,396.9	558.4	508.3
1,500	387	704.5	1,445.2	3,013.1	3,136.6	529.7	480.7
1,400	374	645.3	1,388.1	2,750.7	2,869.5	496.5	448.8
1,300	331	538.6	1,229.8	2,282.4	2,386.1	432.0	388.8
1,200	289	453.2	1,086.7	1,912.9	2,003.4	375.1	336.3
1,100	251	374.4	943.9	1,575.4	1,654.3	319.1	284.6
1,000	209	296.7	782.4	1,245.7	1,312.3	259.8	230.2
900	171	238.0	652.1	997.8	1,053.8	212.2	187.1
800	137	186.8	514.5	782.2	831.2	170.2	148.1
700	101	142.5	378.4	596.4	634.3	130.9	113.7
600	69.4	109.1	281.4	456.2	481.2	99.7	88.1

Heat Rejection Data

ENGINE SPEED	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
RPM	BHP	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN
2,200	416	7,383	1,875	16,228	8,843	2,383	4,543	17,629	44,740	47,659
2,100	416	7,136	1,795	15,709	8,297	2,346	4,644	17,629	44,038	46,912
2,000	416	6,959	1,726	15,513	8,200	2,317	4,508	17,629	43,497	46,335
1,900	416	6,803	1,647	15,086	8,057	2,276	4,356	17,629	42,733	45,521
1,800	416	6,707	1,587	14,835	7,942	2,248	4,196	17,629	42,201	44,954
1,700	408	6,535	1,514	14,275	7,631	2,175	3,886	17,289	40,836	43,500
1,600	399	6,404	1,449	13,753	7,386	2,105	3,596	16,903	39,526	42,105
1,500	387	6,259	1,362	13,062	7,096	2,017	3,245	16,404	37,861	40,332
1,400	374	6,194	1,270	12,548	6,926	1,940	2,917	15,875	36,427	38,804

1,300	331	5,762	1,016	10,918	6,037	1,694	2,162	14,016	31,798	33,873
1,200	289	5,312	852	9,483	5,303	1,478	1,647	12,269	27,752	29,562
1,100	251	4,911	749	8,294	4,615	1,288	1,173	10,635	24,183	25,761
1,000	209	4,586	629	6,908	3,828	1,088	759	8,872	20,422	21,754
900	171	4,392	544	5,600	3,229	915	486	7,269	17,170	18,291
800	137	4,278	506	5,206	2,469	802	230	5,826	15,063	16,046
700	101	3,533	396	4,137	1,696	621	97	4,264	11,666	12,427

Sound Data

EXHAUST:SOUND POWER(1/3 Octave Frequencies)

ENGINE SPEED	ENGINE POWER	OVERALL SOUND	100 HZ	125 HZ	160 HZ	200 HZ	250 HZ	315 HZ	400 HZ	500 HZ	630 HZ	800 HZ
RPM	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
2,200	416	103.9	89.8	84.9	79.9	85.0	87.6	91.7	92.9	95.8	96.9	95.6
2,100	416	103.5	86.7	79.1	79.9	84.8	87.5	91.5	92.7	95.5	96.5	95.2
2,000	416	103.1	83.5	73.3	79.9	84.5	87.3	91.4	92.5	95.2	96.2	94.8
1,900	416	102.3	80.8	73.9	82.9	86.5	88.1	90.4	92.1	94.4	95.2	93.6
1,800	416	101.7	78.1	74.5	85.9	88.5	88.9	89.5	91.7	93.6	94.3	92.5
1,700	408	100.3	73.1	73.6	87.6	83.5	87.8	88.3	90.5	92.5	92.7	90.8
1,600	399	99.1	68.1	72.8	89.3	78.5	86.7	87.2	89.4	91.3	91.1	89.2
1,500	387	97.3	67.5	79.6	86.4	80.8	85.0	86.3	88.2	89.7	89.1	87.0
1,400	374	96.1	66.8	86.5	83.5	83.0	83.3	85.5	87.0	88.0	87.2	84.9
1,300	331	93.4	68.2	86.4	81.5	82.5	80.3	82.0	83.5	84.9	84.2	80.3
1,200	289	91.2	69.6	86.4	79.4	82.0	77.2	78.5	79.9	81.7	81.2	75.6
1,100	251	88.8	81.1	76.1	81.9	73.6	73.8	76.3	77.8	81.5	79.5	72.0
1,000	209	86.3	77.9	70.4	80.2	73.5	70.4	76.7	77.0	78.2	75.2	68.3
900	171	82.7	69.7	72.9	72.8	70.1	69.6	75.4	75.5	73.3	71.6	65.9
800	137	81.0	61.6	75.4	65.4	66.6	68.7	74.1	74.0	68.3	68.0	63.5
700	101	78.4	64.5	70.8	64.8	66.9	67.5	70.1	70.9	66.9	66.5	61.8
600	69.4	76.8	67.5	66.1	64.1	67.3	66.4	66.1	67.7	65.6	65.1	60.0

