Performance Number: DM9248 Change Level: 05

SALES MODEL:	3516C	**COMBUSTION:**	DIRECT INJECTION
BRAND:	CAT	**ENGINE SPEED (RPM):**	1,600
MACHINE SALES MODEL:		**PEAK TORQUE SPEED (RPM):**	1,000
ENGINE POWER (BHP):	2,100	**ASPIRATION:**	TA
PEAK TORQUE (FT-LB):	9,876.0	**AFTERCOOLER TYPE:**	SCAC
COMPRESSION RATIO:	14.7	**AFTERCOOLER CIRCUIT TYPE:**	JW+OC, AC
RATING LEVEL:	B-RATING (HEAVY DUTY)	**AFTERCOOLER TEMP (F):**	113
PUMP QUANTITY:	2	**JACKET WATER TEMP (F):**	210.2
FUEL TYPE:	DIESEL	**TURBO CONFIGURATION:**	PARALLEL
MANIFOLD TYPE:	DRY	**TURBO QUANTITY:**	2
GOVERNOR TYPE:	ADEM3	**TURBOCHARGER MODEL:**	GTB6251BLN-48T-1.38
ELECTRONICS TYPE:	ADEM3	**CERTIFICATION YEAR:**	2007
IGNITION TYPE:	CI	**CRANKCASE BLOWBY RATE (FT3/HR):**	2,098.5
INJECTOR TYPE:	EUI	**FUEL RATE (RATED RPM) NO LOAD (GAL/HR):**	11.8
FUEL INJECTOR:	2664387	**PISTON SPD @ RATED ENG SPD (FT/MIN):**	1,994.8
UNIT INJECTOR TIMING (IN):	64.34		
REF EXH STACK DIAMETER (IN):	12		
MAX OPERATING ALTITUDE (FT):	2,297		

INDUSTRY	SubIndustry	APPLICATION
MARINE	FERRY	MARINE PROPULSION
MARINE	FISHING	MARINE PROPULSION
MARINE	TUG & SALVAGE	MARINE PROPULSION
MARINE	DREDGE	MARINE PROPULSION
MARINE	INLAND WATERWAY	MARINE PROPULSION
MARINE	GENERAL CARGO	MARINE PROPULSION
MARINE	OFFSHORE	MARINE PROPULSION

General Performance Data

ZONE 1

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

1,600	2,000	6,566	235	0.333	0.327	94.0	92.2
1,500	2,000	7,003	251	0.333	0.327	94.0	92.2
1,400	1,900	7,129	255	0.323	0.317	86.5	84.9
1,300	1,765	7,130	255	0.315	0.309	78.4	76.9
1,200	1,678	7,345	263	0.311	0.305	73.5	72.1
1,100	1,525	7,280	261	0.314	0.308	67.5	66.2
1,000	1,482	7,783	279	0.315	0.309	65.9	64.6
900	953	5,560	199	0.340	0.334	45.7	44.8
800	551	3,618	130	0.356	0.350	27.7	27.2
700	389	2,918	104	0.367	0.360	20.1	19.7
600	278	2,430	87	0.398	0.390	15.6	15.3

ZONE 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	BHP	IN-HG	DEG F	DEG F	IN-HG	DEG F	IN-HG	DEG F
1,600	2,000	67.0	129.9	985.3	68.4	674.4	69	406.1
1,500	2,000	70.8	130.0	997.2	68.3	664.7	73	408.6
1,400	1,900	70.9	131.3	942.4	61.8	677.6	73	381.9
1,300	1,765	66.5	130.6	907.1	52.5	626.1	68	353.0
1,200	1,678	61.4	129.8	925.0	44.1	655.8	63	332.0
1,100	1,525	52.0	130.3	986.0	35.0	739.5	53	305.7
1,000	1,482	49.0	132.1	1,096.9	30.4	781.4	50	298.4
900	953	24.0	131.6	1,154.0	14.8	926.7	24	207.5
800	551	8.8	134.7	1,053.5	6.1	860.1	9	132.1
700	389	4.5	136.0	961.2	3.5	753.6	5	107.4
600	278	2.3	134.8	835.2	2.1	736.9	2	92.9

ZONE 1

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
1,600	2,000	5,211.6	11,113.9	22,407.6	23,071.7	4,818.3	4,505.2
1,500	2,000	5,211.2	11,081.3	22,374.3	23,040.7	4,845.7	4,531.6
1,400	1,900	4,966.3	10,481.9	21,324.9	21,887.5	4,531.4	4,227.3
1,300	1,765	4,516.5	9,236.6	19,306.4	19,862.2	4,182.7	3,904.0
1,200	1,678	4,020.4	8,410.1	17,088.7	17,609.8	3,706.8	3,441.8

1,100	1,525	3,314.5	7,448.1	14,029.4	14,508.1	3,053.8	2,813.1
1,000	1,482	2,933.7	6,817.2	12,351.0	12,818.4	2,700.8	2,468.9
900	953	1,768.4	4,584.8	7,439.6	7,761.6	1,626.0	1,470.3
800	551	1,079.6	2,678.2	4,545.2	4,741.8	997.8	902.4
700	389	801.9	1,839.6	3,397.5	3,540.4	745.5	675.7
600	278	629.2	1,415.0	2,668.1	2,778.6	581.4	531.4

