

Performance Number: EM1462

Change Level: 00

SALES MODEL:	C18	COMBUSTION:	DIRECT INJECTION
BRAND:	CAT	ENGINE SPEED (RPM):	1,500
ENGINE POWER (BKW):	438.0	HERTZ:	50
GEN POWER W/O FAN (EKW):	410.0	ASPIRATION:	TA
COMPRESSION RATIO:	16.5	AFTERCOOLER TYPE:	SCAC
RATING LEVEL:	PRIME	AFTERCOOLER CIRCUIT TYPE:	JW+OC, AC
PUMP QUANTITY:	1	AFTERCOOLER TEMP (C):	52
FUEL TYPE:	DIESEL	JACKET WATER TEMP (C):	85
MANIFOLD TYPE:	WATER COOLED	TURBO CONFIGURATION:	SINGLE
GOVERNOR TYPE:	ELEC	TURBO QUANTITY:	1
ELECTRONICS TYPE:	ADEM4	TURBOCHARGER MODEL:	S510W010-1.36
CAMSHAFT TYPE:	STANDARD	CERTIFICATION YEAR:	2015
IGNITION TYPE:	CI	PISTON SPD @ RATED ENG SPD (M/SEC):	9.2
INJECTOR TYPE:	EUI		
REF EXH STACK DIAMETER (MM):	203		
MAX OPERATING ALTITUDE (M):	300		

INDUSTRY	SUBINDUSTRY	APPLICATION
MARINE	INLAND WATERWAY	MARINE AUXILIARY
MARINE	DREDGE	MARINE AUXILIARY
MARINE	FERRY	MARINE AUXILIARY
MARINE	PLEASURE CRAFT	MARINE AUXILIARY
MARINE	FISHING	MARINE AUXILIARY
MARINE	OFFSHORE	MARINE AUXILIARY
MARINE	GOVERNMENT	MARINE AUXILIARY
MARINE	TUG & SALVAGE	MARINE AUXILIARY

General Performance Data

GENSET POWER WITHOUT FAN	PERCENT LOAD	ENGINE POWER	BRAKE MEAN EFF PRES (BMEP)	BRAKE SPEC FUEL CONSUMPTN (BSFC)	VOL FUEL CONSUMPTN (VFC)
EKW	%	BKW	KPA	G/BKW-HR	L/HR
451.0	110	482	2,126	204.3	115.8
410.0	100	438	1,933	208.0	107.2
369.0	90	394	1,740	209.4	97.2
328.0	80	351	1,548	210.7	86.9
307.5	75	329	1,451	211.2	81.7
287.0	70	307	1,354	211.3	76.3
246.0	60	263	1,160	211.9	65.5
205.0	50	219	966	214.1	55.2
164.0	40	175	774	225.4	46.5
123.0	30	132	582	244.1	37.9
102.5	25	110	485	257.2	33.3
82.0	20	88.1	389	272.4	28.2
41.0	10	44.2	195	334.2	17.4

GENSET POWER WITHOUT FAN	PERCENT LOAD	ENGINE POWER	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	ENGINE OUTLET TEMP	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP
EKW	%	BKW	KPA	DEG C	DEG C	KPA	DEG C	KPA	DEG C
451.0	110	482	211.6	60.0	573.2	192.2	395.9	218	204.3
410.0	100	438	204.4	59.2	553.5	183.5	383.0	211	196.4
369.0	90	394	192.5	58.6	524.8	168.0	367.3	199	185.7
328.0	80	351	176.3	58.2	496.5	149.7	350.6	182	172.5
307.5	75	329	166.6	57.9	482.4	139.4	342.4	172	165.0
287.0	70	307	154.5	57.5	468.7	127.8	335.8	160	156.0
246.0	60	263	128.5	56.6	441.2	104.1	323.5	133	137.0
205.0	50	219	102.6	55.8	413.1	82.1	311.1	107	118.1
164.0	40	175	83.9	55.3	383.4	68.2	296.7	88	103.9
123.0	30	132	66.3	55.0	352.3	56.3	281.2	70	90.1
102.5	25	110	57.1	54.9	336.2	50.5	273.1	61	82.8
82.0	20	88.1	46.8	54.6	308.2	43.8	255.5	50	74.6
41.0	10	44.2	24.8	54.1	236.4	29.8	208.1	28	56.7

General Performance Data (Continued)

