

MARINE ENGINE PERFORMANCE DATA

[4BW00449]

JUNE 12, 2020

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Performance Number: DM4253

Change Level:

Sales Model: 3516BDITA	Combustion: DI	Aspr: TA
Engine Power: 1,771.0 KW	Speed: 1,600 RPM	After Cooler: SCAC
Manifold Type: DRY	Governor Type: ADEM2	After Cooler Temp(C): 30
Turbo Quantity: 2	Engine App: MP	Turbo Arrangement: Parallel
Application Type: M PROP ENG	Engine Rating: MP	Strategy:
Rating Type: B RATING (HEAVY DUTY)	Certification: IMO 2000 - EPA TIER-I 2004 - 2007	

General Performance Data : Curve 1: Zone 1

ENGINE SPEED RPM	ENGINE POWER BKW	ENGINE TORQUE N.M	ENGINE BMEP KPA	FUEL BSFC G/BKW-HR	FUEL RATE LPH	INTAKE MFLD TEMP DEG C	INTAKE MFLD P KPA	INTAKE AIR FLOW M3/MIN	EXH MFLD TEMP DEG C	EXH STACK TEMP DEG C	EXH GAS FLOW M3/MIN
1600	1,685.5	10,060	1,619	193.200	388.2	44.3	203.1	158.2	497.1	360.9	347.8
1500	1,685.5	10,730	1,727	190.300	382.3	45.4	207.9	152.3	501.2	367.9	339.1
1400	1,685.5	11,497	1,850	188.100	378.0	44.3	210.1	144.2	515.1	384.5	330.3
1300	1,685.5	12,381	1,993	187.000	375.7	43.3	210.5	134.6	540.2	413.0	321.2
1200	1,577.0	12,549	2,020	187.900	353.3	42.9	183.4	113.0	565.0	454.5	286.7
1100	1,074.0	9,324	1,501	194.000	248.4	38.7	87.7	67.3	624.9	561.1	197.0
1000	705.0	6,732	1,083	200.800	168.7	39.2	39.5	44.6	625.3	582.7	134.2
900	510.0	5,411	871	205.700	125.0	40.5	19.7	33.8	579.0	537.1	96.1
800	427.0	5,097	820	209.800	106.8	41.8	13.7	28.1	566.8	528.1	79.2
650	339.0	4,980	802	216.800	87.6	42.9	8.6	21.1	573.8	518.5	58.9

General Performance Data : Curve 2: Zone 1-2

ENGINE SPEED RPM	ENGINE POWER BKW	ENGINE TORQUE N.M	ENGINE BMEP KPA	FUEL BSFC G/BKW-HR	FUEL RATE LPH	INTAKE MFLD TEMP DEG C	INTAKE MFLD P KPA	INTAKE AIR FLOW M3/MIN	EXH MFLD TEMP DEG C	EXH STACK TEMP DEG C	EXH GAS FLOW M3/MIN
1600	1,771.0	10,570	1,701	191.600	404.5	45.0	210.6	161.6	504.1	365.9	358.3
1500	1,771.0	11,275	1,815	189.900	400.9	46.4	218.8	157.2	510.5	373.1	353.1
1400	1,771.0	12,080	1,944	188.600	398.1	45.3	224.1	150.3	523.4	387.9	345.5
1300	1,771.0	13,009	2,094	187.700	396.2	44.6	226.7	141.2	548.4	415.4	338.3
1200	1,679.0	13,361	2,150	187.700	375.6	44.3	202.5	120.7	565.7	451.5	305.2
1100	1,344.0	11,668	1,878	192.900	309.0	39.9	130.6	83.4	633.7	543.6	239.1
1000	755.0	7,210	1,160	199.800	179.8	39.0	45.1	46.5	644.8	601.1	143.1
900	510.0	5,411	871	205.400	124.9	40.5	19.7	33.8	579.0	537.1	96.1
800	427.0	5,097	820	210.000	106.9	41.8	13.7	28.1	566.8	528.1	79.2
650	339.0	4,980	802	216.800	87.6	42.9	8.6	21.1	573.8	518.5	58.9

General Performance Data :Curve 3: Zone 2-3

ENGINE SPEED RPM	ENGINE POWER BKW	ENGINE TORQUE N.M	ENGINE BMEP KPA	FUEL BSFC G/BKW-HR	FUEL RATE LPH	INTAKE MFLD TEMP DEG C	INTAKE MFLD P KPA	INTAKE AIR FLOW M3/MIN	EXH MFLD TEMP DEG C	EXH STACK TEMP DEG C	EXH GAS FLOW M3/MIN
1600	1,771.0	10,570	1,701	191.600	404.5	45.0	210.6	161.6	504.1	365.9	358.3
1500	1,771.0	11,275	1,815	189.900	400.9	46.4	218.8	157.2	510.5	373.1	353.1
1400	1,771.0	12,080	1,944	188.600	398.1	45.3	224.1	150.3	523.4	387.9	345.5
1300	1,771.0	13,009	2,094	187.700	396.2	44.6	226.7	141.2	548.4	415.4	338.3
1200	1,679.0	13,361	2,150	187.700	375.7	44.3	202.5	120.7	565.7	451.5	305.2
1100	1,344.0	11,668	1,878	193.000	309.2	39.9	130.6	83.4	633.7	543.6	239.1
1000	844.0	8,060	1,297	200.000	201.2	38.4	55.5	50.1	675.0	628.5	159.1
900	510.0	5,411	871	205.500	125.0	40.5	19.7	33.8	579.0	537.1	96.1
800	427.0	5,097	820	210.000	106.9	41.8	13.7	28.1	566.8	528.1	79.2
650	339.0	4,980	802	216.800	87.6	42.9	8.6	21.1	573.8	518.5	58.9