EXHAUST:SOUND POWER(1/3 Octave Frequencies)

ENGINE SPEED	ENGINE POWER	1000 HZ	1250 HZ	1600 HZ	2000 HZ	2500 HZ	3150 HZ	4000 HZ	5000 HZ	6300 HZ	8000 HZ	10000 HZ
RPM	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
2,200	416	93.6	91.6	89.5	87.6	85.9	85.3	84.0	82.5	81.9	79.7	76.3
2,100	416	93.1	91.2	89.2	87.3	85.6	85.0	83.7	82.4	81.7	79.7	76.3
2,000	416	92.6	90.8	88.8	87.0	85.4	84.8	83.5	82.2	81.6	79.6	76.2
1,900	416	91.6	89.8	87.8	86.0	84.5	83.9	82.6	81.4	80.7	78.8	75.4
1,800	416	90.6	88.7	86.8	85.1	83.6	83.0	81.7	80.5	79.8	78.0	74.6

1,700	408	89.0	87.1	85.3	83.7	82.1	81.6	80.4	79.2	78.4	76.6	73.4
1,600	399	87.3	85.5	83.8	82.4	80.7	80.2	79.0	77.9	77.0	75.3	72.2
1,500	387	85.2	83.4	81.9	80.6	78.8	78.3	77.1	76.1	75.0	73.4	70.7
1,400	374	83.0	81.3	80.0	78.8	76.9	76.3	75.2	74.3	73.1	71.6	69.2
1,300	331	78.0	76.9	75.6	74.3	72.3	71.8	70.9	70.3	68.7	67.1	67.4
1,200	289	73.1	72.5	71.2	69.9	67.7	67.3	66.5	66.3	64.4	62.6	65.6
1,100	251	69.3	68.5	67.3	65.8	63.7	63.2	62.4	64.0	60.3	59.3	65.5
1,000	209	65.3	64.2	62.8	61.3	59.1	58.6	57.9	62.1	57.1	57.6	64.9
900	171	62.1	60.5	58.8	57.6	55.9	55.6	55.7	61.7	56.7	57.5	65.0
800	137	59.0	56.8	54.8	54.0	52.7	52.6	53.5	61.4	56.2	57.4	65.0
700	101	58.8	57.2	55.5	55.1	54.5	55.7	54.7	61.1	56.3	57.6	64.7
600	69.4	58.6	57.6	56.1	56.3	56.2	58.7	55.8	60.9	56.5	57.7	64.3

MECHANICAL:SOUND POWER(1/3 Octave Frequencies)

