

Performance Number: EM4318

Change Level: 04

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 (BKW):	280.0	TORQUE RISE (%):	41
PEAK TORQUE (NM):	1,715.0	ASPIRATION:	TA
COMPRESSION RATIO:	16.5	AFTERCOOLER TYPE:	ATAAC
RATING LEVEL:	B-RATING	AFTERCOOLER CIRCUIT TYPE:	JW+OC, ATAAC
PUMP QUANTITY:	1	INLET MANIFOLD AIR TEMP (C):	50
FUEL TYPE:	DIESEL	JACKET WATER TEMP (C):	89
MANIFOLD TYPE:	DRY	TURBO CONFIGURATION:	SINGLE
GOVERNOR TYPE:	ELEC	TURBO QUANTITY:	1
CAMSHAFT TYPE:	STANDARD	TURBOCHARGER MODEL:	S310FG - A/R 1.1
IGNITION TYPE:	CI	CERTIFICATION YEAR:	2018
INJECTOR TYPE:	CR	PISTON SPD @ RATED ENG SPD (M/SEC):	10.9
REF EXH STACK DIAMETER (MM):	102		
MAX OPERATING ALTITUDE (M):	2,895		

INDUSTRY	SUBINDUSTRY	APPLICATION
INDUSTRIAL	GENERAL INDUSTRIAL	INDUSTRIAL
INDUSTRIAL	MATERIAL HANDLING	INDUSTRIAL
INDUSTRIAL	CONSTRUCTION	INDUSTRIAL
INDUSTRIAL	AGRICULTURE	INDUSTRIAL
INDUSTRIAL	MINING	INDUSTRIAL
INDUSTRIAL	INDUSTRIAL POWER UNIT	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
2,200	280	1,215	1,645	224.1	221.9	73.8	73.1
2,100	280	1,273	1,723	207.0	205.0	68.2	67.5
2,000	280	1,337	1,809	199.1	197.2	65.6	64.9
1,900	280	1,407	1,904	194.6	192.7	64.1	63.5
1,800	280	1,485	2,010	192.2	190.4	63.3	62.7
1,700	274	1,538	2,081	193.8	192.0	62.4	61.8
1,600	268	1,598	2,162	195.0	193.1	61.4	60.8
1,500	260	1,654	2,239	198.5	196.6	60.7	60.1
1,400	252	1,715	2,322	209.6	207.6	62.0	61.4
1,300	222	1,631	2,207	197.1	195.2	51.5	51.0
1,200	194	1,546	2,093	195.6	193.7	44.7	44.3
1,100	168	1,462	1,979	199.5	197.6	39.5	39.2
1,000	134	1,277	1,728	210.1	208.1	33.1	32.7
900	91.0	965	1,306	211.7	209.7	22.7	22.4
800	70.5	842	1,139	218.2	216.2	18.1	17.9
700	53.9	736	995	223.1	220.9	14.1	14.0
600	38.9	619	837	227.2	225.0	10.4	10.3

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
2,200	280	200.3	49.0	617.6	246.3	459.0	215	203.6
2,100	280	186.2	49.0	586.7	206.9	443.3	199	185.9
2,000	280	180.5	49.0	577.4	186.7	441.3	192	179.1
1,900	280	178.7	49.1	575.5	174.7	444.2	189	175.2
1,800	280	180.7	49.2	583.1	157.0	453.3	190	175.1
1,700	274	184.0	49.2	600.3	154.1	470.2	192	176.2
1,600	268	186.1	49.2	618.5	143.3	489.5	193	177.6
1,500	260	185.9	49.2	647.4	134.9	520.0	192	178.7
1,400	252	202.5	49.2	691.8	140.7	547.5	208	191.6
1,300	222	144.6	49.1	677.5	108.9	573.0	148	158.9
1,200	194	114.8	49.1	682.5	94.0	585.7	117	140.9
1,100	168	91.7	46.8	695.8	88.2	608.7	94	125.7

