ATTACHMENT A
M/V PACIFIC FALCON
EMISSION REDUCTION SUMMARY

A. Fuel Logs Summary

2005	Millennium Dawn, Gal	Millennium Star, Gal	Tug Eagle Gal	CF Campbell Gal	Total All Tugs, Gal
March	11,591	0	29,195	0	40,786
April	17,036	0	27,055	0	44,091
May	14,032	0	20,402	0	34,434
June	31,514	0	11,640	0	43,154
July	637	0	17,030	0	17,667
August	23,043	0	0	0	23,043
September	43,440	0	0	0	43,440
October	42,018	0	0	0	42,018
November	31,310	0	0	0	31,310
December	19,548	17,512	0	0	37,060
	234,169	17,512	105,322	0	357,003

2006	Millennium Dawn, Gal	Millennium Star, Gal	Tug Eagle Gal	CF Campbell Gal	Total All Tugs, Gal
January	24,152	24,014	0	0	48,166
February	22,500	22,554	0	12,086	57,140
	46,652	46,568	0	12,086	105,306

Total fuel consumed during 12 month period March 2005 through February 2006

Vessel	Fuel, Gal	% of Total
Millennium Dawn	280,821	60.74%
Millennium Star	64,080	13.86%
Tug Eagle	105,322	22.78%
CF Campbell	12,086	2.61%
Total	462,309	100.00%

B. Trip Logs

B.1. Line Haul Trips 3/01-05-2/28-06

From	To	# trips	Hrs	Avg hrs/trip
San Francisco	LA/LB	8	584	73.0
LA/LB	San Francisco	23	1811	78.7
San Francisco	Ellwood	4	280	70.0
Ellwood	LA/LB	15	632	42.1
LA/LB	Ellwood	15	480	32.0
		65	3787	58.3

San Francisco trips include San Francisco, Martinez, Richmond, Alameda, Rodeo, Avon
LA/LB include Los Angeles, Long Beach, El Segundo

B.2. Local Los Angeles/Long Beach/El Segundo 3/01-05-2/28-06

# trips	Hrs	Avg hrs/trip
29	838	28.9

Includes idle hours for vessel while loading, cleaning, safety check etc

B.3. Local Richmond, Martinez, Benecia 3/01-05-2/28-06

# trips	Hrs	Avg hrs/trip
24	549	22.9

Includes idle hours for vessel while loading, cleaning, safety check etc

B.4. Data Reduction

Total run hours	5174	for 3/01/05 - 2/28/06
Total trips	118	for 3/01/05 - 2/28/06
Avg/trip hrs/trip	43.8	for 3/01/05 - 2/28/06

Service	Engine H.P.	Load Factor	Fuel Consumption gal/hr	Total Hrs Actual	Total Fuel Consumed Calculated gal	Total Fuel Consumed Adjusted for Actual, gal	% of total Fuel
Line haul	2,845	0.70	139.4	3,787	527,838	428,663	92.72%
Local Los Angeles/El Segundo/Long Beach	610	0.15	29.9	838	25,031	20,328	4.40%
Local Richmond/Benecia/Martinez	610	0.15	29.9	549	16,399	13,318	2.88%
				5,174	569,268	462,309	

C. Emission Reduction Calculations

C.1. Trip Logs Summary

Line Haul Distances

For Line Haul Trips from/to S.F. to LA			For line haul trips from/to Ellwood to LA	
SCAQMD Jurisdiction	82	16.87%	82	56.16%
VCAPCD Jurisdiction	44	9.05%	44	30.14%
SBAPCD Jurisdiction	130	26.75%	20	13.70%
SLOAPCD	60	12.35%	146	
MBUAPCD Jurisdictior	100	20.58%		
BAAQMD Jurisdiction	70	14.40%		
	486			

SCAQMD and BAAQMD miles include the turn into the Port
Approx. 70% of the total line haul hours are for trips between S.F. and LA, remaining 30% are for trips between Ellwood and LA