ZONE 1-2

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
1,600	2,100	6,894	247	0.332	0.325	98.2	96.3
1,500	2,100	7,353	263	0.329	0.323	97.5	95.6
1,400	2,008	7,534	270	0.321	0.315	90.9	89.2
1,300	1,855	7,496	268	0.314	0.308	82.0	80.5
1,200	1,765	7,724	277	0.309	0.304	77.0	75.5
1,100	1,609	7,680	275	0.312	0.306	70.8	69.5
1,000	1,582	8,307	298	0.314	0.308	70.0	68.7
900	1,120	6,535	234	0.338	0.332	53.4	52.3
800	551	3,618	130	0.356	0.350	27.7	27.2
700	389	2,918	104	0.367	0.360	20.1	19.7
600	278	2,430	87	0.398	0.390	15.6	15.3

ZONE 1-2

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
1,600	2,100	68.2	130.1	1,008.8	70.2	691.3	70	415.7
1,500	2,100	71.8	130.3	1,014.0	69.6	675.7	74	416.0
1,400	2,008	72.6	131.3	965.8	63.8	677.6	75	392.0
1,300	1,855	69.1	130.7	923.0	54.9	631.8	71	363.3
1,200	1,765	64.8	130.1	936.0	46.8	656.0	66	342.9
1,100	1,609	55.6	130.2	990.9	37.3	733.8	56	316.9
1,000	1,582	53.8	132.0	1,102.4	33.4	772.0	54	313.7
900	1,120	31.2	130.4	1,193.5	18.5	939.3	32	240.3
800	551	8.8	134.7	1,053.5	6.1	860.1	9	132.1
700	389	4.5	136.0	961.2	3.5	753.6	5	107.4
600	278	2.3	134.8	835.2	2.1	736.9	2	92.9

ZONE 1-2

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
1,600	2,100	5,265.9	11,417.9	22,639.2	23,335.6	4,877.5	4,551.5
1,500	2,100	5,242.1	11,273.8	22,518.4	23,210.2	4,882.0	4,557.5
1,400	2,008	5,039.5	10,583.1	21,658.6	22,254.4	4,575.2	4,260.0
1,300	1,855	4,629.7	9,537.0	19,812.4	20,394.1	4,296.1	4,005.6
1,200	1,765	4,164.6	8,728.1	17,720.8	18,266.8	3,846.6	3,569.5
1,100	1,609	3,465.6	7,759.2	14,685.0	15,187.5	3,196.4	2,944.1
1,000	1,582	3,122.4	7,207.0	13,156.8	13,653.4	2,876.9	2,630.3
900	1,120	2,023.2	5,329.6	8,517.8	8,896.2	1,873.1	1,690.3
800	551	1,079.6	2,678.2	4,545.2	4,741.8	997.8	902.4
700	389	801.9	1,839.6	3,397.5	3,540.4	745.5	675.7
600	278	629.2	1,415.0	2,668.1	2,778.6	581.4	531.4

ZONE 2-3

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
1,600	2,100	6,894	247	0.332	0.325	98.2	96.3
1,500	2,100	7,353	263	0.329	0.323	97.5	95.6
1,400	2,100	7,878	282	0.320	0.314	94.7	92.9
1,300	1,939	7,834	281	0.313	0.307	85.5	83.8
1,200	1,843	8,064	289	0.309	0.303	80.2	78.7
1,100	1,686	8,048	288	0.311	0.305	74.0	72.6
1,000	1,674	8,793	315	0.313	0.307	73.9	72.4
900	1,348	7,865	282	0.341	0.335	64.9	63.6
800	551	3,618	130	0.356	0.350	27.7	27.2
700	389	2,918	104	0.367	0.360	20.1	19.7
600	278	2,430	87	0.398	0.390	15.6	15.3

ZONE 2-3

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	BHP	IN-HG	DEG F	DEG F	IN-HG	DEG F	IN-HG	DEG F
1,600	2,100	68.2	130.1	1,008.8	70.2	691.3	70	415.7
1,500	2,100	71.8	130.3	1,014.0	69.6	675.7	74	416.0
1,400	2,100	74.0	131.4	985.4	65.6	677.6	76	401.1

1,300	1,939	71.4	130.8	938.7	57.2	638.3	73	372.8
1,200	1,843	67.8	130.5	946.5	49.2	656.9	69	352.7
1,100	1,686	59.2	130.2	996.4	39.5	728.3	60	327.7
1,000	1,674	58.3	131.8	1,104.9	36.2	764.0	59	327.6
900	1,348	41.6	129.8	1,222.8	23.8	988.2	42	281.7
800	551	8.8	134.7	1,053.5	6.1	860.1	9	132.1
700	389	4.5	136.0	961.2	3.5	753.6	5	107.4
600	278	2.3	134.8	835.2	2.1	736.9	2	92.9