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1,000	134	62.3	47.0	692.2	63.0	621.2	63	101.1
900	91.0	31.7	44.2	621.5	52.7	555.1	32	70.6
800	70.5	20.5	43.2	571.7	39.2	511.6	21	58.7
700	53.9	14.0	46.8	506.7	32.9	455.4	14	51.9
600	38.9	9.6	46.1	428.0	21.9	388.0	10	47.1

General Performance Data (Continued)

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	ENGINE OUTLET WET EXH VOL FLOW RATE (0 DEG C AND 101 KPA)	ENGINE OUTLET DRY EXH VOL FLOW RATE (0 DEG C AND 101 KPA)
RPM	BKW	M3/MIN	M3/MIN	KG/HR	KG/HR	M3/MIN	M3/MIN
2,200	280	26.0	61.7	1,865.9	1,928.5	23.0	21.2
2,100	280	23.9	55.3	1,689.4	1,747.3	21.1	19.4
2,000	280	22.4	51.7	1,575.4	1,631.1	19.8	18.2
1,900	280	21.3	49.3	1,488.3	1,542.8	18.8	17.2
1,800	280	20.4	47.8	1,419.1	1,472.9	18.0	16.4
1,700	274	19.6	47.1	1,362.6	1,415.7	17.3	15.8
1,600	268	18.7	46.0	1,293.0	1,345.2	16.5	15.0
1,500	260	17.6	45.0	1,215.0	1,266.6	15.5	14.1
1,400	252	17.5	46.2	1,206.6	1,259.3	15.4	13.9
1,300	222	13.2	36.4	899.6	943.3	11.8	10.5
1,200	194	10.7	30.1	724.1	762.1	9.6	8.5
1,100	168	8.8	25.4	590.9	624.5	7.9	6.9
1,000	134	6.7	20.0	454.5	482.6	6.1	5.3
900	91.0	4.9	13.5	330.2	349.5	4.4	3.9
800	70.5	4.0	10.4	268.0	283.4	3.6	3.2
700	53.9	3.3	7.9	219.8	231.8	3.0	2.6
600	38.9	2.7	5.9	182.8	191.6	2.5	2.2

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
2,200	280	135	36.0	263	160	39.7	80.6	280	746	794
2,100	280	129	32.0	228	137	36.7	64.6	280	689	734
2,000	280	126	30.6	211	127	35.3	57.3	280	662	706
1,900	280	122	29.7	205	122	34.5	52.5	280	647	690
1,800	280	119	29.1	204	120	34.1	49.9	280	640	681
1,700	274	116	29.3	204	123	33.6	48.3	274	631	672
1,600	268	115	30.2	202	125	33.0	46.4	268	620	661
1,500	260	114	31.4	204	130	32.6	44.0	260	613	653
1,400	252	116	33.6	218	140	33.4	48.0	252	626	667
1,300	222	111	33.2	161	113	27.7	27.6	222	520	554
1,200	194	101	30.5	137	94.9	24.1	18.6	194	452	481
1,100	168	92.5	29.1	122	82.7	21.3	13.0	168	399	425
1,000	134	87.8	27.1	100	66.2	17.8	6.9	134	334	356
900	91.0	69.2	19.6	61.6	40.3	12.2	2.4	91.0	229	244
800	70.5	62.7	17.9	42.5	28.8	9.7	1.2	70.5	183	195
700	53.9	44.3	13.1	40.6	19.4	7.6	0.3	53.9	143	152

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	BKW	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
2,200	280	130.5	111.9	106.7	98.1	116.9	111.8	119.9	115.9	119.2	119.5	120.0