C.2. Emission Factors

	Engine	H.P.	NOx lbs/hr	CO lbs/hr	HC lbs/hr	PM lbs/hr
Millennium Dawn	3516B	2200	43.88	2.06	0.64	0.4
Millennium Star	3516B	2200	43.88	2.06	0.64	0.4
Tug Eagle	3512B	1500	See gms/bhp-hr data below			
CF Campbell	3516B	2000	59.82	1.56	1.41	0.33

	Engine	H.P.	NOx gms/bhp-hr	CO gms/bhp-hr	HC gms/bhp-hr	PM gms/bhp-hr	Corrected NOx (note 1) gms/bhp-hr	Corrected PM (note 1) gms/bhp-hr
Millennium Dawn	3516B	2200	9.06	0.43	0.13	0.08	8.51	0.07
Millennium Star	3516B	2200	9.06	0.43	0.13	0.08	8.51	0.07
Tug Eagle	3512B	1500	18.10	1.75	0.05	0.10	17.01	0.08
CF Campbell	3516B	2000	13.58	0.35	0.32	0.07	12.76	0.06
Note 1: Correction factor for California fuel NOx 0.94, PM 0.8								
Fleet Average Baseline Emission Factors		2035.30	10.56	0.73	0.12	0.07		

Baseline

Fleetwide		
NOx	10.56	gms/bhp-hr
CO	0.73	gms/bhp-hr
HC	0.12	gms/bhp-hr
PM	0.07	gms/bhp-hr
Total Fuel	462,309	gallons/yr

Repower

NOx	4.87	gms/bhp-hr	Reference: USEPA Tier 2 Emission Limit
PM	0.107	gms/bhp-hr	
NOx Correction for California fuel	0.87		
PM Correction for California fuel	0.9		
Corrected NOx	4.2369	gms/bhp-hr	
Corrected PM	0.0963	gms/bhp-hr	

C.3. Emission Reductions

Methodology for calculating emission reductions: SCAQMD Rule 1631 - Pilot Credit Generation Program for Marine Vessels (SIP-approved MSERC calculation method peer reviewed by USEPA)

Emission reductions (tons/yr) = (EFbase-EFrepower) x ECF x Fuel Burn / 454/2000
where ECF = Energy Consumption Factor

EFBase = 10.75 gms/bhp-hr	Reference: GM EMD Manufacturers Specification
EFrepower = 4.24 gms/bhp-hr	Reference: USEPA Tier 2 Emission Limit
ECF = 22.61 bhp-hr/gal	Reference: ElectroMotive 8-710 Tier 2 Certificate of Conformity
	22.61 bhp-hr/gal = 1/(0.314 lb/bhp-hr /7.1 lb/gal) @ 900 RPM

C.4 Emission Reductions by Segment

Line Haul segment

NOx	67.49 tons/yr	
	To/Fm S.F. to LA line haul segment	47.25 tons/yr
	To/Fm Ellwood to LA line haul segment	20.25 tons/yr

Local Los Angeles/Long Beach/El Segundo segment

NOx 3.20 tons/yr

Local San Francisco, Richmond, Martinez, Avon, Rodeo segment

NOx 2.10 tons/yr

Total Emission Reductions NOx 72.79 tons/yr

C.5 Emissions Reductions by Air District

NOx

	Line Haul Segment tons/yr	Local Segment tons/yr	Total tons/yr	% of All
SCAQMD	19.34	3.20	22.54	30.97%
VCACPD	10.38	0.00	10.38	14.26%
SBAPCD	15.41	0.00	15.41	21.17%
SLOAPCD	5.83	0.00	5.83	8.01%
MBUAPCD	9.72	0.00	9.72	13.36%
BAAQMD	6.80	2.10	8.90	12.23%
	67.49	5.30	72.79	

ATTACHMENT B
BASELINE NO_X EMISSION FACTOR DOCUMENTATION
CATERPILLAR ENGINES

Douglas J. Ribble/0Q/Caterpillar@CATERPILLAR
05/19/2006 02:54 PM

To Rich Floyd/Quinn@QUINN@CATEXTERNAL
cc
bcc
Subject Re: Fw: Information on Cat Engines

Check TMI first. They should be in there. If not, place a request into Application Support for the E3 Cycle data on each SN.