GENSET POWER WITHOUT FAN	PERCENT LOAD	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)
EKW	%	BKW	M3/MIN	M3/MIN	KG/HR	KG/HR	M3/MIN	M3/MIN
451.0	110	482	36.1	80.8	2,412.8	2,511.2	33.0	30.0
410.0	100	438	35.7	77.9	2,375.4	2,466.6	32.4	29.6
369.0	90	394	34.5	73.2	2,296.1	2,378.9	31.2	28.6
328.0	80	351	32.8	67.5	2,178.0	2,252.1	29.6	27.2
307.5	75	329	31.7	64.4	2,104.4	2,173.9	28.6	26.4
287.0	70	307	30.4	60.8	2,009.5	2,074.4	27.3	25.2
246.0	60	263	27.4	53.4	1,803.1	1,858.8	24.4	22.6
205.0	50	219	24.4	46.2	1,596.9	1,643.8	21.6	20.1
164.0	40	175	22.2	41.1	1,452.8	1,492.3	19.7	18.4
123.0	30	132	20.2	36.2	1,316.9	1,349.1	17.8	16.7
102.5	25	110	19.1	33.5	1,245.6	1,273.9	16.7	15.8
82.0	20	88.1	17.8	30.3	1,164.4	1,188.4	15.7	14.8
41.0	10	44.2	15.1	23.2	988.8	1,003.6	13.2	12.6

Heat Rejection Data

GENSET POWER WITHOUT FAN	PERCENT LOAD	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
EKW	%	BKW	KW	KW	KW	KW	KW	KW	KW	KW	KW
451.0	110	482	257	25.3	402	162	62.8	93.0	482	1,178	1,255
410.0	100	438	238	24.4	378	149	58.0	85.9	438	1,090	1,161
369.0	90	394	217	22.8	348	132	52.8	76.4	394	991	1,056
328.0	80	351	196	21.3	315	114	47.3	65.5	351	889	947
307.5	75	329	185	20.5	298	104	44.5	59.5	329	835	890
287.0	70	307	174	19.7	280	95.5	41.5	52.7	307	780	830
246.0	60	263	151	18.2	242	78.7	35.6	38.9	263	668	711
205.0	50	219	129	16.7	206	63.5	29.8	26.3	219	560	596
164.0	40	175	112	15.4	179	51.3	25.0	19.3	175	470	500
123.0	30	132	95.2	14.1	152	40.2	20.3	12.9	132	380	405
102.5	25	110	85.8	13.4	136	34.9	17.8	10.0	110	333	355
82.0	20	88.1	75.0	12.7	118	26.5	15.0	7.0	88.1	282	300
41.0	10	44.2	50.9	11.1	76.5	8.8	9.2	1.4	44.2	173	184

Sound Data

EXHAUST: Sound Power (1/3 Octave Frequencies)

GENSET POWER WITHOUT FAN	PERCENT LOAD	ENGINE POWER	OVERALL SOUND	100 HZ	125 HZ	160 HZ	200 HZ	250 HZ	315 HZ	400 HZ	500 HZ	630 HZ	800 HZ
EKW	%	BKW	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
451.0	110	482	122.3	99.5	104.2	93.4	103.9	97.6	99.5	107.3	108.1	109.0	105.6
410.0	100	438	122.1	99.8	104.3	93.3	103.7	96.4	99.7	107.1	107.9	108.6	105.4
369.0	90	394	121.6	100.4	104.8	93.2	103.5	95.4	100.2	105.9	107.1	108.0	105.1
328.0	80	351	120.8	100.9	105.3	93.0	103.2	94.3	100.6	104.8	106.3	107.3	104.8
307.5	75	329	120.4	101.1	105.5	92.9	103.1	93.7	100.6	104.2	105.8	106.9	104.7
287.0	70	307	120.0	101.0	105.3	92.8	103.0	93.2	100.0	103.7	105.4	106.5	104.7
246.0	60	263	119.1	100.4	104.7	92.5	102.9	92.1	98.4	102.6	104.5	105.5	104.8
205.0	50	219	118.1	99.4	103.7	92.1	102.9	91.0	96.6	101.6	103.6	104.5	104.8
164.0	40	175	117.1	98.3	102.6	91.1	101.7	90.5	95.4	101.3	102.8	103.9	104.3
123.0	30	132	116.0	96.6	101.0	90.3	99.6	90.4	94.3	101.1	101.9	103.3	103.4
102.5	25	110	115.3	95.7	100.0	90.1	98.2	90.6	93.7	101.0	101.5	102.8	102.8
82.0	20	88.1	114.1	94.6	98.0	90.5	96.2	91.2	93.1	100.9	100.6	102.3	102.1
41.0	10	44.2	111.5	91.5	93.9	91.0	92.2	92.1	91.5	100.9	99.2	100.7	100.1