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2,100	280	129.5	106.4	95.9	96.3	109.5	103.5	115.3	115.0	117.4	117.3	118.6
2,000	280	131.2	104.0	90.3	95.1	114.4	104.9	118.9	118.9	119.0	119.6	119.8
1,900	280	129.5	102.8	92.0	100.4	111.4	110.1	115.8	117.7	117.9	118.2	118.2
1,800	280	127.9	101.5	93.9	105.4	108.4	115.3	112.7	116.4	116.7	116.7	116.6
1,700	274	126.8	93.8	94.4	106.3	103.0	112.7	112.2	114.5	115.3	115.1	114.8
1,600	268	125.8	86.1	94.9	107.3	97.6	110.3	111.8	112.6	113.9	113.3	113.0
1,500	260	129.7	87.1	101.7	106.0	105.3	113.9	115.4	116.6	118.4	118.1	118.5
1,400	252	134.4	88.1	108.3	105.0	113.2	117.8	119.2	120.9	123.2	122.9	124.1
1,300	222	125.2	89.0	108.7	96.1	110.4	114.0	110.4	112.4	114.0	115.2	114.9
1,200	194	122.9	86.6	100.0	98.0	101.4	104.0	106.7	106.4	109.9	113.8	116.0
1,100	168	120.6	100.5	96.0	103.1	103.2	100.3	99.5	105.7	109.1	111.7	113.0
1,000	134	118.8	99.9	88.2	97.2	99.3	96.9	98.7	104.4	106.2	111.4	111.0
900	91.0	116.2	88.4	91.5	95.4	97.1	95.3	97.4	101.8	106.8	109.3	108.7
800	70.5	117.6	82.5	97.8	101.5	93.9	100.0	98.7	101.9	106.7	109.7	110.3
700	53.9	110.2	78.9	86.0	90.0	92.4	92.6	92.5	96.5	100.3	103.1	102.0
600	38.9	106.2	79.9	85.7	89.2	88.3	92.6	92.7	93.1	96.5	98.8	97.0

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	BKW	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
2,200	280	119.7	119.7	122.5	119.5	117.0	117.5	116.2	112.9	107.3	102.4	95.7
2,100	280	119.1	119.8	123.6	120.7	116.8	115.2	112.5	108.7	103.4	97.5	90.8
2,000	280	120.6	121.3	124.2	122.3	118.0	117.5	115.2	111.8	107.8	103.8	97.5
1,900	280	118.9	120.5	122.7	119.4	115.9	115.3	112.8	108.7	103.5	98.7	91.7
1,800	280	117.1	119.5	121.0	116.4	113.6	113.0	110.4	105.5	98.8	93.2	85.3
1,700	274	115.6	117.6	120.5	117.0	113.5	112.7	110.1	104.3	97.5	91.2	82.5
1,600	268	113.9	115.5	119.7	117.5	113.0	112.0	109.5	103.0	95.9	88.9	79.4
1,500	260	118.8	119.8	121.9	120.8	118.2	117.1	116.2	112.1	106.8	101.6	95.4
1,400	252	123.7	124.1	123.8	124.0	123.4	122.1	122.9	121.1	117.8	114.2	111.4
1,300	222	116.0	115.8	114.8	114.1	111.7	110.4	109.1	103.7	96.0	89.3	80.6
1,200	194	114.9	113.5	111.9	112.0	110.6	108.3	107.2	101.9	92.8	85.1	75.0
1,100	168	110.8	110.6	108.9	109.4	109.1	107.6	106.3	101.3	92.6	85.1	74.9
1,000	134	108.8	107.9	107.9	107.6	107.6	106.8	104.9	99.9	92.6	84.9	75.2
900	91.0	105.9	105.8	104.6	103.3	103.0	102.5	99.8	95.2	88.3	80.8	72.3
800	70.5	110.6	107.7	106.5	104.6	101.4	100.1	97.0	93.2	86.3	80.9	75.5
700	53.9	100.8	99.6	98.2	98.1	96.8	96.6	93.7	88.4	81.8	75.2	69.6
600	38.9	95.7	95.4	92.4	95.4	91.8	91.6	89.7	82.6	75.3	70.0	68.2