ENGINE SPEED	ENGINE POWER	OVERALL SOUND	100 HZ	125 HZ	160 HZ	200 HZ	250 HZ	315 HZ	400 HZ	500 HZ	630 HZ	800 HZ
RPM	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
2,200	416	113.8	80.4	90.3	86.0	87.8	89.2	90.8	92.0	97.2	98.9	100.3
2,100	416	113.0	79.9	85.9	86.6	86.2	88.7	89.9	92.8	97.0	98.9	99.7
2,000	416	112.2	79.3	81.4	87.3	84.7	88.2	89.1	93.6	96.9	98.8	99.1
1,900	416	111.3	76.2	83.5	87.6	84.9	87.3	87.8	92.0	95.3	97.2	97.6
1,800	416	110.4	73.2	85.6	87.9	85.0	86.4	86.5	90.3	93.8	95.5	96.1
1,700	408	109.3	73.5	87.5	85.9	82.9	85.8	85.2	90.3	93.2	95.4	95.6
1,600	399	108.4	73.7	89.5	84.0	80.8	85.2	83.9	90.3	92.6	95.3	95.1
1,500	387	106.8	73.1	85.3	82.0	81.4	83.9	83.0	87.8	90.4	93.2	93.5
1,400	374	105.2	72.5	81.0	80.1	82.1	82.5	82.1	85.3	88.2	91.1	91.9
1,300	331	104.4	71.6	78.3	79.3	80.5	82.6	81.7	85.2	87.5	90.8	91.5
1,200	289	103.6	70.6	75.5	78.4	78.9	82.7	81.2	85.1	86.7	90.6	91.1
1,100	251	102.7	70.6	75.6	79.4	79.1	81.8	80.4	84.1	86.1	89.4	90.1
1,000	209	103.0	70.0	81.3	79.4	78.8	82.5	80.6	82.9	85.3	89.1	88.7
900	171	102.4	67.4	77.0	79.5	79.1	80.9	79.9	82.9	86.3	89.2	89.6
800	137	101.9	64.7	72.8	79.5	79.4	79.4	79.1	82.9	87.2	89.2	90.5
700	101	102.6	63.9	74.2	80.4	78.6	79.0	84.7	83.4	86.1	89.8	90.3
600	69.4	103.4	63.1	75.6	81.4	77.8	78.5	90.3	83.8	85.0	90.4	90.1

MECHANICAL:SOUND POWER(1/3 Octave Frequencies)

ENGINE SPEED	ENGINE POWER	1000 HZ	1250 HZ	1600 HZ	2000 HZ	2500 HZ	3150 HZ	4000 HZ	5000 HZ	6300 HZ	8000 HZ	10000 HZ
RPM	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)

2,200	416	108.4	105.2	105.6	103.3	102.2	100.3	98.7	98.3	96.4	95.0	92.3
2,100	416	107.3	104.9	104.8	102.2	101.1	99.4	98.0	97.5	95.6	94.1	91.5
2,000	416	106.1	104.7	104.0	101.1	100.0	98.6	97.3	96.7	94.8	93.2	90.8
1,900	416	105.5	104.1	102.4	100.1	99.3	97.6	96.2	95.7	93.7	92.5	89.9
1,800	416	104.8	103.5	100.9	99.1	98.6	96.6	95.1	94.8	92.6	91.9	89.0
1,700	408	104.2	102.0	99.2	97.8	97.5	95.6	93.7	93.5	91.2	90.6	87.8
1,600	399	103.6	100.5	97.6	96.5	96.4	94.6	92.4	92.3	89.8	89.3	86.6
1,500	387	101.5	98.9	96.3	95.6	95.2	93.6	91.5	91.6	88.9	88.6	86.1
1,400	374	99.5	97.3	95.1	94.6	94.0	92.7	90.6	91.0	88.0	87.8	85.6
1,300	331	99.1	95.7	94.5	93.2	92.9	91.5	89.8	90.0	87.3	87.1	85.0
1,200	289	98.7	94.1	93.9	91.8	91.9	90.3	88.9	89.0	86.5	86.4	84.3
1,100	251	97.2	93.3	92.7	91.3	91.4	89.5	88.4	88.9	86.1	85.8	83.5
1,000	209	97.7	94.6	92.6	92.5	92.0	90.5	87.8	89.5	85.3	84.7	82.4
900	171	96.6	94.2	92.0	92.1	91.4	88.9	86.8	89.4	86.1	84.1	81.4
800	137	95.5	93.9	91.4	91.6	90.8	87.3	85.8	89.3	86.8	83.5	80.4
700	101	95.9	94.6	92.1	92.2	91.9	89.8	86.7	90.3	86.9	83.2	79.9
600	69.4	96.3	95.3	92.7	92.8	92.9	92.3	87.6	91.2	86.9	82.9	79.3