ZONE 2-3

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
1,600	2,100	5,265.9	11,417.9	22,639.2	23,335.6	4,877.5	4,551.5
1,500	2,100	5,242.1	11,273.8	22,518.4	23,210.2	4,882.0	4,557.5
1,400	2,100	5,098.0	10,758.2	21,926.1	22,563.4	4,650.9	4,322.1
1,300	1,939	4,728.6	9,815.0	20,256.1	20,862.0	4,395.2	4,093.8
1,200	1,843	4,292.3	9,016.5	18,282.9	18,851.6	3,970.4	3,682.3
1,100	1,686	3,611.8	8,058.8	15,321.9	15,846.7	3,335.2	3,071.7
1,000	1,674	3,302.9	7,578.6	13,928.3	14,452.2	3,045.1	2,784.7
900	1,348	2,378.6	6,505.7	10,023.2	10,483.2	2,209.2	1,988.4
800	551	1,079.6	2,678.2	4,545.2	4,741.8	997.8	902.4
700	389	801.9	1,839.6	3,397.5	3,540.4	745.5	675.7
600	278	629.2	1,415.0	2,668.1	2,778.6	581.4	531.4

MAXIMUM LIMIT

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
1,600	2,100	6,894	247	0.332	0.325	98.2	96.3
1,500	2,100	7,353	263	0.329	0.323	97.5	95.6
1,400	2,100	7,878	282	0.320	0.314	94.7	92.9
1,300	2,100	8,484	304	0.311	0.305	92.2	90.4
1,200	2,020	8,842	317	0.308	0.302	87.6	86.0
1,100	1,881	8,980	322	0.310	0.304	82.3	80.7
1,000	1,881	9,878	354	0.312	0.306	82.7	81.1
900	1,348	7,865	282	0.341	0.335	64.9	63.6

800	675	4,428	159	0.360	0.353	34.2	33.6
700	432	3,240	116	0.369	0.362	22.5	22.0
600	304	2,659	95	0.397	0.389	17.0	16.7

MAXIMUM LIMIT

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
1,600	2,100	68.2	130.1	1,008.8	70.2	691.3	70	415.7
1,500	2,100	71.8	130.3	1,014.0	69.6	675.7	74	416.0
1,400	2,100	74.0	131.4	985.4	65.6	677.6	76	401.1
1,300	2,100	75.6	130.7	971.7	61.3	653.9	77	390.8
1,200	2,020	74.8	131.7	972.9	55.0	662.0	76	374.9
1,100	1,881	68.9	131.2	1,013.9	46.5	714.0	70	356.8
1,000	1,881	68.9	131.2	1,101.6	42.8	748.5	69	357.4
900	1,348	41.6	129.8	1,222.8	23.8	988.2	42	281.7
800	675	12.6	136.6	1,185.5	8.0	952.0	13	154.2
700	432	5.4	137.0	1,042.0	3.9	811.5	6	113.2
600	304	2.7	135.6	903.8	2.3	792.9	3	95.5

MAXIMUM LIMIT

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
1,600	2,100	5,265.9	11,417.9	22,639.2	23,335.6	4,877.5	4,551.5
1,500	2,100	5,242.1	11,273.8	22,518.4	23,210.2	4,882.0	4,557.5
1,400	2,100	5,098.0	10,758.2	21,926.1	22,563.4	4,650.9	4,322.1
1,300	2,100	4,902.4	10,348.2	21,040.6	21,693.7	4,569.0	4,246.6
1,200	2,020	4,577.4	9,684.5	19,544.4	20,165.8	4,245.1	3,932.0
1,100	1,881	4,010.1	8,869.5	17,069.5	17,653.0	3,715.5	3,422.0
1,000	1,881	3,725.7	8,444.7	15,737.1	16,323.6	3,436.5	3,145.9
900	1,348	2,378.6	6,505.7	10,023.2	10,483.2	2,209.2	1,988.4
800	675	1,205.4	3,233.9	5,079.0	5,322.0	1,126.4	1,009.5
700	432	828.6	2,000.0	3,510.8	3,670.2	773.5	696.7
600	304	632.1	1,490.2	2,680.9	2,801.5	585.0	530.9

PROP DEMAND CURVE P

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
1,600	2,100	6,894	247	0.332	0.325	98.2	96.3
1,500	1,730	6,059	217	0.341	0.335	83.2	81.6
1,400	1,407	5,278	189	0.340	0.333	67.3	66.1
1,300	1,126	4,551	163	0.335	0.328	53.1	52.1
1,200	886	3,878	139	0.365	0.358	45.5	44.7
1,100	682	3,258	117	0.346	0.339	33.3	32.7
1,000	513	2,693	96	0.359	0.353	26.0	25.5
900	374	2,181	78	0.367	0.360	19.3	19.0
800	263	1,723	62	0.378	0.371	14.0	13.7
700	176	1,319	47	0.398	0.390	9.9	9.7
600	111	969	35	0.443	0.435	6.9	6.8

PROP DEMAND CURVE P

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
1,600	2,100	68.2	130.1	1,008.8	70.2	691.3	70	415.7
1,500	1,730	66.9	129.2	935.8	63.3	622.0	69	382.4
1,400	1,407	56.8	130.0	833.8	48.0	677.6	59	322.7
1,300	1,126	43.7	128.4	824.6	34.2	614.8	45	275.0
1,200	886	28.1	129.3	836.9	20.8	817.2	29	218.6
1,100	682	17.4	130.7	851.1	13.3	737.5	18	173.7
1,000	513	10.7	130.1	825.5	8.6	730.1	11	138.2
900	374	5.7	131.1	744.9	5.3	664.3	6	112.9
800	263	3.1	129.7	649.9	3.2	547.3	3	96.7
700	176	1.6	129.1	543.4	2.1	414.3	2	88.1
600	111	0.8	129.1	450.3	1.4	306.6	1	81.5