EXHAUST: Sound Power (1/3 Octave Frequencies)

GENSET POWER	PERCENT LOAD	ENGINE POWER	1000 HZ	1250 HZ	1600 HZ	2000 HZ	2500 HZ	3150 HZ	4000 HZ	5000 HZ	6300 HZ	8000 HZ	10000 HZ
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WITHOUT FAN													
EKW	%	BKW	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
451.0	110	482	114.1	113.3	115.0	113.7	111.1	111.0	108.8	104.3	101.3	97.2	90.1
410.0	100	438	114.1	113.3	114.8	113.0	110.8	110.8	108.4	103.6	100.6	96.5	89.3
369.0	90	394	113.6	112.8	113.9	112.3	110.3	110.3	107.9	102.9	99.9	95.8	88.8
328.0	80	351	113.0	112.0	113.1	111.5	109.6	109.8	107.2	102.0	99.0	94.9	88.3
307.5	75	329	112.6	111.5	112.6	111.0	109.1	109.4	106.7	101.4	98.4	94.4	87.9
287.0	70	307	112.3	111.0	112.2	110.4	108.6	109.1	106.2	100.8	97.7	93.6	87.3
246.0	60	263	111.4	109.8	111.5	109.1	107.5	108.4	104.8	99.6	96.0	91.8	85.8
205.0	50	219	110.4	108.5	110.6	107.8	106.4	107.5	103.2	98.1	94.2	90.1	84.0
164.0	40	175	109.3	107.3	109.6	107.4	106.1	106.6	101.7	96.7	92.5	88.3	81.6
123.0	30	132	107.8	106.0	108.5	106.8	105.3	105.3	99.8	95.1	91.0	86.5	79.3
102.5	25	110	107.0	105.3	107.8	106.2	104.6	104.6	98.8	94.3	90.3	85.7	78.4
82.0	20	88.1	105.2	104.3	106.0	105.1	103.0	102.8	96.9	92.6	89.5	84.1	77.6
41.0	10	44.2	102.2	102.0	101.9	102.3	99.9	98.7	93.6	90.3	88.1	81.7	76.8

Sound Data (Continued)

MECHANICAL: Sound Power (1/3 Octave Frequencies)

GENSET POWER WITHOUT FAN	PERCENT LOAD	ENGINE POWER	OVERALL SOUND	100 HZ	125 HZ	160 HZ	200 HZ	250 HZ	315 HZ	400 HZ	500 HZ	630 HZ	800 HZ
EKW	%	BKW	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
451.0	110	482	115.5	69.8	84.2	88.3	85.2	87.9	90.5	95.2	101.6	105.1	105.5
410.0	100	438	114.9	68.9	82.7	86.3	84.2	86.2	89.2	94.4	100.9	104.1	104.6
369.0	90	394	114.3	67.9	81.4	84.6	83.3	85.6	88.9	93.8	101.0	103.2	104.0
328.0	80	351	113.7	66.8	80.4	83.3	82.5	85.1	89.2	93.4	101.4	102.4	103.4
307.5	75	329	113.4	66.2	79.8	82.7	82.2	84.8	89.4	93.2	101.6	102.0	103.1
287.0	70	307	113.1	65.6	79.1	82.4	82.2	84.5	89.1	93.1	101.2	102.3	102.8
246.0	60	263	112.6	64.2	77.6	81.9	82.3	83.9	88.5	93.0	100.4	103.0	102.3
205.0	50	219	112.2	62.8	76.1	81.3	82.5	83.3	88.4	93.3	99.6	103.8	101.8
164.0	40	175	112.4	61.8	74.2	80.8	82.3	85.4	91.3	95.1	100.5	103.5	102.5
123.0	30	132	112.5	61.0	72.5	80.3	81.8	87.0	93.2	96.4	101.1	102.8	102.8
102.5	25	110	112.2	60.7	71.8	80.0	81.4	87.1	93.1	96.5	101.0	102.3	102.6
82.0	20	88.1	111.5	61.0	71.4	79.2	80.7	85.5	90.8	95.8	100.0	101.5	101.5
41.0	10	44.2	109.8	61.2	70.6	78.0	79.3	82.6	85.7	93.2	97.6	100.5	99.4