Emissions Data

DIESEL

RATED SPEED NOMINAL DATA: 2200 RPM

ENGINE POWER		BHP	416	312	208	104	41.6
PERCENT LOAD		%	100	75	50	25	10
TOTAL NOX (AS NO2)		G/HR	65	22	8	4	16
TOTAL CO		G/HR	23	23	19	12	11
TOTAL HC		G/HR	3	7	8	8	11
TOTAL CO2		KG/HR	214	163	112	69	42
PART MATTER		G/HR	1.1	0.8	0.7	0.5	0.3
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	69.8	29.8	15.4	12.8	79.9
TOTAL CO	(CORR 5% O2)	MG/NM3	24.6	32.2	37.0	39.3	53.4
TOTAL HC	(CORR 5% O2)	MG/NM3	2.6	8.0	14.0	21.0	48.5
PART MATTER	(CORR 5% O2)	MG/NM3	1.0	1.0	1.2	1.4	1.6
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	34	15	7	6	39
TOTAL CO	(CORR 5% O2)	PPM	20	26	30	31	43
TOTAL HC	(CORR 5% O2)	PPM	5	15	26	39	91
TOTAL NOX (AS NO2)		G/HP-HR	0.16	0.07	0.04	0.04	0.39
TOTAL CO		G/HP-HR	0.06	0.08	0.09	0.12	0.26

TOTAL HC		G/HP-HR	0.01	0.02	0.04	0.07	0.27
PART MATTER		G/HP-HR	0.00	0.00	0.00	0.00	0.01
TOTAL NOX (AS NO2)		LB/HR	0.14	0.05	0.02	0.01	0.04
TOTAL CO		LB/HR	0.05	0.05	0.04	0.03	0.02
TOTAL HC		LB/HR	0.01	0.02	0.02	0.02	0.02
TOTAL CO2		LB/HR	472	360	246	152	93
PART MATTER		LB/HR	0.00	0.00	0.00	0.00	0.00
OXYGEN IN EXH		%	10.1	12.0	13.7	15.3	16.8

SECONDARY SPEED NOMINAL DATA: 1800 RPM

ENGINE POWER		BHP	416	312	208	104	41.6
PERCENT LOAD		%	100	75	50	25	10
TOTAL NOX (AS NO2)		G/HR	52	13	5	3	8
TOTAL CO		G/HR	24	21	15	12	7
TOTAL HC		G/HR	2	3	3	2	5
TOTAL CO2		KG/HR	202	147	101	57	32
PART MATTER		G/HR	0.7	0.5	0.6	0.4	0.0
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	56.2	20.0	12.5	13.7	48.2
TOTAL CO	(CORR 5% O2)	MG/NM3	26.9	31.6	34.1	44.6	47.2
TOTAL HC	(CORR 5% O2)	MG/NM3	1.9	3.8	5.7	8.7	25.3
PART MATTER	(CORR 5% O2)	MG/NM3	0.6	0.7	1.2	1.2	0.2
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	27	10	6	7	24
TOTAL CO	(CORR 5% O2)	PPM	22	25	27	36	38
TOTAL HC	(CORR 5% O2)	PPM	4	7	11	16	47
TOTAL NOX (AS NO2)		G/HP-HR	0.13	0.04	0.03	0.03	0.18
TOTAL CO		G/HP-HR	0.06	0.07	0.07	0.11	0.17
TOTAL HC		G/HP-HR	0.00	0.01	0.01	0.02	0.11
PART MATTER		G/HP-HR	0.00	0.00	0.00	0.00	0.00
TOTAL NOX (AS NO2)		LB/HR	0.11	0.03	0.01	0.01	0.02
TOTAL CO		LB/HR	0.05	0.05	0.03	0.03	0.02
TOTAL HC		LB/HR	0.00	0.01	0.01	0.01	0.01
TOTAL CO2		LB/HR	445	324	223	127	71
PART MATTER		LB/HR	0.00	0.00	0.00	0.00	0.00
OXYGEN IN EXH		%	9.7	11.1	12.4	14.3	16.2

EPA TIER 4 FINAL 2014 - ----				
GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO THE EPA ARE CONSISTENT WITH THOSE DESCRIBED IN EPA40 CFR PART 1039 SUBPART F AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THE "MAX LIMITS" SHOWN BELOW AREWEIGHTED 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 4 FINAL	CO: 3.5 NOx: 0.4 HC: 0.19 PM: 0.02