General Performance Data :Maximum Limit

ENGINE SPEED RPM	ENGINE POWER BKW	ENGINE TORQUE N.M	ENGINE BMEP KPA	FUEL BSFC G/BKW-HR	FUEL RATE LPH	INTAKE MFLD TEMP DEG C	INTAKE MFLD P KPA	INTAKE AIR FLOW M3/MIN	EXH MFLD TEMP DEG C	EXH STACK TEMP DEG C	EXH GAS FLOW M3/MIN
1600	1,771.0	10,570	1,701	191.600	404.5	45.0	210.6	161.6	504.1	365.9	358.3
1500	1,771.0	11,275	1,815	189.900	400.9	46.4	218.8	157.2	510.5	373.1	353.1
1400	1,771.0	12,080	1,944	188.600	398.1	45.3	224.1	150.3	523.4	387.9	345.5
1300	1,771.0	13,009	2,094	187.700	396.2	44.6	226.7	141.2	548.4	415.4	338.3
1200	1,679.0	13,361	2,150	187.700	375.6	44.3	202.5	120.7	565.7	451.5	305.2
1100	1,344.0	11,668	1,878	193.500	309.9	39.9	130.6	83.4	633.7	543.6	239.1
1000	898.0	8,575	1,380	201.900	216.1	37.9	62.1	52.3	690.9	641.1	168.7
900	653.0	6,929	1,115	209.900	163.4	41.2	35.0	38.4	700.2	636.1	123.2
800	450.0	5,371	864	215.100	115.4	42.4	15.8	28.6	600.4	557.1	83.5
650	350.0	5,142	828	219.700	91.7	43.1	9.5	21.3	599.9	536.3	60.8

General Performance Data :Prop Demand Curve P

ENGINE SPEED RPM	ENGINE POWER BKW	ENGINE TORQUE N.M	ENGINE BMEP KPA	FUEL BSFC G/BKW-HR	FUEL RATE LPH	INTAKE MFLD TEMP DEG C	INTAKE MFLD P KPA	INTAKE AIR FLOW M3/MIN	EXH MFLD TEMP DEG C	EXH STACK TEMP DEG C	EXH GAS FLOW M3/MIN
1600	1,771.0	10,570	1,701	191.600	404.5	45.0	210.6	161.6	504.1	365.9	358.3
1500	1,459.3	9,290	1,495	189.800	330.1	42.9	175.1	136.9	480.1	360.0	300.4
1400	1,186.4	8,093	1,302	189.400	267.9	39.2	126.1	105.5	481.7	386.8	241.5
1300	949.9	6,978	1,123	191.100	216.4	36.5	80.1	77.1	501.0	434.5	189.9
1200	747.1	5,946	957	194.900	173.6	35.9	48.0	57.8	512.2	466.3	149.0
1100	575.5	4,996	804	198.800	136.4	36.3	28.0	45.2	498.8	469.8	117.0
1000	432.4	4,129	664	201.300	103.7	36.9	15.5	36.5	450.7	425.8	88.9
900	315.2	3,344	538	203.600	76.5	37.1	7.7	30.5	382.6	352.5	66.1
800	221.4	2,642	425	208.700	55.1	37.1	2.8	25.8	316.7	297.2	50.7
650	118.7	1,744	281	228.600	32.4	35.8	0.3	20.4	231.0	208.2	33.6

General Performance Data :Max Power Curve M

ENGINE SPEED RPM	ENGINE POWER BKW	ENGINE TORQUE N.M	ENGINE BMEP KPA	FUEL BSFC G/BKW-HR	FUEL RATE LPH	INTAKE MFLD TEMP DEG C	INTAKE MFLD P KPA	INTAKE AIR FLOW M3/MIN	EXH MFLD TEMP DEG C	EXH STACK TEMP DEG C	EXH GAS FLOW M3/MIN
1600	1,771.0	10,570	1,701	191.600	404.5	45.0	210.6	161.6	504.1	365.9	358.3
1500	1,771.0	11,275	1,815	189.900	400.9	46.4	218.8	157.2	510.5	373.1	353.1
1400	1,771.0	12,080	1,944	188.600	398.1	45.3	224.1	150.3	523.4	387.9	345.5
1300	1,771.0	13,009	2,094	187.700	396.2	44.6	226.7	141.2	548.4	415.4	338.3
1200	1,679.0	13,361	2,150	187.700	375.6	44.3	202.5	120.7	565.7	451.5	305.2
1100	1,344.0	11,668	1,878	193.500	309.9	39.9	130.6	83.4	633.7	543.6	239.1
1000	898.0	8,575	1,380	201.900	216.1	37.9	62.1	52.3	690.9	641.1	168.7
900	653.0	6,929	1,115	209.900	163.4	41.2	35.0	38.4	700.2	636.1	123.2
800	450.0	5,371	864	215.100	115.4	42.4	15.8	28.6	600.4	557.1	83.5
650	350.0	5,142	828	219.700	91.7	43.1	9.5	21.3	599.9	536.3	60.8