PROP DEMAND CURVE P

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
1,600	2,100	5,265.9	11,417.9	22,639.2	23,335.6	4,877.5	4,551.5
1,500	1,730	5,074.5	10,338.2	21,748.5	22,339.1	4,699.3	4,417.5
1,400	1,407	4,369.3	9,293.2	18,614.3	19,087.7	4,017.5	3,767.6

1,300	1,126	3,480.0	6,954.6	14,741.3	15,118.2	3,182.2	2,987.0
1,200	886	2,511.7	5,980.3	10,563.2	10,886.3	2,302.7	2,137.5
1,100	682	1,859.0	4,125.3	7,810.0	8,046.2	1,694.2	1,572.5
1,000	513	1,440.8	3,158.5	6,013.6	6,197.9	1,305.2	1,211.2
900	374	1,107.4	2,302.2	4,646.7	4,783.7	1,007.1	935.2
800	263	890.7	1,658.0	3,748.7	3,847.9	809.6	756.5
700	176	725.9	1,176.4	3,075.5	3,145.4	661.8	622.5
600	111	591.0	834.8	2,496.7	2,545.9	535.7	510.8

MAXIMUM POWER CURVE M

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
1,600	2,100	6,894	247	0.332	0.325	98.2	96.3
1,500	2,100	7,353	263	0.329	0.323	97.5	95.6
1,400	2,100	7,878	282	0.320	0.314	94.7	92.9
1,300	2,100	8,484	304	0.311	0.305	92.2	90.4
1,200	2,020	8,842	317	0.308	0.302	87.6	86.0
1,100	1,881	8,980	322	0.310	0.304	82.3	80.7
1,000	1,881	9,878	354	0.312	0.306	82.7	81.1
900	1,348	7,865	282	0.341	0.335	64.9	63.6
800	675	4,428	159	0.360	0.353	34.2	33.6
700	432	3,240	116	0.369	0.362	22.5	22.0
600	304	2,659	95	0.397	0.389	17.0	16.7

MAXIMUM POWER CURVE M

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
1,600	2,100	68.2	130.1	1,008.8	70.2	691.3	70	415.7
1,500	2,100	71.8	130.3	1,014.0	69.6	675.7	74	416.0
1,400	2,100	74.0	131.4	985.4	65.6	677.6	76	401.1
1,300	2,100	75.6	130.7	971.7	61.3	653.9	77	390.8
1,200	2,020	74.8	131.7	972.9	55.0	662.0	76	374.9
1,100	1,881	68.9	131.2	1,013.9	46.5	714.0	70	356.8
1,000	1,881	68.9	131.2	1,101.6	42.8	748.5	69	357.4
900	1,348	41.6	129.8	1,222.8	23.8	988.2	42	281.7
800	675	12.6	136.6	1,185.5	8.0	952.0	13	154.2

700	432	5.4	137.0	1,042.0	3.9	811.5	6	113.2
600	304	2.7	135.6	903.8	2.3	792.9	3	95.5

MAXIMUM POWER CURVE M

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
1,600	2,100	5,265.9	11,417.9	22,639.2	23,335.6	4,877.5	4,551.5
1,500	2,100	5,242.1	11,273.8	22,518.4	23,210.2	4,882.0	4,557.5
1,400	2,100	5,098.0	10,758.2	21,926.1	22,563.4	4,650.9	4,322.1
1,300	2,100	4,902.4	10,348.2	21,040.6	21,693.7	4,569.0	4,246.6
1,200	2,020	4,577.4	9,684.5	19,544.4	20,165.8	4,245.1	3,932.0
1,100	1,881	4,010.1	8,869.5	17,069.5	17,653.0	3,715.5	3,422.0
1,000	1,881	3,725.7	8,444.7	15,737.1	16,323.6	3,436.5	3,145.9
900	1,348	2,378.6	6,505.7	10,023.2	10,483.2	2,209.2	1,988.4
800	675	1,205.4	3,233.9	5,079.0	5,322.0	1,126.4	1,009.5
700	432	828.6	2,000.0	3,510.8	3,670.2	773.5	696.7
600	304	632.1	1,490.2	2,680.9	2,801.5	585.0	530.9

Heat Rejection Data

Note(s)
HEAT REJECTION DATA REPRESENTS OPERATION AT STEADY STATE. VALUES WILL DIFFER DURING TRANSIENT OPERATION.