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	BKW	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
2,200	280	110.6	82.1	84.5	81.7	88.7	87.8	89.4	94.0	96.2	97.0	98.1
2,100	280	110.5	83.6	80.6	82.4	87.5	86.7	88.3	94.5	96.0	96.6	98.6
2,000	280	110.6	85.8	79.1	84.2	85.8	87.9	91.0	94.4	95.5	97.9	98.9
1,900	280	110.4	83.7	80.6	82.7	85.9	87.0	89.9	93.7	94.7	98.2	98.0
1,800	280	110.1	81.6	82.1	80.9	85.7	85.9	88.6	92.7	93.8	98.4	97.0
1,700	274	109.1	77.5	83.2	81.6	83.9	86.1	88.0	92.2	93.5	96.5	96.2
1,600	268	108.0	73.3	84.0	82.1	82.0	86.2	87.3	91.4	93.0	94.4	95.2
1,500	260	106.7	72.8	82.0	78.7	82.7	85.2	85.6	88.7	91.0	92.4	93.5
1,400	252	105.4	72.1	79.8	75.1	83.2	84.4	84.0	85.8	88.8	90.2	91.8
1,300	222	105.8	77.8	77.0	73.9	80.4	84.3	83.7	87.4	89.2	94.0	93.0
1,200	194	106.8	74.0	76.4	76.2	81.9	84.8	86.3	87.6	89.8	92.1	93.5
1,100	168	107.1	72.8	75.0	79.3	81.3	84.2	83.6	86.0	88.9	90.6	92.2
1,000	134	107.1	74.1	78.1	80.6	82.8	84.5	82.7	86.1	87.7	90.8	91.7
900	91.0	107.7	69.7	75.8	77.3	80.9	83.5	83.2	86.1	89.3	90.8	92.1
800	70.5	107.9	67.6	75.7	77.2	79.1	83.2	82.7	85.8	89.1	92.3	92.2
700	53.9	108.2	66.3	72.2	74.6	77.6	81.0	81.0	85.9	89.7	92.2	93.4
600	38.9	108.3	63.4	69.8	73.0	74.9	79.8	79.5	86.4	88.9	92.7	94.3

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	BKW	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
2,200	280	101.0	102.2	101.6	99.5	99.7	99.4	97.5	97.3	96.9	96.5	95.4
2,100	280	101.0	103.1	101.5	99.0	99.7	99.0	97.3	96.5	96.0	94.9	94.6

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2,000	280	100.5	103.3	101.3	98.8	99.9	99.3	97.4	96.6	95.5	94.2	94.7
1,900	280	100.7	103.6	101.0	98.5	99.7	98.8	96.6	96.1	95.0	93.8	95.0
1,800	280	100.8	103.7	100.6	98.1	99.3	98.2	95.6	95.3	94.4	93.1	95.6
1,700	274	100.1	102.0	99.4	97.1	98.1	97.7	95.7	94.8	94.0	92.9	95.2
1,600	268	99.2	100.2	98.0	96.0	96.8	97.0	95.7	94.1	93.5	92.5	95.1
1,500	260	97.2	98.4	96.7	94.8	95.6	95.4	94.4	93.6	93.5	92.8	95.0
1,400	252	95.3	96.7	95.2	93.5	94.4	93.8	92.9	93.0	93.3	92.8	94.9
1,300	222	97.4	98.7	95.4	93.7	94.4	93.5	92.3	93.0	91.6	91.1	91.6
1,200	194	99.1	101.5	95.8	93.7	94.6	93.4	92.2	94.0	91.5	91.8	88.6
1,100	168	99.7	102.6	97.4	93.8	94.3	92.9	91.5	94.3	91.1	90.0	84.5
1,000	134	98.3	101.9	99.5	94.1	94.9	93.2	91.4	96.4	91.5	85.3	82.0
900	91.0	99.6	102.6	98.9	93.9	95.2	93.6	91.2	99.1	91.1	83.5	79.0
800	70.5	100.0	103.0	99.6	93.0	94.3	92.2	90.1	99.8	90.5	81.8	78.1
700	53.9	100.4	102.9	98.8	93.7	95.2	93.8	90.9	100.9	91.1	83.5	79.2
600	38.9	101.2	103.2	98.5	93.6	94.4	93.4	90.3	100.1	90.7	83.7	78.8