MECHANICAL: Sound Power (1/3 Octave Frequencies)

GENSET POWER WITHOUT FAN	PERCENT LOAD	ENGINE POWER	1000 HZ	1250 HZ	1600 HZ	2000 HZ	2500 HZ	3150 HZ	4000 HZ	5000 HZ	6300 HZ	8000 HZ	10000 HZ
EKW	%	BKW	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
451.0	110	482	106.0	107.3	108.0	105.8	104.0	102.3	100.0	98.0	98.1	95.7	93.9
410.0	100	438	106.4	107.2	107.7	104.2	103.0	101.8	99.3	97.4	97.4	95.4	92.3
369.0	90	394	105.6	106.8	107.1	103.5	102.3	101.2	98.7	96.9	96.9	95.2	92.1
328.0	80	351	104.9	106.4	106.2	103.1	101.6	100.5	98.1	96.3	96.3	95.0	92.4
307.5	75	329	104.5	106.1	105.6	102.9	101.2	100.1	97.8	96.0	95.9	94.8	92.4
287.0	70	307	104.1	106.0	104.9	102.8	100.9	99.8	97.4	95.6	95.3	94.5	91.6
246.0	60	263	103.5	105.8	103.5	102.5	100.2	99.2	96.5	94.8	94.1	93.6	89.4
205.0	50	219	102.8	105.7	102.0	102.2	99.5	98.7	95.6	94.1	92.9	92.4	87.0
164.0	40	175	103.1	106.1	101.0	101.5	100.3	99.8	95.5	94.4	92.8	90.9	85.1
123.0	30	132	103.2	106.2	100.2	100.7	100.8	100.4	95.1	94.2	92.4	89.1	83.3
102.5	25	110	103.1	106.0	99.9	100.4	100.6	100.1	94.5	93.7	91.8	88.0	82.3
82.0	20	88.1	102.5	105.1	100.0	100.2	99.5	98.8	93.1	92.5	90.8	86.4	80.8
41.0	10	44.2	101.3	103.6	99.5	100.1	97.0	95.7	90.7	89.6	87.8	83.4	78.6

Emissions Data

DIESEL

RATED SPEED NOMINAL DATA: 1500 RPM

GENSET POWER WITHOUT FAN	EKW	451.0	410.0	307.5	205.0	102.5	41.0
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PERFORMANCE DATA[EM1462]

July 22, 2021

PERCENT LOAD	%	110	100	75	50	25	10
ENGINE POWER	BKW	482	438	329	219	110	44.2
TOTAL NOX (AS NO2)	G/HR	3,711	2,868	1,805	1,268	488	245
TOTAL CO	G/HR	290	231	138	153	150	187
TOTAL HC	G/HR	8	13	24	20	29	29
TOTAL CO2	KG/HR	316	293	223	148	88	45
PART MATTER	G/HR	17.1	19.6	17.6	25.2	11.5	18.8
TOTAL NOX (AS NO2)	(CORR 5% O2) MG/NM3	2,790.1	2,326.6	1,911.2	2,005.2	1,293.6	1,257.2
TOTAL CO	(CORR 5% O2) MG/NM3	217.9	187.4	146.6	241.3	397.7	959.9
TOTAL HC	(CORR 5% O2) MG/NM3	5.0	9.3	22.4	26.8	66.8	129.5
PART MATTER	(CORR 5% O2) MG/NM3	10.5	13.1	15.7	34.1	26.5	88.0
TOTAL NOX (AS NO2)	(CORR 5% O2) PPM	1,359	1,133	931	977	630	612
TOTAL CO	(CORR 5% O2) PPM	174	150	117	193	318	768
TOTAL HC	(CORR 5% O2) PPM	9	17	42	50	125	242
TOTAL NOX (AS NO2)	G/HP-HR	5.79	4.91	4.11	4.34	3.32	4.14
TOTAL CO	G/HP-HR	0.45	0.40	0.32	0.52	1.02	3.17
TOTAL HC	G/HP-HR	0.01	0.02	0.06	0.07	0.20	0.50
PART MATTER	G/HP-HR	0.03	0.03	0.04	0.09	0.08	0.32
TOTAL NOX (AS NO2)	LB/HR	8.18	6.32	3.98	2.80	1.08	0.54
TOTAL CO	LB/HR	0.64	0.51	0.31	0.34	0.33	0.41
TOTAL HC	LB/HR	0.02	0.03	0.05	0.04	0.06	0.06
TOTAL CO2	LB/HR	698	645	492	326	193	99
PART MATTER	LB/HR	0.04	0.04	0.04	0.06	0.03	0.04
OXYGEN IN EXH	%	8.3	9.1	10.7	12.0	14.2	16.7
DRY SMOKE OPACITY	%	0.9	1.1	1.1	2.2	0.9	2.3
BOSCH SMOKE NUMBER		0.32	0.42	0.45	0.97	0.29	1.05