Engine Heat Rejection Data :Maximum Limit

ENGINE SPEED RPM	ENGINE POWER BKW	REJ TO JW KW	REJ TO ATMOS KW	REJ TO EXHAUST KW	EXH RCOV TO 177C KW	FROM OIL CLR KW	FROM AFT CLR KW	WORK ENERGY KW	LHV ENERGY KW	HHV ENERGY KW
1600	1,771.0	545.0	110.0	1,407.0	626.0	202.0	460.0	1,771.0	4,030.0	4,293.0
1500	1,771.0	537.0	111.0	1,401.0	634.0	200.0	436.0	1,771.0	3,995.0	4,256.0
1400	1,771.0	525.0	114.0	1,398.0	655.0	198.0	414.0	1,771.0	3,963.0	4,222.0
1300	1,771.0	515.0	120.0	1,421.0	700.0	198.0	391.0	1,771.0	3,960.0	4,218.0
1200	1,679.0	507.0	124.0	1,339.0	697.0	186.0	302.0	1,679.0	3,709.0	3,951.0
1100	1,344.0	443.0	144.0	1,139.0	659.0	151.0	150.0	1,344.0	3,023.0	3,220.0
1000	898.0	354.0	165.0	862.0	536.0	109.0	48.0	898.0	2,184.0	2,326.0
900	653.0	294.0	169.0	632.0	390.0	83.0	16.0	653.0	1,656.0	1,764.0
800	450.0	209.0	133.0	408.0	236.0	56.0	2.0	450.0	1,128.0	1,202.0
650	350.0	193.0	134.0	300.0	167.0	46.0	-2.0	350.0	915.0	975.0

EXHAUST Sound Data: 1.5 METERS

ENGINE SPEED RPM	ENGINE POWER BKW	OVERALL SOUND DB(A)	OBCF 63HZ DB	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
1600	1,771.0	115	109	120	115	108	106	108	108	105
1500	1,459.3	113	108	118	114	106	105	106	107	104
1400	1,186.4	111	106	116	112	104	103	105	105	102
1300	949.9	110	109	115	110	103	101	104	103	101
1200	747.1	109	108	114	109	102	100	103	102	100
1100	575.5	107	106	112	107	100	99	102	100	98
1000	432.4	106	113	110	104	100	99	102	95	90
900	315.2	105	112	109	103	99	98	101	94	89
800	221.4	103	111	107	101	97	96	99	92	88
650	118.7	102	109	106	100	96	95	98	91	86

EXHAUST Sound Data: 7.0 METERS

ENGINE SPEED RPM	ENGINE POWER BKW	OVERALL SOUND DB(A)	OBCF 63HZ DB	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
1600	1,771.0	101	98	109	103	94	93	94	95	90
1500	1,459.3	100	96	107	101	92	92	93	93	89
1400	1,186.4	98	95	106	100	91	90	91	92	87
1300	949.9	97	99	103	98	91	90	91	91	86
1200	747.1	95	97	102	96	89	89	90	89	84
1100	575.5	94	96	100	95	88	87	88	88	83
1000	432.4	92	103	100	91	88	87	86	81	77
900	315.2	91	102	99	90	87	86	85	80	76
800	221.4	90	101	98	89	86	85	84	79	75
650	118.7	88	99	96	87	84	83	82	77	73

EXHAUST Sound Data: 15.0 METERS

ENGINE SPEED RPM	ENGINE POWER BKW	OVERALL SOUND DB(A)	OBCF 63HZ DB	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
1600	1,771.0	95	91	102	96	87	87	88	88	84
1500	1,459.3	93	90	101	95	86	85	86	87	82
1400	1,186.4	91	88	99	93	84	83	85	85	80
1300	949.9	90	92	96	91	84	84	84	84	79
1200	747.1	89	91	95	90	83	82	83	83	78
1100	575.5	87	89	94	88	81	81	82	81	76
1000	432.4	86	96	94	85	82	80	80	75	71
900	315.2	85	95	93	84	81	79	79	74	69
800	221.4	83	94	91	82	79	78	77	72	68
650	118.7	82	92	90	81	78	76	76	71	67