Douglas J. Ribble
Caterpillar Marine Engine Sales Manager
Pacific Region
425-562-9657
425-865-0919 (fax)

Rich Floyd/Quinn@QUINN
05/19/2006 11:37 AM PDT

To Douglas J. Ribble/0Q/Caterpillar@Caterpillar
cc
bcc
Subject Fw: Information on Cat Engines

Fw: Information on Cat Engines

Caterpillar: Confidential Green
Retain Until: 06/18/2006
Retention Category: G90 - General Matters/Administration

Doug,
can you help Mahesh with these values or how do I get this information?
Thanks
Rich

Rich Floyd
Manager- Marine Sales
Quinn Power Systems
3500 Shepherd St.
City of Industry CA 90601
562 463- 6064 Ph.
562 695-7535 Fax

—— Forwarded by Rich Floyd/Quinn on 05/19/2006 11:35 AM ——

"oceanair1" <oceanair1@worldnet.att.net>
05/16/2006 04:20 PM

To"Rich Floyd" <rfloyd@quinnpower.com>
cc
SubjectInformation on Cat Engines

EMISSIONS DATA [8KN00454]

MAY 22, 2006

Can't find what you're looking for? Click here

ENGINE EMISSIONS DATA

Serial Number	8KN00454
Engine Arrangement Number	1731806
As - Shipped Certification	IMO Compliant
As - Shipped Certification	IMO Tech File - Electronic Engines
Labeled Model Year	
Spec Number	0K1936
Has Engine Been Rerated?	No
Interlock Code Actual Progression	No Interlock Code Progression
As - Shipped Interlock Code	No Interlock Code
As - Shipped Flash File	2051535
As - Shipped Flash File CRB	2051535
As - Shipped CORR FL Power at RPM	2,200 HP (1,640.5 KW) at 1600 rpms
Build Date	2001-10-19

Caterpillar Confidential: Green
Content Owner: Alan Scott
Web Master(s): PSG Web Based Systems Support
Current Date: Monday, May 22, 2006 9:53:26 AM
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Data Privacy Statement.

This is not an official emission certificate. This is for emission data information only.

This emission data is Caterpillar's best estimate for this rating. If actual emissions are required then an emission test needs to be run on your engine.

MARINE ENGINE PERFORMANCE DATA [8KN00454]

MAY 22, 2006

Can't find what you're looking for? Click here

Performance Number: DM4422

Change Level: 02

Sales Model: 3516BDITA
Engine Power: 2,200 HP
Manifold Type: DRY
Turbo Quantity: 2

Combustion: DI
Speed: 1,600 RPM
Governor Type: ADEM2
Engine App: MP
Engine Rating: MP

Aspr: TA
After Cooler: SCAC
After Cooler Temp(F): 86
Turbo Arrangement: Parallel
Strategy:

Rating Type: C RATING (MAXIMUM CONTINUOUS)