RATED SPEED POTENTIAL SITE VARIATION: 1500 RPM

GENSET POWER WITHOUT FAN	EKW	451.0	410.0	307.5	205.0	102.5	41.0
PERCENT LOAD	%	110	100	75	50	25	10
ENGINE POWER	BKW	482	438	329	219	110	44.2
TOTAL NOX (AS NO2)	G/HR	4,007	3,098	1,949	1,370	527	264
TOTAL CO	G/HR	543	432	259	286	280	350
TOTAL HC	G/HR	15	25	46	37	55	55
PART MATTER	G/HR	33.3	38.2	34.3	49.1	22.4	36.6
TOTAL NOX (AS NO2)	(CORR 5% O2) MG/NM3	3,013.3	2,512.7	2,064.1	2,165.6	1,397.0	1,357.7
TOTAL CO	(CORR 5% O2) MG/NM3	407.4	350.5	274.1	451.2	743.7	1,795.0
TOTAL HC	(CORR 5% O2) MG/NM3	9.4	17.6	42.4	50.7	126.2	244.8
PART MATTER	(CORR 5% O2) MG/NM3	20.5	25.5	30.6	66.4	51.7	171.6
TOTAL NOX (AS NO2)	(CORR 5% O2) PPM	1,468	1,224	1,005	1,055	680	661
TOTAL CO	(CORR 5% O2) PPM	326	280	219	361	595	1,436
TOTAL HC	(CORR 5% O2) PPM	18	33	79	95	236	457
TOTAL NOX (AS NO2)	G/HP-HR	6.26	5.31	4.44	4.68	3.59	4.48
TOTAL CO	G/HP-HR	0.85	0.74	0.59	0.98	1.91	5.93
TOTAL HC	G/HP-HR	0.02	0.04	0.11	0.13	0.38	0.94
PART MATTER	G/HP-HR	0.05	0.07	0.08	0.17	0.15	0.62
TOTAL NOX (AS NO2)	LB/HR	8.83	6.83	4.30	3.02	1.16	0.58
TOTAL CO	LB/HR	1.20	0.95	0.57	0.63	0.62	0.77
TOTAL HC	LB/HR	0.03	0.05	0.10	0.08	0.12	0.12
PART MATTER	LB/HR	0.07	0.08	0.08	0.11	0.05	0.08

Regulatory Information

CCNR STAGE II	2006 - ----
GASEOUS EMISSION DATA MEASUREMENTS ARE CONSISTENT WITH THOSE DESCRIBED IN CHAPTER 8A OF RHINE VESSEL INSPECTION REGULATION (RVIR) AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. GASEOUS EMISSIONS VALUES ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE MARINE REGULATIONS.	

EPA TIER 2		2007 - 2013		CYCLE :D2	
GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO THE EPA ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 94.103 AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THIS ENGINE CONFORMS TO US EPA MARINE COMMERCIAL COMPRESSION-IGNITION EMISSION REGULATIONS. THE "MAX LIMITS" SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE MARINE REGULATIONS.					
Locality	Agency	Regulation	Tier/Stage	Max Limits - G/BKW - HR	
U.S. (INCL CALIF)	EPA	MARINE COMMERCIAL	TIER 2	CO: 5.0 NOx + HC: 7.2 PM: 0.20	

IMO II		2011 - ----		CYCLE :E2,D2	
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.					

Cross Reference

Test Spec	Setting	Engine Arrangement	Engineering Model	Engineering Model Version	Start Effective Serial Number	End Effective Serial Number
4150044	PP7197	3697552	GS606	-	GPT00001	
4150044	PP7198	3697552	GS606	-	GPT00001	

Performance Parameter Reference

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

PERFORMANCE DATA[EM1462]

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:

PERFORMANCE DATA[EM1462]

July 22, 2021

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