MAXIMUM LIMIT

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
BHP	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN
2,100	34,015	6,670	71,962	33,089	11,376	26,217	89,057	213,580	227,516

Sound Data

EXHAUST:SOUND PRESSURE(OBCF) DISTANCE:1.5 METER PROP DEMAND CURVE P

ENGINE SPEED	ENGINE POWER	OVERALL SOUND	63 HZ	125 HZ	250 HZ	500 HZ
RPM	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
1,600	2,100	114.0	108.0	119.0	114.0	107.0

1,500	1,730	112.0	107.0	117.0	113.0	105.0
1,400	1,407	111.0	105.0	116.0	111.0	104.0
1,300	1,126	109.0	108.0	114.0	109.0	102.0
1,200	886	108.0	107.0	113.0	108.0	101.0
1,100	682	107.0	106.0	112.0	107.0	100.0
1,000	513	105.0	113.0	109.0	103.0	99.0
900	374	104.0	112.0	108.0	102.0	98.0
800	263	103.0	111.0	107.0	101.0	97.0
700	176	102.0	110.0	106.0	100.0	96.0
600	111	101.0	109.0	105.0	99.0	95.0

EXHAUST:SOUND PRESSURE(OBCF) DISTANCE:1.5 METER PROP DEMAND CURVE P

ENGINE SPEED	ENGINE POWER	1000 HZ	2000 HZ	4000 HZ	8000 HZ
RPM	BHP	dB(A)	dB(A)	dB(A)	dB(A)
1,600	2,100	105.0	107.0	107.0	104.0
1,500	1,730	104.0	105.0	106.0	103.0
1,400	1,407	102.0	104.0	104.0	101.0
1,300	1,126	101.0	104.0	102.0	100.0
1,200	886	99.0	102.0	101.0	99.0
1,100	682	98.0	101.0	100.0	98.0
1,000	513	98.0	101.0	94.0	90.0
900	374	97.0	100.0	93.0	89.0
800	263	96.0	99.0	92.0	88.0
700	176	95.0	98.0	91.0	87.0
600	111	94.0	97.0	90.0	86.0

EXHAUST:SOUND PRESSURE(OBCF) DISTANCE:7 METER PROP DEMAND CURVE P

ENGINE SPEED	ENGINE POWER	OVERALL SOUND	63 HZ	125 HZ	250 HZ	500 HZ
RPM	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
1,600	2,100	100.0	97.0	108.0	102.0	93.0
1,500	1,730	99.0	95.0	106.0	100.0	91.0
1,400	1,407	97.0	94.0	105.0	99.0	90.0
1,300	1,126	96.0	98.0	102.0	97.0	90.0
1,200	886	94.0	96.0	101.0	95.0	88.0
1,100	682	93.0	95.0	100.0	94.0	87.0
1,000	513	92.0	102.0	100.0	91.0	88.0
900	374	91.0	101.0	99.0	90.0	87.0

800	263	90.0	100.0	98.0	89.0	86.0
700	176	89.0	99.0	97.0	88.0	85.0
600	111	88.0	98.0	96.0	87.0	84.0

EXHAUST:SOUND PRESSURE(OBCF) DISTANCE:7 METER PROP DEMAND CURVE P

ENGINE SPEED	ENGINE POWER	1000 HZ	2000 HZ	4000 HZ	8000 HZ
RPM	BHP	dB(A)	dB(A)	dB(A)	dB(A)
1,600	2,100	92.0	93.0	94.0	89.0
1,500	1,730	91.0	92.0	92.0	88.0
1,400	1,407	89.0	90.0	91.0	86.0
1,300	1,126	90.0	90.0	90.0	85.0
1,200	886	88.0	89.0	88.0	83.0
1,100	682	87.0	88.0	87.0	82.0
1,000	513	86.0	86.0	81.0	77.0
900	374	85.0	85.0	80.0	76.0
800	263	84.0	84.0	79.0	75.0
700	176	83.0	83.0	78.0	74.0
600	111	82.0	82.0	77.0	73.0

EXHAUST:SOUND PRESSURE(OBCF) DISTANCE:15 METER PROP DEMAND CURVE P

ENGINE SPEED	ENGINE POWER	OVERALL SOUND	63 HZ	125 HZ	250 HZ	500 HZ
RPM	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
1,600	2,100	94.0	90.0	101.0	95.0	86.0
1,500	1,730	92.0	89.0	100.0	94.0	85.0
1,400	1,407	91.0	87.0	98.0	92.0	83.0
1,300	1,126	89.0	91.0	96.0	90.0	83.0
1,200	886	88.0	90.0	94.0	89.0	82.0
1,100	682	87.0	89.0	93.0	88.0	81.0
1,000	513	85.0	96.0	93.0	84.0	81.0
900	374	84.0	95.0	92.0	83.0	80.0
800	263	83.0	94.0	91.0	82.0	79.0
700	176	82.0	93.0	90.0	81.0	78.0
600	111	81.0	92.0	89.0	80.0	77.0

EXHAUST:SOUND PRESSURE(OBCF) DISTANCE:15 METER PROP DEMAND CURVE P

ENGINE SPEED	ENGINE POWER	1000 HZ	2000 HZ	4000 HZ	8000 HZ
RPM	BHP	dB(A)	dB(A)	dB(A)	dB(A)
1,600	2,100	86.0	87.0	87.0	83.0
1,500	1,730	84.0	85.0	86.0	81.0
1,400	1,407	83.0	84.0	84.0	80.0
1,300	1,126	83.0	84.0	83.0	78.0
1,200	886	82.0	82.0	82.0	77.0
1,100	682	80.0	81.0	81.0	76.0
1,000	513	80.0	79.0	74.0	70.0
900	374	79.0	78.0	73.0	69.0
800	263	78.0	77.0	72.0	68.0
700	176	77.0	76.0	71.0	67.0
600	111	76.0	75.0	70.0	66.0