EU STAGE V 2019 - ----				
GASEOUS EMISSION DATA MEASUREMENTS ARE CONSISTENT WITH THOSE DESCRIBED IN EU 2016/1628, 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	NON-ROAD	STAGE V	CO: 3.5 NOx: 0.4 HC: 0.19 PM: 0.015

JAPAN MLIT TIER 4F 2016 - ----				
GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO MLIT ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 1039 SUBPART F 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 JAPANESE NON-ROAD REGULATIONS.				
Locality	Agency	Regulation	Tier/Stage	Max Limits - G/BKW - HR
JAPAN	JAPAN MLIT	NON-ROAD	TIER 4F	CO: 3.5 NOx: 0.4 HC: 0.19 PM: 0.02

SOUTH KOREA MOE TIER 4F 2015 - ----				
GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO KOREA ARE CONSISTENT WITH THOSE DESCRIBED IN ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THE "MAX LIMITS" SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE KOREAN NON-ROAD REGULATIONS.				
Locality	Agency	Regulation	Tier/Stage	Max Limits - G/BKW - HR
SOUTH KOREA	SOUTH KOREA MOE	NON-ROAD	TIER 4F	CO: 3.5 NOx: 0.4 HC: 0.19 PM: 0.025

UN R120	2018 - ----
UNIFORM PROVISIONS CONCERNING THE APPROVAL OF INTERNAL COMBUSTION ENGINES TO BE INSTALLED IN AGRICULTURAL AND FORESTRY TRACTORS AND IN NON-ROAD MOBILE MACHINERY, WITH REGARD TO THE MEASUREMENT OF THE NET POWER, NET TORQUE AND SPECIFIC FUEL CONSUMPTION.	

Altitude Derate Data
STANDARD

ALTITUDE CORRECTED POWER CAPABILITY (BHP)

AMBIENT OPERATING TEMP (F)	50	60	70	80	90	100	110	120	130	140	NORMAL
ALTITUDE (FT)											
0	416	416	416	416	416	415	414	412	411	410	416
1,000	416	416	416	415	414	413	411	410	409	407	416
2,000	416	415	414	413	411	410	409	407	406	404	414
3,000	414	413	411	410	408	407	406	404	403	391	411
4,000	411	409	408	407	405	404	402	401	396	378	409
5,000	407	406	404	403	402	400	393	387	380	364	406
6,000	405	404	402	398	392	385	378	372	365	351	404
7,000	399	396	390	383	376	369	363	356	349	336	399
8,000	393	387	379	371	363	356	348	341	333	323	393
9,000	376	368	360	352	344	337	330	324	318	310	377
10,000	354	347	340	333	327	321	314	308	302	296	359
11,000	334	329	323	317	311	306	299	293	287	280	340
12,000	319	313	307	302	296	290	284	278	271	265	324
13,000	304	299	293	287	281	275	269	263	256	250	310
14,000	290	284	278	273	267	260	255	248	242	236	297
15,000	275	270	264	258	253	247	241	234	228	222	285

Cross Reference

Test Spec	Setting	Engine Arrangement	Engineering Model	Engineering Model Version	Start Effective Serial Number	End Effective Serial Number
4581455	NAP	5395436	EE463	-	NGH00001	
5526640	PP7760	5395436	EE463	-	NGH00001	
4581811	NAP	5442940	EE465	-	NGK00001	
5526651	PP7794	5442940	EE465	-	NGK00001	
5526640	PP7760	5543102	EE463	-	NGH00001	
5526640	PP7760	6182747	EE463	-	NGH00001	

5526640	PP7760	6182754	EE463	-	NGH00001	
5526651	PP7794	6182764	EE465	-	NGK00001	
5526651	PP7794	6182783	EE465	-	NGK00001	
4150790	PP7359	6189640	EE463	-	HNW00001	
6351911	PP7597	6531675	EE463	-	K9H00001	
6351911	PP7597	6531677	EE463	-	K9H00001	

Performance Parameter Reference

Parameters Reference: DM9600 - 15 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% Specific fuel consumption (C7-C18) +/- 4% 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: 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. 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 : 03/12/24