MECHANICAL Sound Data: 1.0 METERS

ENGINE SPEED RPM	ENGINE POWER BKW	OVERALL SOUND DB(A)	OBCF 63HZ DB	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
1600	1,771.0	104	95	100	99	96	99	99	97	101
1500	1,459.3	103	95	99	98	95	98	98	96	100
1400	1,186.4	103	94	98	97	94	97	98	96	99
1300	949.9	102	98	99	96	92	97	97	94	98
1200	747.1	102	97	98	95	91	96	97	94	97
1100	575.5	101	97	97	95	90	95	96	93	96
1000	432.4	100	96	97	94	90	95	96	92	96
900	315.2	100	95	96	93	89	94	95	92	95
800	221.4	99	95	96	93	89	93	94	91	95
650	118.7	98	94	95	92	88	92	93	90	94

MECHANICAL Sound Data: 7.0 METERS

ENGINE SPEED RPM	ENGINE POWER BKW	OVERALL SOUND DB(A)	OBCF 63HZ DB	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCJ 8000HZ DB
1600	1,771.0	92	84	88	87	84	87	87	85	89
1500	1,459.3	92	83	87	86	83	86	87	85	88
1400	1,186.4	91	83	87	86	83	86	86	84	88
1300	949.9	91	86	87	84	80	85	86	83	86
1200	747.1	90	86	86	84	79	84	85	82	85
1100	575.5	89	85	86	83	79	84	85	81	85
1000	432.4	89	84	85	82	78	83	84	81	84
900	315.2	88	84	85	82	78	82	83	80	84
800	221.4	87	83	84	81	77	82	83	80	83
650	118.7	86	82	83	80	76	81	82	79	82

MECHANICAL Sound Data: 15.0 METERS

ENGINE SPEED RPM	ENGINE POWER BKW	OVERALL SOUND DB(A)	OBCF 63HZ DB	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
1600	1,771.0	87	78	83	82	79	82	82	80	84
1500	1,459.3	86	78	82	81	78	81	81	79	83
1400	1,186.4	86	77	81	80	77	80	81	79	83
1300	949.9	85	81	82	79	75	80	81	77	81
1200	747.1	85	80	81	78	74	79	80	77	80
1100	575.5	84	80	80	78	73	78	79	76	79
1000	432.4	83	79	80	77	73	78	79	75	79
900	315.2	83	78	79	76	72	77	78	75	78
800	221.4	82	78	79	76	72	76	77	74	78
650	118.7	81	77	78	75	71	76	76	73	77

EMISSIONS DATA

IMO 2000 - ***** M1

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's exhaust emissions are in compliance with the INTERNATIONAL MARINE ORGANIZATION'S 'IMO' regulations.

EPA TIER-I 2004 - 2007 ***** L1

Gaseous emissions data measurements 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 compression-ignition emission regulations.

LOCALITY AGENCY/LEVEL

U. S. (incl Calif) EPA/TIER-1

REFERENCE EXHAUST STACK DIAMETER	360 MM
WET EXHAUST MASS	11,720.0 KG/HR
WET EXHAUST FLOW (365.00 C STACK TEMP)	358.50 M3/MIN
WET EXHAUST FLOW RATE (0 DEG C AND 101.2 KPA)	153.20 M3/MIN
DRY EXHAUST FLOW RATE (0 DEG C AND 101.2 KPA)	142.10 M3/MIN
FUEL FLOW RATE	404 L/HR

RATED SPEED "Potential site variation"

ENGINE SPEED RPM	PERCENT LOAD	ENGINE POWER BKW	TOTAL NOX (AS NO2) G/HR	TOTAL CO G/HR	TOTAL HC G/HR	PART MATTER G/HR	OXYGEN IN EXHAUST PERCENT	DRY SMOKE OPACITY PERCENT	BOSCH SMOKE NUMBER
1600	100	1,771.0	16,604.00	383.00	456.00	219.30	12.2000	.4000	1.2800
1600	75	1,328.3	11,917.00	328.00	383.00	188.70	12.9000	.6000	1.2800
1600	50	885.5	8,401.00	591.00	355.00	150.10	13.5000	.8000	1.2800
1600	25	442.8	4,358.00	928.00	314.00	125.40	14.9000	1.4000	1.2800
1600	10	177.1	2,203.00	1,496.00	426.00	118.10	16.9000	1.9000	1.2800

RATED SPEED "Potential site variation"

ENGINE SPEED RPM	PERCENT LOAD	ENGINE POWER BKW	TOTAL NOX (AS NO2) mg/norm cu M @ %5 O2	TOTAL CO mg/norm cu M @ %5 O2	TOTAL HC mg/norm cu M @ %5 O2	PART MATTER mg/norm cu M @ %5 O2	OXYGEN IN EXHAUST PERCENT	DRY SMOKE OPACITY PERCENT	BOSCH SMOKE NUMBER
1600	100	1,771.0	3,541.1	81.8	97.3	46.800	12.2000	.4000	1.2800
1600	75	1,328.3	3,371.6	92.7	108.3	53.400	12.9000	.6000	1.2800
1600	50	885.5	3,462	243.5	146.1	61.900	13.5000	.8000	1.2800
1600	25	442.8	3,179.5	677.3	229.2	91.500	14.9000	1.4000	1.2800
1600	10	177.1	2,860.7	1,943.1	553.3	153.400	16.9000	1.9000	1.2800

RATED SPEED "Potential site variation"