MECHANICAL:SOUND PRESSURE(OBCF) DISTANCE:1 METER PROP DEMAND CURVE P

ENGINE SPEED	ENGINE POWER	OVERALL SOUND	63 HZ	125 HZ	250 HZ	500 HZ
RPM	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
1,600	2,100	104.0	95.0	100.0	99.0	96.0
1,500	1,730	103.0	95.0	99.0	98.0	95.0
1,400	1,407	103.0	94.0	98.0	97.0	94.0
1,300	1,126	102.0	98.0	99.0	96.0	92.0
1,200	886	102.0	97.0	98.0	95.0	91.0
1,100	682	101.0	97.0	97.0	95.0	90.0
1,000	513	100.0	96.0	97.0	94.0	90.0
900	374	100.0	95.0	96.0	93.0	89.0
800	263	99.0	95.0	96.0	93.0	89.0
700	176	98.0	94.0	95.0	92.0	88.0
600	111	98.0	93.0	94.0	91.0	87.0

MECHANICAL:SOUND PRESSURE(OBCF) DISTANCE:1 METER PROP DEMAND CURVE P

ENGINE SPEED	ENGINE POWER	1000 HZ	2000 HZ	4000 HZ	8000 HZ
RPM	BHP	dB(A)	dB(A)	dB(A)	dB(A)
1,600	2,100	99.0	99.0	97.0	101.0
1,500	1,730	98.0	98.0	96.0	100.0
1,400	1,407	97.0	98.0	96.0	99.0
1,300	1,126	97.0	97.0	94.0	98.0
1,200	886	96.0	97.0	94.0	97.0

1,100	682	95.0	96.0	93.0	96.0
1,000	513	95.0	96.0	92.0	96.0
900	374	94.0	95.0	92.0	95.0
800	263	93.0	94.0	91.0	95.0
700	176	93.0	94.0	91.0	94.0
600	111	92.0	93.0	90.0	93.0

MECHANICAL:SOUND PRESSURE(OBCF) DISTANCE:7 METER PROP DEMAND CURVE P

ENGINE SPEED	ENGINE POWER	OVERALL SOUND	63 HZ	125 HZ	250 HZ	500 HZ
RPM	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
1,600	2,100	92.0	84.0	88.0	87.0	84.0
1,500	1,730	92.0	83.0	87.0	86.0	83.0
1,400	1,407	91.0	83.0	87.0	86.0	83.0
1,300	1,126	91.0	86.0	87.0	84.0	80.0
1,200	886	90.0	86.0	86.0	84.0	79.0
1,100	682	89.0	85.0	86.0	83.0	79.0
1,000	513	89.0	84.0	85.0	82.0	78.0
900	374	88.0	84.0	85.0	82.0	78.0
800	263	87.0	83.0	84.0	81.0	77.0
700	176	87.0	82.0	83.0	80.0	76.0
600	111	86.0	82.0	83.0	80.0	76.0

MECHANICAL:SOUND PRESSURE(OBCF) DISTANCE:7 METER PROP DEMAND CURVE P

ENGINE SPEED	ENGINE POWER	1000 HZ	2000 HZ	4000 HZ	8000 HZ
RPM	BHP	dB(A)	dB(A)	dB(A)	dB(A)
1,600	2,100	87.0	87.0	85.0	89.0
1,500	1,730	86.0	87.0	85.0	88.0
1,400	1,407	86.0	86.0	84.0	88.0
1,300	1,126	85.0	86.0	83.0	86.0
1,200	886	84.0	85.0	82.0	85.0
1,100	682	84.0	85.0	81.0	85.0
1,000	513	83.0	84.0	81.0	84.0
900	374	82.0	83.0	80.0	84.0
800	263	82.0	83.0	80.0	83.0
700	176	81.0	82.0	79.0	82.0
600	111	81.0	82.0	78.0	82.0

MECHANICAL:SOUND PRESSURE(OBCF) DISTANCE:15 METER PROP DEMAND CURVE P

ENGINE SPEED	ENGINE POWER	OVERALL SOUND	63 HZ	125 HZ	250 HZ	500 HZ
RPM	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
1,600	2,100	87.0	78.0	83.0	82.0	79.0
1,500	1,730	86.0	78.0	82.0	81.0	78.0
1,400	1,407	86.0	77.0	81.0	80.0	77.0
1,300	1,126	85.0	81.0	82.0	79.0	75.0
1,200	886	85.0	80.0	81.0	78.0	74.0
1,100	682	84.0	80.0	80.0	78.0	73.0
1,000	513	83.0	79.0	80.0	77.0	73.0
900	374	83.0	78.0	79.0	76.0	72.0
800	263	82.0	78.0	79.0	76.0	72.0
700	176	81.0	77.0	78.0	75.0	71.0
600	111	81.0	77.0	77.0	75.0	70.0

MECHANICAL:SOUND PRESSURE(OBCF) DISTANCE:15 METER PROP DEMAND CURVE P

ENGINE SPEED	ENGINE POWER	1000 HZ	2000 HZ	4000 HZ	8000 HZ
RPM	BHP	dB(A)	dB(A)	dB(A)	dB(A)
1,600	2,100	82.0	82.0	80.0	84.0
1,500	1,730	81.0	81.0	79.0	83.0
1,400	1,407	80.0	81.0	79.0	83.0
1,300	1,126	80.0	81.0	77.0	81.0
1,200	886	79.0	80.0	77.0	80.0
1,100	682	78.0	79.0	76.0	79.0
1,000	513	78.0	79.0	75.0	79.0
900	374	77.0	78.0	75.0	78.0
800	263	76.0	77.0	74.0	78.0
700	176	76.0	77.0	74.0	77.0
600	111	75.0	76.0	73.0	76.0