Emissions Data

DIESEL

RATED SPEED NOMINAL DATA: 2200 RPM

ENGINE POWER	BKW	280	210	140	70.0	28.0
PERCENT LOAD	%	100	75	50	25	10
TOTAL NOX (AS NO2)	G/HR	1,011	577	319	248	167
TOTAL CO	G/HR	580	203	159	251	293
TOTAL HC	G/HR	34	45	51	53	78
TOTAL CO2	KG/HR	199	160	121	63	35
PART MATTER	G/HR	43.6	28.9	30.4	17.5	13.7
TOTAL NOX (AS NO2) (CORR 5% O2)	MG/NM3	1,174.5	834.3	610.6	890.0	1,071.4
TOTAL CO (CORR 5% O2)	MG/NM3	669.5	287.7	300.8	905.8	1,854.7
TOTAL HC (CORR 5% O2)	MG/NM3	34.4	56.4	84.2	165.7	429.7
PART MATTER (CORR 5% O2)	MG/NM3	42.8	36.0	50.5	56.6	79.8
TOTAL NOX (AS NO2) (CORR 5% O2)	PPM	572	406	297	434	522
TOTAL CO (CORR 5% O2)	PPM	536	230	241	725	1,484
TOTAL HC (CORR 5% O2)	PPM	64	105	157	309	802
TOTAL NOX (AS NO2)	G/HP-HR	2.72	2.07	1.71	2.66	4.47
TOTAL CO	G/HP-HR	1.56	0.73	0.85	2.69	7.83
TOTAL HC	G/HP-HR	0.09	0.16	0.28	0.57	2.10
PART MATTER	G/HP-HR	0.12	0.10	0.16	0.19	0.37
TOTAL NOX (AS NO2)	LB/HR	2.23	1.27	0.70	0.55	0.37
TOTAL CO	LB/HR	1.28	0.45	0.35	0.55	0.65
TOTAL HC	LB/HR	0.08	0.10	0.11	0.12	0.17
TOTAL CO2	LB/HR	439	353	266	139	78
PART MATTER	LB/HR	0.10	0.06	0.07	0.04	0.03
OXYGEN IN EXH	%	11.1	12.5	13.8	15.2	16.9

RATED SPEED POTENTIAL SITE VARIATION: 2200 RPM

ENGINE POWER	BKW	280	210	140	70.0	28.0
PERCENT LOAD	%	100	75	50	25	10
TOTAL NOX (AS NO2)	G/HR	1,092	623	345	268	181
TOTAL CO	G/HR	1,084	380	298	470	548
TOTAL HC	G/HR	65	86	97	100	148
PART MATTER	G/HR	85.0	56.4	59.2	34.2	26.8
TOTAL NOX (AS NO2) (CORR 5% O2)	MG/NM3	1,268.5	901.0	659.4	961.2	1,157.1
TOTAL CO (CORR 5% O2)	MG/NM3	1,252.0	538.1	562.4	1,693.8	3,468.3
TOTAL HC (CORR 5% O2)	MG/NM3	65.0	106.5	159.2	313.2	812.2
PART MATTER (CORR 5% O2)	MG/NM3	83.5	70.2	98.5	110.4	155.7
TOTAL NOX (AS NO2) (CORR 5% O2)	PPM	618	439	321	468	564
TOTAL CO (CORR 5% O2)	PPM	1,002	430	450	1,355	2,775
TOTAL HC (CORR 5% O2)	PPM	121	199	297	585	1,516
TOTAL NOX (AS NO2)	G/HP-HR	2.94	2.23	1.85	2.87	4.83
TOTAL CO	G/HP-HR	2.92	1.36	1.60	5.03	14.64
TOTAL HC	G/HP-HR	0.17	0.31	0.52	1.07	3.96
PART MATTER	G/HP-HR	0.23	0.20	0.32	0.37	0.72
TOTAL NOX (AS NO2)	LB/HR	2.41	1.37	0.76	0.59	0.40
TOTAL CO	LB/HR	2.39	0.84	0.66	1.04	1.21
TOTAL HC	LB/HR	0.14	0.19	0.21	0.22	0.33