Certification: IMO 2000 - EPA TIER-I 2004 - 2007

General Performance Data: Curve 1: Zone 1

ENGINE SPEED RPM	ENGINE POWER BHP	ENGINE TORQUE LB.FT	ENGINE BMEP PSI	FUEL RATE LB/BHP-HR	FUEL RATE GPH	INTAKE MFLD TEMP DEG F	INTAKE MFLD P IN-HG	INTAKE AIR FLOW CFM	EXH MFLD TEMP DEG F	EXH STACK TEMP DEG F	EXH GAS FLOW CFM
1600	2000	6,566	235	0.332	95.0	129.4	60.5	4,537.9	1,048.3	768.2	10,887.5
1500	2000	7,003	251	0.332	94.9	130.3	63.5	4,432.0	1,068.4	781.5	10,781.6
1400	2000	7,503	269	0.328	93.6	129.9	64.3	4,209.5	1,100.8	813.6	10,495.5
1300	2000	8,081	289	0.322	92.1	127.2	61.2	3,785.7	1,125.5	855.9	9,796.3
1200	1684	7,372	264	0.319	76.7	116.8	46.3	2,948.8	1,138.3	873.9	7,758.6
1100	1279	6,108	219	0.326	59.5	107.2	29.4	2,122.4	1,158.8	910.9	5,759.8
1000	900	4,726	169	0.336	43.2	104.4	16.5	1,525.6	1,151.1	915.4	4,153.0
900	712	4,155	149	0.346	35.2	104.5	10.7	1,211.3	1,156.6	886.3	3,227.8
800	543	3,565	128	0.356	27.6	104.0	6.3	960.6	1,086.3	800.6	2,383.7
700	439	3,290	118	0.366	22.9	105.4	4.3	773.4	1,063.0	772.5	1,878.7
650	401	3,240	116	0.372	21.3	108.5	3.4	681.6	1,067.5	792.1	1,684.5

General Performance Data :Curve 2: Zone 1-2

ENGINE SPEED RPM	ENGINE POWER BHP	ENGINE TORQUE LB.FT	ENGINE BMEP PSI	FUEL RATE LB/BHP-HR	FUEL RATE GPH	INTAKE MFLD TEMP DEG F	INTAKE MFLD P IN-HG	INTAKE AIR FLOW CFM	EXH MFLD TEMP DEG F	EXH STACK TEMP DEG F	EXH GAS FLOW CFM
1600	2100	6,893	247	0.332	99.5	131.5	62.3	4,605.0	1,075.6	791.1	11,261.9
1500	2100	7,353	263	0.331	99.3	132.3	65.8	4,520.3	1,093.1	800.2	11,166.5
1400	2100	7,879	282	0.327	98.0	131.9	67.0	4,301.3	1,121.2	828.0	10,855.7
1300	2100	8,484	304	0.322	96.5	130.1	64.5	3,895.2	1,142.1	868.6	10,184.8
1200	1684	7,372	264	0.318	76.6	116.8	46.3	2,948.8	1,138.3	873.9	7,758.6
1100	1411	6,736	241	0.325	65.4	109.6	34.2	2,284.9	1,194.4	924.8	6,268.4
1000	971	5,099	183	0.336	46.6	105.1	18.8	1,599.8	1,186.0	938.8	4,439.1
900	742	4,328	155	0.347	36.8	105.3	11.6	1,239.5	1,191.9	911.3	3,369.0
800	543	3,565	128	0.357	27.7	104.0	6.3	960.6	1,086.3	800.6	2,383.7
700	439	3,290	118	0.366	22.9	105.4	4.3	773.4	1,063.0	772.5	1,878.7
650	401	3,240	116	0.372	21.3	108.5	3.4	681.6	1,067.5	792.1	1,684.5