ENGINE SPEED RPM	PERCENT LOAD	ENGINE POWER BKW	TOTAL NOX (AS NO2) PPM @ %5 O2	TOTAL CO PPM @ %5 O2	TOTAL HC PPM @ %5 O2	OXYGEN IN EXHAUST PERCENT	DRY SMOKE OPACITY PERCENT	BOSCH SMOKE NUMBER
1600	100	1,771.0	1,725	65	157	12.2000	.4000	1.2800
1600	75	1,328.3	1,641	74	175	12.9000	.6000	1.2800
1600	50	885.5	1,698	191	237	13.5000	.8000	1.2800
1600	25	442.8	1,547	544	371	14.9000	1.4000	1.2800
1600	10	177.1	1,388	1,569	905	16.9000	1.9000	1.2800

RATED SPEED "Potential site variation"

ENGINE SPEED RPM	PERCENT LOAD	ENGINE POWER BKW	TOTAL NOX (AS NO2) G/HP-HR	TOTAL CO G/HP-HR	TOTAL HC G/HP-HR	PART MATTER G/HP-HR	OXYGEN IN EXHAUST PERCENT	DRY SMOKE OPACITY PERCENT	BOSCH SMOKE NUMBER
1600	100	1,771.0	6.99	0.16	0.19	0.092	12.2000	.4000	1.2800
1600	75	1,328.3	6.69	0.18	0.22	0.106	12.9000	.6000	1.2800
1600	50	885.5	7.07	0.50	0.30	0.126	13.5000	.8000	1.2800
1600	25	442.8	7.34	1.56	0.53	0.211	14.9000	1.4000	1.2800
1600	10	177.1	9.27	6.30	1.79	0.497	16.9000	1.9000	1.2800

RATED SPEED "Nominal Data"

ENGINE SPEED RPM	PERCENT LOAD	ENGINE POWER BKW	TOTAL NOX (AS NO2) G/HR	TOTAL CO G/HR	TOTAL HC G/HR	TOTAL CO2 KG/HR	PART MATTER G/HR	OXYGEN IN EXHAUST PERCENT	DRY SMOKE OPACITY PERCENT	BOSCH SMOKE NUMBER
1600	100	1,771.0	13,837.00	213.00	343.00	1,082.7	156.60	12.2000	.4000	1.2800
1600	75	1,328.3	9,931.00	182.00	288.00	816.6	134.80	12.9000	.6000	1.2800
1600	50	885.5	7,001.00	328.00	267.00	559.9	107.20	13.5000	.8000	1.2800
1600	25	442.8	3,632.00	516.00	236.00	315.7	89.60	14.9000	1.4000	1.2800
1600	10	177.1	1,836.00	831.00	320.00	178.2	84.40	16.9000	1.9000	1.2800

RATED SPEED "Nominal Data"

ENGINE SPEED RPM	PERCENT LOAD	ENGINE POWER BKW	TOTAL NOX (AS NO2) mg/norm cu M @ %5 O2	TOTAL CO mg/norm cu M @ %5 O2	TOTAL HC mg/norm cu M @ %5 O2	PART MATTER mg/norm cu M @ %5 O2	OXYGEN IN EXHAUST PERCENT	DRY SMOKE OPACITY PERCENT	BOSCH SMOKE NUMBER
1600	100	1,771.0	2,950.9	45.4	73.2	33.4	12.2000	.4000	1.2800
1600	75	1,328.3	2,809.6	51.5	81.4	38.1	12.9000	.6000	1.2800
1600	50	885.5	2,885.0	135.3	109.9	44.2	13.5000	.8000	1.2800
1600	25	442.8	2,649.6	376.3	172.3	65.3	14.9000	1.4000	1.2800
1600	10	177.1	2,383.9	1,079.5	416.0	109.6	16.9000	1.9000	1.2800

RATED SPEED "Nominal Data"

ENGINE SPEED RPM	PERCENT LOAD	ENGINE POWER BKW	TOTAL NOX (AS NO2) PPM @ %5 O2	TOTAL CO PPM @ %5 O2	TOTAL HC PPM @ %5 O2	OXYGEN IN EXHAUST PERCENT	DRY SMOKE OPACITY PERCENT	BOSCH SMOKE NUMBER
1600	100	1,771.0	1,437	36	118	12.2000	.4000	1.2800
1600	75	1,328.3	1,368	41	131	12.9000	.6000	1.2800
1600	50	885.5	1,415	106	178	13.5000	.8000	1.2800
1600	25	442.8	1,290	302	279	14.9000	1.4000	1.2800
1600	10	177.1	1,157	872	680	16.9000	1.9000	1.2800

RATED SPEED "Nominal Data"

ENGINE SPEED RPM	PERCENT LOAD	ENGINE POWER BKW	TOTAL NOX (AS NO2) G/HP-HR	TOTAL CO G/HP-HR	TOTAL HC G/HP-HR	PART MATTER G/HP-HR	OXYGEN IN EXHAUST PERCENT	DRY SMOKE OPACITY PERCENT	BOSCH SMOKE NUMBER
1600	100	1,771.0	5.83	0.09	0.14	0.07	12.2000	.4000	1.2800
1600	75	1,328.3	5.57	0.10	0.16	0.08	12.9000	.6000	1.2800
1600	50	885.5	5.89	0.28	0.22	0.09	13.5000	.8000	1.2800
1600	25	442.8	6.12	0.87	0.40	0.15	14.9000	1.4000	1.2800
1600	10	177.1	7.73	3.50	1.35	0.35	16.9000	1.9000	1.2800