Emissions Data

Note(s)
THE CHINA STAGE 1 MARINE REGULATION HAS AN EFFECTIVE DATE OF JULY 1, 2019, AND IT ENDS ON JULY 1, 2021. CATERPILLAR, INC DIDN'T RECEIVE CERTIFICATION OF ITS ENGINES UNTIL JUNE 9, 2020. ENGINES BUILT BEFORE THIS DATE ARE NOT CONSIDERED CERTIFIED TO THE CHINA STAGE 1 MARINE REGULATION. SHIPYARDS HAVE UP UNTIL JULY 1, 2022 TO GET ENGINES INSTALLED IN SHIPS OTHERWISE THEY WOULD BE REQUIRED TO USE A CHINA STAGE 2 ENGINE.

DIESEL

RATED SPEED NOMINAL DATA: 1600 RPM

ENGINE POWER		**BHP**	**2,100**	**1,575**	**1,050**	**525**	**210**
PERCENT LOAD		**%**	**100**	**75**	**50**	**25**	**10**
TOTAL NOX (AS NO2)		G/HR	12,357	6,610	5,161	3,246	1,795
TOTAL CO		G/HR	869	578	622	661	845
TOTAL HC		G/HR	247	236	250	215	270
TOTAL CO2		KG/HR	1,000	780	516	289	164
PART MATTER		G/HR	129.9	73.0	66.9	77.3	86.8
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	3,020.5	2,094.4	2,427.7	2,684.7	2,470.9
TOTAL CO	(CORR 5% O2)	MG/NM3	196.5	163.8	273.6	531.1	1,274.4
TOTAL HC	(CORR 5% O2)	MG/NM3	48.9	60.4	96.0	150.2	355.8
PART MATTER	(CORR 5% O2)	MG/NM3	25.2	18.7	25.9	55.6	118.5
TOTAL NOX (AS NO2)	(CORR 15% O2)	MG/NM3	1,120.8	777.2	900.8	996.2	916.9
TOTAL CO	(CORR 15% O2)	MG/NM3	72.9	60.8	101.5	197.1	472.9
TOTAL HC	(CORR 15% O2)	MG/NM3	18.2	22.4	35.6	55.7	132.0
PART MATTER	(CORR 15% O2)	MG/NM3	9.4	6.9	9.6	20.6	44.0
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	1,471	1,020	1,183	1,308	1,204
TOTAL CO	(CORR 5% O2)	PPM	157	131	219	425	1,020
TOTAL HC	(CORR 5% O2)	PPM	91	113	179	280	664
TOTAL NOX (AS NO2)	(CORR 15% O2)	PPM	546	379	439	485	447
TOTAL CO	(CORR 15% O2)	PPM	58	49	81	158	378
TOTAL HC	(CORR 15% O2)	PPM	34	42	67	104	246
TOTAL NOX (AS NO2)		G/HP-HR	5.91	4.22	4.94	6.22	8.59
TOTAL CO		G/HP-HR	0.42	0.37	0.60	1.27	4.04
TOTAL HC		G/HP-HR	0.12	0.15	0.24	0.41	1.29
PART MATTER		G/HP-HR	0.06	0.05	0.06	0.15	0.42
TOTAL NOX (AS NO2)		G/KW-HR	7.93	5.66	6.62	8.34	11.52
TOTAL CO		G/KW-HR	0.56	0.49	0.80	1.70	5.42
TOTAL HC		G/KW-HR	0.16	0.20	0.32	0.55	1.73
PART MATTER		G/KW-HR	0.08	0.06	0.09	0.20	0.56
TOTAL NOX (AS NO2)		LB/HR	27.24	14.57	11.38	7.16	3.96
TOTAL CO		LB/HR	1.92	1.27	1.37	1.46	1.86
TOTAL HC		LB/HR	0.55	0.52	0.55	0.48	0.60
TOTAL CO2		LB/HR	2,205	1,719	1,137	638	362
PART MATTER		LB/HR	0.29	0.16	0.15	0.17	0.19
OXYGEN IN EXH		%	11.8	13.3	14.6	15.5	17.0
DRY SMOKE OPACITY		%	0.0	0.0	0.8	2.1	2.4
BOSCH SMOKE NUMBER			0.68	0.67	0.75	0.88	0.93