General Performance Data :Curve 3: Zone 2-3

ENGINE SPEED RPM	ENGINE POWER BHP	ENGINE TORQUE LB.FT	ENGINE BMEP PSI	FUEL RATE LB/BHP-HR	FUEL RATE GPH	INTAKE MFLD TEMP DEG F	INTAKE MFLD P IN-HG	INTAKE AIR FLOW CFM	EXH MFLD TEMP DEG F	EXH STACK TEMP DEG F	EXH GAS FLOW CFM
1600	2200	7,221	259	0.332	104.4	134.1	64.3	4,672.1	1,108.8	820.0	11,706.8
1500	2200	7,703	276	0.330	103.8	134.4	68.0	4,594.4	1,119.4	821.7	11,551.4
1400	2200	8,253	296	0.326	102.4	133.9	69.4	4,382.6	1,142.2	844.5	11,215.9
1300	2200	8,888	318	0.321	100.8	133.2	67.6	4,001.2	1,160.1	884.7	10,590.9
1200	1684	7,372	264	0.318	76.6	116.8	46.3	2,948.8	1,138.3	873.9	7,758.6
1100	1621	7,741	277	0.325	75.2	115.7	42.7	2,578.0	1,247.2	942.8	7,183.0
1000	1070	5,620	201	0.337	51.5	106.2	22.3	1,709.2	1,232.4	963.1	4,831.1
900	791	4,617	165	0.349	39.4	106.2	13.3	1,285.5	1,248.4	950.0	3,605.6
800	543	3,565	128	0.357	27.7	104.0	6.3	960.6	1,086.3	800.6	2,383.7
700	439	3,290	118	0.366	22.9	105.4	4.3	773.4	1,063.0	772.5	1,878.7
650	401	3,240	116	0.372	21.3	108.5	3.4	681.6	1,067.5	792.1	1,684.5

General Performance Data :Maximum Limit

ENGINE SPEED RPM	ENGINE POWER BHP	ENGINE TORQUE LB.FT	ENGINE BMEP PSI	FUEL RATE LB/BHP-HR	FUEL RATE GPH	INTAKE MFLD TEMP DEG F	INTAKE MFLD P IN-HG	INTAKE AIR FLOW CFM	EXH MFLD TEMP DEG F	EXH STACK TEMP DEG F	EXH GAS FLOW CFM
1600	2200	7,221	259	0.332	104.4	134.1	64.3	4,672.1	1,108.8	820.0	11,706.8
1500	2200	7,703	276	0.330	103.8	134.4	68.0	4,594.4	1,119.4	821.7	11,551.4
1400	2200	8,253	296	0.326	102.4	133.9	69.4	4,382.6	1,142.2	844.5	11,215.9
1300	2200	8,888	318	0.321	100.8	133.2	67.6	4,001.2	1,160.1	884.7	10,590.9
1200	1684	7,372	264	0.318	76.5	116.8	46.3	2,948.8	1,138.3	873.9	7,758.6
1100	1624	7,754	278	0.324	75.3	115.7	42.8	2,581.5	1,247.9	943.0	7,193.6
1000	1204	6,325	227	0.338	58.1	107.8	27.0	1,861.1	1,293.4	985.8	5,353.7
900	836	4,875	175	0.351	41.9	106.9	14.8	1,331.4	1,291.8	978.3	3,810.5
800	578	3,795	136	0.361	29.8	105.1	7.2	985.3	1,151.6	845.2	2,535.6
700	464	3,481	125	0.371	24.6	106.0	4.9	787.5	1,129.3	815.4	1,977.6
650	421	3,402	122	0.377	22.7	109.2	3.8	688.6	1,130.0	835.5	1,765.7

General Performance Data :Prop Demand Curve P

ENGINE SPEED RPM	ENGINE POWER BHP	ENGINE TORQUE LB.FT	ENGINE BMEP PSI	FUEL RATE LB/BHP-HR	FUEL RATE GPH	INTAKE MFLD TEMP DEG F	INTAKE MFLD P IN-HG	INTAKE AIR FLOW CFM	EXH MFLD TEMP DEG F	EXH STACK TEMP DEG F	EXH GAS FLOW CFM
1600	2200	7,221	259	0.332	104.4	134.1	64.3	4,672.1	1,108.8	820.0	11,706.8
1500	1813	6,347	227	0.336	86.9	126.3	58.7	4,248.4	1,026.9	753.6	10,057.6
1400	1474	5,529	198	0.334	70.4	117.3	46.5	3,492.6	998.4	756.7	8,313.1
1300	1180	4,768	171	0.332	56.0	107.2	31.2	2,616.8	979.7	784.4	6,381.4
1200	928	4,062	145	0.330	43.8	101.7	19.7	1,956.4	960.1	788.9	4,795.7
1100	715	3,413	122	0.332	33.9	99.1	11.9	1,507.9	920.1	765.5	3,630.4
1000	537	2,821	101	0.338	26.0	97.7	6.9	1,214.8	841.8	686.5	2,733.4
900	392	2,285	82	0.348	19.4	97.0	4.0	1,017.1	740.8	592.0	2,073.0
800	275	1,806	65	0.362	14.2	95.9	2.1	858.1	628.2	477.5	1,553.8
700	184	1,382	49	0.388	10.2	94.5	0.9	706.3	517.3	375.4	1,137.1
650	148	1,192	43	0.407	8.6	93.9	0.5	635.7	467.4	339.4	978.2