INTERMEDIATE SPEED "Potential site variation"

ENGINE SPEED RPM	PERCENT LOAD	ENGINE POWER BKW	TOTAL NOX (AS NO2) G/HR	TOTAL CO G/HR	TOTAL HC G/HR	PART MATTER G/HR	O2 IN EXHAUST PERCENT	O2(DRY) SMOKE OPAC PERCENT	O2(DRY) BOSCH SMKE NO.
1280	100	1,763.3	16,158.00	1,033.00	276.00	258.50	10.92	1.3	1.28
1280	75	1,322.4	13,079.00	863.00	325.00	159.30	10.99	0.7	1.28
1280	50	881.6	9,438.00	922.00	250.00	123.70	11.08	1.1	1.28
1280	25	440.8	5,073.00	634.00	206.00	80.90	13.59	0.9	1.28
1280	10	176.3	2,389.00	851.00	294.00	69.20	16.63	0.9	1.28

INTERMEDIATE SPEED "Potential site variation"

ENGINE SPEED RPM	PERCENT LOAD	ENGINE POWER BKW	TOTAL NOX (AS NO2) mg/norm cu M @ %5 O2	TOTAL CO mg/norm cu M @ %5 O2	TOTAL HC mg/norm cu M @ %5 O2	No Conversion Available: [K15] M	O2 IN EXHAUST PERCENT	O2(DRY) SMOKE OPAC PERCENT	O2(DRY) BOSCH SMKE NO.
1280	100	1,763.3	3,538.2	226.1	60.5	56.6	10.92	1.3	1.28
1280	75	1,322.4	3,838.6	253.3	95.3	46.7	10.99	0.7	1.28
1280	50	881.6	4,073.3	398.0	108.0	53.4	11.08	1.1	1.28
1280	25	440.8	4,091.4	511.4	166.4	65.2	13.59	0.9	1.28
1280	10	176.3	3,787.4	1,348.7	465.4	109.6	16.63	0.9	1.28

INTERMEDIATE SPEED "Potential site variation"

ENGINE SPEED RPM	PERCENT LOAD	ENGINE POWER BKW	TOTAL NOX (AS NO2) PPM @ %5 O2	TOTAL CO PPM @ %5 O2	TOTAL HC PPM @ %5 O2	O2 IN EXHAUST PERCENT	O2(DRY) SMOKE OPAC PERCENT	O2(DRY) BOSCH SMKE NO.
1280	100	1,763.3	1,723	181	97	10.92	1.3	1.28
1280	75	1,322.4	1,871	201	154	10.99	0.7	1.28
1280	50	881.6	1,983	319	173	11.08	1.1	1.28
1280	25	440.8	1,993	410	269	13.59	0.9	1.28
1280	10	176.3	1,847	1,082	752	16.63	0.9	1.28

INTERMEDIATE SPEED "Potential site variation"

ENGINE SPEED RPM	PERCENT LOAD	ENGINE POWER BKW	TOTAL NOX (AS NO2) G/HP-HR	TOTAL CO G/HP-HR	TOTAL HC G/HP-HR	PART MATTER G/HP-HR	O2 IN EXHAUST PERCENT	O2(DRY) SMOKE OPAC PERCENT	O2(DRY) BOSCH SMKE NO.
1280	100	1,763.3	6.83	0.44	0.12	0.109	10.92	1.3	1.28
1280	75	1,322.4	7.38	0.49	0.18	0.090	10.99	0.7	1.28
1280	50	881.6	7.98	0.78	0.21	0.105	11.08	1.1	1.28
1280	25	440.8	8.58	1.07	0.35	0.137	13.59	0.9	1.28
1280	10	176.3	10.10	3.60	1.24	0.293	16.63	0.9	1.28

INTERMEDIATE SPEED "Nominal Data"

ENGINE SPEED RPM	PERCENT LOAD	ENGINE POWER BKW	TOTAL NOX (AS NO2) G/HR	TOTAL CO G/HR	TOTAL HC G/HR	CO2 KG/HR	PART MATTER G/HR	O2 IN EXHAUST PERCENT	O2(DRY) SMOKE OPAC PERCENT	O2(DRY) BOSCH SMKE NO.
1280	100	1,763.3	13,465.00	574.00	208.00	1,053.1	184.60	10.92	1.3	1.28
1280	75	1,322.4	10,899.00	480.00	244.00	788.3	113.80	10.99	0.7	1.28
1280	50	881.6	7,865.00	512.00	188.00	535.7	88.40	11.08	1.1	1.28
1280	25	440.8	4,228.00	352.00	155.00	286.7	57.80	13.59	0.9	1.28
1280	10	176.3	1,991.00	473.00	221.00	146.0	49.40	16.63	0.9	1.28