RATED SPEED POTENTIAL SITE VARIATION: 1600 RPM

ENGINE POWER		BHP	2,100	1,575	1,050	525	210
PERCENT LOAD		%	100	75	50	25	10
TOTAL NOX (AS NO2)		G/HR	14,829	7,932	6,193	3,896	2,155
TOTAL CO		G/HR	1,565	1,041	1,119	1,190	1,521
TOTAL HC		G/HR	329	313	332	287	359
PART MATTER		G/HR	181.8	102.2	93.6	108.2	121.6
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	3,624.6	2,513.3	2,913.2	3,221.7	2,965.1
TOTAL CO	(CORR 5% O2)	MG/NM3	353.7	294.8	492.5	955.9	2,293.9
TOTAL HC	(CORR 5% O2)	MG/NM3	65.1	80.3	127.7	199.7	473.2
PART MATTER	(CORR 5% O2)	MG/NM3	35.3	26.2	36.2	77.9	166.0
TOTAL NOX (AS NO2)	(CORR 15% O2)	MG/NM3	1,345.0	932.6	1,081.0	1,195.5	1,100.3
TOTAL CO	(CORR 15% O2)	MG/NM3	131.2	109.4	182.7	354.7	851.2
TOTAL HC	(CORR 15% O2)	MG/NM3	24.2	29.8	47.4	74.1	175.6
PART MATTER	(CORR 15% O2)	MG/NM3	13.1	9.7	13.4	28.9	61.6
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	1,765	1,224	1,419	1,569	1,444
TOTAL CO	(CORR 5% O2)	PPM	283	236	394	765	1,835
TOTAL HC	(CORR 5% O2)	PPM	122	150	238	373	883
TOTAL NOX (AS NO2)	(CORR 15% O2)	PPM	655	454	527	582	536
TOTAL CO	(CORR 15% O2)	PPM	105	88	146	284	681
TOTAL HC	(CORR 15% O2)	PPM	45	56	88	138	328
TOTAL NOX (AS NO2)		G/HP-HR	7.10	5.06	5.93	7.46	10.31
TOTAL CO		G/HP-HR	0.75	0.66	1.07	2.28	7.28
TOTAL HC		G/HP-HR	0.16	0.20	0.32	0.55	1.72
PART MATTER		G/HP-HR	0.09	0.07	0.09	0.21	0.58
TOTAL NOX (AS NO2)		G/KW-HR	9.52	6.79	7.95	10.00	13.83
TOTAL CO		G/KW-HR	1.00	0.89	1.44	3.06	9.76
TOTAL HC		G/KW-HR	0.21	0.27	0.43	0.74	2.31
PART MATTER		G/KW-HR	0.12	0.09	0.12	0.28	0.78
TOTAL NOX (AS NO2)		LB/HR	32.69	17.49	13.65	8.59	4.75
TOTAL CO		LB/HR	3.45	2.29	2.47	2.62	3.35
TOTAL HC		LB/HR	0.72	0.69	0.73	0.63	0.79
PART MATTER		LB/HR	0.40	0.23	0.21	0.24	0.27

Regulatory Information

CHINA STAGE 1	2018 - 2021	CYCLE : E2,E3		
THIS ENGINE HAS BEEN TESTED IN ACCORDANCE WITH THE PROVISIONS OF THE PEOPLE'S REPUBLIC OF CHINA NATIONAL STANDARD #GB 15097-2016, AND COMPLIES WITH THE STATED LIMITS OF HC, CO, NOX, AND PM FOR MARINE STAGE 1.				
Locality	Agency	Regulation	Tier/Stage	Max Limits - G/BKW - HR

CHINA	CHINA	MARINE	STAGE 1	CO: 5.0 NOx + HC: 7.2 PM: 0.20

EPA TIER 2 **2007 - 2011**

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

EU STAGE IIIA **2009 - 2019** **CYCLE : E2,E3**

GASEOUS EMISSION DATA MEASUREMENTS ARE CONSISTENT WITH THOSE DESCRIBED IN EU 97/68/EC (AS AMENDED BY EU 2004/26/EC) 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.

Locality	Agency	Regulation	Tier/Stage	Max Limits - G/BKW - HR
EUROPE	EU	MARINE COMMERCIAL	STAGE IIIA	CO: 5.0 NOx + HC: 7.2 PM: 0.20

IMO **2000 - 2010**

GASEOUS EMISSIONS DATA MEASUREMENTS ARE CONSISTENT WITH THOSE DESCRIBED IN REGULATION 13 OF 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.

IMO II **2011 - ----** **CYCLE : E2,E3**

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 (BHP)

AMBIENT OPERATING TEMP (F)	30	40	50	60	70	80	90	100	110	120	130	140	NORMAL
ALTITUDE (FT)													
0	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,072	2,037	2,100
1,000	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,071	2,035	2,000	1,967	2,100
2,000	2,100	2,100	2,100	2,100	2,100	2,100	2,072	2,035	1,999	1,965	1,931	1,899	2,100
3,000	2,100	2,100	2,100	2,100	2,075	2,037	2,000	1,964	1,930	1,896	1,864	1,833	2,084

Cross Reference

Test Spec	Setting	Engine Arrangement	Engineering Model	Engineering Model Version	Start Effective Serial Number	End Effective Serial Number
0K8038	LL5760	2829667	E901	-	TTD00001	
0K8039	LL5761	2829667	E901	-	TTD00001	
4369575	LL6459	3856960	EE146	-	PXD00001	
4485921	GG0966	3856960	EE146	XJ	ML300001	
4369578	LL6462	3856961	EE146	-	PXD00001	
4485925	GG0969	3856961	EE146	XJ	ML300001	

Supplementary Data

Type	Classification	Performance Number
SOUND	SOUND PRESSURE	DM8779
CHART	BSFC CONTOUR PLOT	DM9489

General Notes

TTD00415 - 05
SOUND PRESSURE DATA FOR THIS RATING CAN BE FOUND IN PERFORMANCE NUMBER - DM8779

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