General Performance Data :Max Power Curve M

ENGINE SPEED RPM	ENGINE POWER BHP	ENGINE TORQUE LB.FT	ENGINE BMEP PSI	FUEL RATE LB/BHP-HR	FUEL RATE GPH	INTAKE MFLD TEMP DEG F	INTAKE MFLD P IN-HG	INTAKE AIR FLOW CFM	EXH MFLD TEMP DEG F	EXH STACK TEMP DEG F	EXH GAS FLOW CFM
1600	2200	7,221	259	0.332	104.4	134.1	64.3	4,672.1	1,108.8	820.0	11,706.8
1500	2200	7,703	276	0.330	103.8	134.4	68.0	4,594.4	1,119.4	821.7	11,551.4
1400	2200	8,253	296	0.326	102.4	133.9	69.4	4,382.6	1,142.2	844.5	11,215.9
1300	2200	8,888	318	0.321	100.8	133.2	67.6	4,001.2	1,160.1	884.7	10,590.9
1200	1684	7,372	264	0.318	76.5	116.8	46.3	2,948.8	1,138.3	873.9	7,758.6
1100	1624	7,754	278	0.324	75.3	115.7	42.8	2,581.5	1,247.9	943.0	7,193.6
1000	1204	6,325	227	0.338	58.1	107.8	27.0	1,861.1	1,293.4	985.8	5,353.7
900	836	4,875	175	0.351	41.9	106.9	14.8	1,331.4	1,291.8	978.3	3,810.5
800	578	3,795	136	0.361	29.8	105.1	7.2	985.3	1,151.6	845.2	2,535.6
700	464	3,481	125	0.371	24.6	106.0	4.9	787.5	1,129.3	815.4	1,977.6
650	421	3,402	122	0.377	22.7	109.2	3.8	688.6	1,130.0	835.5	1,765.7

Heat Rejection Data :Maximum Limit

ENGINE SPEED RPM	ENGINE POWER BHP	REJ TO JW BTU/MN	REJ TO ATMOS BTU/MN	REJ TO EXHAUST BTU/MN	EXH RCOV TO 350F BTU/MN	FROM OIL CLR BTU/MN	FROM AFT CLR BTU/MN	WORK ENERGY BTU/MN	LHV ENERGY BTU/MN	HHV ENERGY BTU/MN
1600	2200	34,122	7,621	81,324	41,117	11,203	21,667	93,323	223,442	238,000
1500	2200	33,781	7,734	80,414	40,605	11,146	21,440	93,323	222,134	236,636
1400	2200	33,269	7,962	79,504	40,776	11,033	20,303	93,323	220,030	234,361
1300	2200	32,473	8,132	77,002	40,548	10,748	17,800	93,323	214,684	228,731
1200	1684	27,980	7,905	56,586	29,345	8,189	10,237	71,429	163,501	174,136
1100	1624	29,345	9,099	54,766	29,515	8,019	8,644	68,869	160,259	170,723
1000	1204	25,136	9,725	41,913	23,089	6,199	4,322	51,069	124,033	132,166
900	836	20,189	9,668	29,970	16,322	4,550	1,649	35,430	90,992	96,906
800	578	15,241	8,076	18,995	9,384	3,185	512	24,511	63,239	67,334
700	464	13,364	8,076	14,900	7,052	2,673	227	19,677	52,775	56,244
650	421	12,568	7,848	13,478	6,483	2,445	57	17,857	48,624	51,808