INTERMEDIATE SPEED "Nominal Data"

ENGINE SPEED RPM	PERCENT LOAD	ENGINE POWER BKW	TOTAL NOX (AS NO2) mg/norm cu M @ %5 O2	TOTAL CO mg/norm cu M @ %5 O2	TOTAL HC mg/norm cu M @ %5 O2	PART MATTER mg/norm cu M @ %5 O2	O2 IN EXHAUST PERCENT	O2(DRY) SMOKE OPAC PERCENT	O2(DRY) BOSCH SMKE NO.
1280	100	1,763.3	2,948.5	125.6	45.5	40.4	10.92	1.3	1.28
1280	75	1,322.4	3,198.8	140.7	71.7	33.4	10.99	0.7	1.28
1280	50	881.6	3,394.4	221.1	81.2	38.1	11.08	1.1	1.28
1280	25	440.8	3,409.5	284.1	125.1	46.6	13.59	0.9	1.28
1280	10	176.3	3,156.2	749.3	349.9	78.3	16.63	0.9	1.28

INTERMEDIATE SPEED "Nominal Data"

ENGINE SPEED RPM	PERCENT LOAD	ENGINE POWER BKW	TOTAL NOX (AS NO2) PPM @ %5 O2	TOTAL CO PPM @ %5 O2	TOTAL HC PPM @ %5 O2	O2 IN EXHAUST PERCENT	O2(DRY) SMOKE OPAC PERCENT	O2(DRY) BOSCH SMKE NO.
1280	100	1,763.3	1,436	100	73	10.92	1.3	1.28
1280	75	1,322.4	1,559	112	116	10.99	0.7	1.28
1280	50	881.6	1,653	177	130	11.08	1.1	1.28
1280	25	440.8	1,661	228	202	13.59	0.9	1.28
1280	10	176.3	1,539	601	565	16.63	0.9	1.28

INTERMEDIATE SPEED "Nominal Data"

ENGINE SPEED RPM	PERCENT LOAD	ENGINE POWER BKW	TOTAL NOX (AS NO2) G/HP-HR	TOTAL CO G/HP-HR	TOTAL HC G/HP-HR	PART MATTER G/HP-HR	O2 IN EXHAUST PERCENT	O2(DRY) SMOKE OPAC PERCENT	O2(DRY) BOSCH SMOKE NO.
1280	100	1,763.3	5.70	0.24	0.09	0.08	10.92	1.3	1.28
1280	75	1,322.4	6.15	0.27	0.14	0.06	10.99	0.7	1.28
1280	50	881.6	6.65	0.43	0.16	0.08	11.08	1.1	1.28
1280	25	440.8	7.15	0.60	0.26	0.10	13.59	0.9	1.28
1280	10	176.3	8.42	2.00	0.93	0.21	16.63	0.9	1.28

Altitude Capability Data(Corrected Power Altitude Capability)

Ambient Operating Temp.	10 C	20 C	30 C	40 C	50 C	NORMAL
Altitude						
0 M	1,771 kw	1,771 kw	1,771 kw	1,771 kw	1,771 kw	1,771 kw
300 M	1,771 kw	1,771 kw	1,771 kw	1,771 kw	1,720 kw	1,771 kw
500 M	1,771 kw	1,771 kw	1,771 kw	1,732 kw	1,679 kw	1,771 kw
1,000 M	1,771 kw	1,742 kw	1,685 kw	1,631 kw	1,580 kw	1,719 kw
1,500 M	1,697 kw	1,639 kw	1,585 kw	1,534 kw	1,487 kw	1,636 kw
2,000 M	1,595 kw	1,541 kw	1,490 kw	1,443 kw	1,398 kw	1,555 kw
2,500 M	1,499 kw	1,448 kw	1,400 kw	1,355 kw	1,313 kw	1,477 kw
3,000 M	1,407 kw	1,359 kw	1,314 kw	1,272 kw	1,233 kw	1,403 kw
3,200 M	1,372 kw	1,325 kw	1,281 kw	1,240 kw	1,202 kw	1,374 kw

The powers listed above and all the Powers displayed are Corrected Powers

Identification Reference and Notes

Engine Arrangement:	1736957	Lube Oil Press @ Rated Spd(KPA):	385.0
Effective Serial No:	4BW00333	Piston Speed @ Rated Eng SPD(M/Sec):	11.5
Primary Engine Test Spec:	0K2491	Max Operating Altitude(M):	700.0
Performance Parm Ref:	TM0015	PEEC Elect Control Module Ref	
Performance Data Ref:	DM4253	PEEC Personality Cont Mod Ref	
Aux Coolant Pump Perf Ref:	DM1286		
Cooling System Perf Ref:	DM1299	Turbocharger Model	TPS48 D01 CA15 TA80
Certification Ref:	IMO	Fuel Injector	1550727
Certification Year:	2000	Timing-Static (DEG):	--
Compression Ratio:	15.5	Timing-Static Advance (DEG):	--
Combustion System:	DI	Timing-Static (MM):	--
Aftercooler Temperature (C):	30	Unit Injector Timing (MM):	64.3
Crankcase Blowby Rate(M3/H):	67.2	Torque Rise (percent)	--
Fuel Rate (Rated RPM) No Load(L/HR):	--	Peak Torque Speed RPM	--
Lube Oil Press @ Low Idle Spd(KPA):	138.0	Peak Torque (NM):	--