PART MATTER	LB/HR	0.19	0.12	0.13	0.08	0.06
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Regulatory Information

CHINA STAGE 3		2015 - ----				
THIS ENGINE HAS BEEN TESTED IN ACCORDANCE WITH THE PROVISIONS OF THE PEOPLE'S REPUBLIC OF CHINA NATIONAL STANDARD # GB 20891-2014, AND COMPLIES WITH THE STATED LIMITS OF CO, HC, NOX, AND PM FOR STAGE III						
Locality	Agency	Regulation	Tier/Stage	Max Limits - G/BKW - HR		
CHINA	CHINA	NON-ROAD	STAGE 3	CO: 3.5 NOx + HC: 4.0 PM: 0.2		

EU STAGE IIIA R96		2006 - ----				
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	NON-ROAD	STAGE IIIA R96	CO: 3.5 NOx + HC: 4.0 PM: 0.2		

IBAMA MAR-1		2015 - ----				
GASEOUS EMISSION DATA MEASUREMENTS ARE CONSISTENT WITH THOSE DESCRIBED IN CONAMA RESOLUTION NO. 433/2011 AND ISO 8178-1 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		
BRAZIL	IBAMA	NON-ROAD	MAR-1	CO: 3.5 NOx + HC: 4.0 PM: 0.2		

Altitude Derate Data

STANDARD

ALTITUDE CORRECTED POWER CAPABILITY (BKW)

AMBIENT OPERATING TEMP (C)	10	15	20	25	30	35	40	45	50	55	60	NORMAL
ALTIUDE (M)												
0	280	280	280	280	280	279	277	276	269	255	239	280
250	280	280	280	280	278	277	275	273	265	249	233	280
500	280	280	278	277	276	274	272	267	256	239	219	278
750	278	277	276	275	273	269	265	258	241	217	194	276
1,000	276	275	273	271	264	260	256	247	224	196	175	273
1,250	280	280	276	268	260	256	251	238	206	181	157	279
1,500	280	280	280	270	259	251	239	217	188	161	139	280
1,750	280	280	279	270	255	243	225	197	170	145	126	280
2,000	280	280	273	264	246	231	209	180	155	131	116	280
2,250	280	263	251	242	227	211	192	167	147	127	113	276
2,500	269	244	228	218	205	191	173	156	140	124	113	270
2,750	256	226	205	196	184	171	159	146	133	121	112	263
3,000	236	204	184	174	167	158	147	137	127	118	111	249
3,250	206	182	168	163	156	148	139	129	122	114	110	222
3,500	180	165	157	152	146	138	130	122	117	111	109	194
3,750	161	153	146	141	136	129	122	116	112	109	108	170
4,000	148	142	137	133	128	122	116	110	109	108	107	157
4,250	137	133	129	126	121	116	111	108	108	107	107	146
4,500	129	126	123	120	116	111	108	107	107	106	106	137

Cross Reference

Test Spec	Setting	Engine Arrangement	Engineering Model	Engineering Model Version	Start Effective Serial Number	End Effective Serial Number
5526465	PP7281	5477363	EE464	-	NGL00001	
5526469	PP7286	5477365	EE466	-	NGW00001	

Performance Parameter Reference

Parameters Reference:DM9600-14**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.

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).

PERFORMANCE DATA[EM4318]

December 5, 2023

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 : 10/27/21