EXHAUST Sound Data: 6.6 FEET

ENGINE SPEED RPM	ENGINE POWER BHP	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	2200	114	109	119	115	107	106	107	108	105
1500	2200	112	107	117	113	105	104	106	106	103
1400	2200	111	106	116	111	104	102	104	105	101
1300	2200	109	108	114	109	102	101	104	102	100
1200	1684	108	107	113	108	101	100	103	101	99
1100	1624	107	106	112	107	100	98	101	100	98
1000	1204	105	113	109	103	99	98	101	94	90
900	836	104	112	108	102	98	97	100	93	89
800	578	103	111	107	101	97	96	99	92	88
700	464	102	110	106	100	96	95	98	91	87
650	421	102	109	106	100	96	95	98	91	86

EXHAUST Sound Data: 23.0 FEET

ENGINE SPEED RPM	ENGINE POWER BHP	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	2200	101	97	108	102	93	93	94	94	90
1500	2200	99	96	107	101	92	91	92	93	88
1400	2200	98	94	105	99	90	90	91	91	87
1300	2200	96	98	103	97	90	90	91	90	85
1200	1684	95	97	101	96	89	88	89	89	84
1100	1624	93	95	100	94	87	87	88	87	82
1000	1204	92	103	100	91	88	87	86	81	77
900	836	91	101	99	90	87	85	85	80	76
800	578	90	100	98	89	86	84	84	79	75
700	464	89	99	97	88	85	83	83	78	74
650	421	88	99	96	87	84	83	82	77	73

EXHAUST Sound Data: 49.2 FEET

ENGINE SPEED RPM	ENGINE POWER BHP	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	2200	94	91	102	96	87	86	87	88	83
1500	2200	92	89	100	94	85	84	86	86	81
1400	2200	91	88	98	92	83	83	84	85	80
1300	2200	89	91	96	90	83	83	84	83	78
1200	1684	88	90	95	89	82	82	83	82	77
1100	1624	87	89	93	88	81	80	81	81	76
1000	1204	85	96	93	84	81	80	79	74	70
900	836	84	95	92	83	80	79	78	73	69
800	578	83	94	91	82	79	78	77	72	68
700	464	82	93	90	81	78	77	76	71	67
650	421	82	92	90	81	78	76	76	71	67

MECHANICAL Sound Data: 3.3 FEET

ENGINE SPEED RPM	ENGINE POWER BHP	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	2200	104	95	100	99	96	99	99	97	101
1500	2200	103	95	99	98	95	98	98	96	100
1400	2200	103	94	98	97	94	97	98	96	99
1300	2200	102	98	99	96	92	97	97	94	98
1200	1684	102	97	98	95	91	96	97	94	97
1100	1624	101	97	97	95	90	95	96	93	96
1000	1204	100	96	97	94	90	95	96	92	96
900	836	100	95	96	93	89	94	95	92	95
800	578	99	95	96	93	89	93	94	91	95
700	464	98	94	95	92	88	93	94	91	94
650	421	98	94	95	92	88	92	93	90	94

MECHANICAL Sound Data: 23.0 FEET

ENGINE SPEED RPM	ENGINE POWER BHP	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	2200	92	84	88	87	84	87	87	85	89
1500	2200	92	83	87	86	83	86	87	85	88
1400	2200	91	83	87	86	83	86	86	84	88
1300	2200	91	86	87	84	80	85	86	83	86
1200	1684	90	86	86	84	79	84	85	82	85
1100	1624	89	85	86	83	79	84	85	81	85
1000	1204	89	84	85	82	78	83	84	81	84
900	836	88	84	85	82	78	82	83	80	84
800	578	87	83	84	81	77	82	83	80	83
700	464	87	82	83	80	76	81	82	79	82
650	421	86	82	83	80	76	81	82	79	82