**Reference
Number: DM4253**

IMO 2000 M1EPA TIER-I 20042007L1

**Parameters
Reference: TM0015**

MARINE PROP - ALL EXCEPT 3600

LIMIT DEFINITIONS FOR USE WITH A, B AND C RATED ENGINES:

ZONE 1 - FOR CONTINUOUS OPERATION, INCLUDING DREDGE ENGINES, WITHOUT INTERRUPTION OR LOAD CYCLING ON OR UNDER CURVE 1.

ZONE 1-2 - OPERATION LIMITED TO 4 HOUR PERIOD AT FULL POWER FOLLOWED BY A 1 HOUR PERIOD ON OR UNDER CURVE 1.

ZONE 2-3 - OPERATION LIMITED TO 1 HOUR PERIOD AT FULL POWER FOLLOWED BY A 1 HOUR PERIOD ON OR UNDER CURVE 1.

MAX LIMIT CURVE - OPERATION LIMITED TO 5 MINUTE PERIOD AT FULL POWER FOLLOWED BY A 2 HOUR PERIOD ON OR UNDER CURVE 1.

CURVE P - POWER CURVE P REPRESENTS THE POWER DEMAND OF A TYPICAL FIXED PITCH PROPELLER, SHAFT POWER MAY BE ASSUMED TO BE 97 PERCENT OF THE BRAKE ENGINE POWER SHOWN.

MAX POWER DATA CURVE M - MAXIMUM POWER ENGINE IS CAPABLE OF PRODUCING.

TOLERANCES:

Power	+/- 3%
Exhaust stack temperature	+/- 8%
Inlet airflow	+/- 5%
Intake manifold pressure-gage	+/- 10%
Exhaust flow	+/- 6%
Specific fuel consumption	+/- 3%
Fuel rate	+/- 5%
Heat rejection	+/- 5%

CONDITIONS:

ENGINE PERFORMANCE IS CORRECTED TO INLET AIR STANDARD CONDITIONS OF 99 KPA (29.31 IN HG) DRY BAROMETER AND 25 DEG C (77 DEG F). THESE VALUES CORRESPOND TO THE STANDARD ATMOSPHERIC PRESSURE AND TEMPERATURE AS SHOWN IN SAE J1228. ALSO INCLUDED IS A CORRECTION TO STANDARD FUEL GRAVITY OF 35 DEGREES API HAVING A LOWER HEATING VALUE OF 42,780 KJ/KG (18,390 BTU/LB) WHEN USED AT 29 DEG C (84.2 DEG F) WHERE THE DENSITY IS 838.9 G/L (7.002 LB/GAL).

THE CORRECTED PERFORMANCE VALUES SHOWN FOR CATERPILLAR ENGINES WILL APPROXIMATE THE VALUES OBTAINED WHEN THE OBSERVED PERFORMANCE DATA IS CORRECTED TO SAE J1228, ISO 3046-2 & 8665 & 2288 & 9249 & 1585, EEC 80/1269 AND DIN 70020 STANDARD REFERENCE CONDITIONS.

ENGINES ARE EQUIPPED WITH STANDARD ACCESSORIES; LUBE OIL, FUEL PUMP AND JACKET WATER PUMP. THE POWER REQUIRED TO DRIVE AUXILIARIES MUST BE DEDUCTED FROM THE GROSS OUTPUT TO ARRIVE AT THE NET POWER AVAILABLE FOR THE EXTERNAL (FLYWHEEL) LOAD. TYPICAL AUXILIARIES INCLUDE COOLING FANS, AIR COMPRESSORS AND CHARGING

ALTERNATORS.

RATINGS MUST BE REDUCED TO COMPENSATE FOR ALTITUDE AND/OR AMBIENT TEMPERATURE CONDITIONS ACCORDING TO THE APPLICABLE DATA SHOWN ON THE PERFORMANCE DATA SET.

ALTITUDE:

ALTITUDE CAPABILITY - THE RECOMMENDED REDUCED POWER VALUES FOR SUSTAINED ENGINE OPERATION AT SPECIFIC ALTITUDE LEVELS AND AMBIENT TEMPERATURES.

COLUMN "N" DATA - THE FLYWHEEL POWER OUTPUT AT NORMAL AMBIENT TEMPERATURE.

AMBIENT TEMPERATURE - TO BE MEASURED AT THE AIR CLEANER AIR INLET DURING NORMAL ENGINE OPERATION.

NORMAL TEMPERATURE - THE NORMAL TEMPERATURE AT VARIOUS SPECIFIC ALTITUDE LEVELS FOUND ON TM2001.

SOUND DEFINITIONS:

Sound Power : [DM8702](#)

Sound Pressure : [TM7080](#)

Date Released : 03/21/12

Caterpillar Confidential: **Green**
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