MECHANICAL Sound Data: 49.2 FEET

ENGINE SPEED RPM	ENGINE POWER BHP	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	2200	87	78	83	82	79	82	82	80	84
1500	2200	86	78	82	81	78	81	81	79	83
1400	2200	86	77	81	80	77	80	81	79	83
1300	2200	85	81	82	79	75	80	81	77	81
1200	1684	85	80	81	78	74	79	80	77	80
1100	1624	84	80	80	78	73	78	79	76	79
1000	1204	83	79	80	77	73	78	79	75	79
900	836	83	78	79	76	72	77	78	75	78
800	578	82	78	79	76	72	76	77	74	78
700	464	81	77	78	75	71	76	77	74	77
650	421	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

EXHAUST STACK DIAMETER	11 IN
WET EXHAUST MASS	21,415.7 LB/HR
WET EXHAUST FLOW (818.60 F STACK TEMP)	11,713.89 CFM
WET EXHAUST FLOW RATE (32 DEG F AND 29.98 IN HG)	4,441.00 STD CFM
DRY EXHAUST FLOW RATE (32 DEG F AND 29.98 IN HG)	4,068.25 STD CFM
FUEL FLOW RATE	104 GAL/HR

RATED SPEED "Not to exceed data"

ENGINE SPEED RPM	PERCENT LOAD	ENGINE POWER BHP	TOTAL NOX (AS NO2) LB/HR	TOTAL CO LB/HR	TOTAL HC LB/HR	PART MATTER LB/HR	OXYGEN IN EXHAUST PERCENT	BOSCH SMOKE NUMBER
1600	100	2200	43.88	2.06	0.64	.400	10.40	1.28
1600	75	1650	23.50	1.90	0.82	.460	12.10	1.28
1600	50	1100	15.18	2.00	0.76	.420	13.20	1.28
1600	25	550	8.09	2.87	0.78	.210	14.80	1.28
1600	10	220	3.85	9.00	3.18	.140	16.80	1.28

RATED SPEED "Nominal Data"

ENGINE SPEED RPM	PERCENT LOAD	ENGINE POWER BHP	TOTAL NOX (AS NO2) LB/HR	TOTAL CO LB/HR	TOTAL HC LB/HR	TOTAL CO2 LB/HR	PART MATTER LB/HR	OXYGEN IN EXHAUST PERCENT	BOSCH SMOKE NUMBER
1600	100	2200	36.57	1.14	0.48	2,170.2	0.290	10.40	1.28
1600	75	1650	19.59	1.05	0.62	1,648.9	0.330	12.10	1.28
1600	50	1100	12.65	1.11	0.57	1,116.4	0.300	13.20	1.28
1600	25	550	6.74	1.60	0.59	612.9	0.150	14.80	1.28
1600	10	220	3.21	5.00	2.39	335.4	0.100	16.80	1.28

INTERMEDIATE SPEED "Not to exceed data"

ENGINE SPEED RPM	PERCENT LOAD	TOTAL NOX (AS NO2) LB/HR	TOTAL CO LB/HR	TOTAL CO LB/HR	PART MATTER LB/HR	O2 IN EXHAUST PERCENT	O2(DRY) BOSCH SMKE NO.
1280	100	45.89	6.67	0.25	0.320	9.16	1.28
1280	75	30.06	3.89	0.42	0.300	10.10	1.28
1280	50	18.01	2.52	0.49	0.290	11.07	1.28
1280	25	10.19	2.36	0.79	0.140	13.52	1.28
1280	10	5.17	5.06	1.92	0.090	16.41	1.28

INTERMEDIATE SPEED "Nominal Data"

ENGINE SPEED RPM	PERCENT LOAD	TOTAL NOX (AS NO2) LB/HR	TOTAL CO LB/HR	TOTAL CO LB/HR	TOTAL CO2 LB/HR	PART MATTER LB/HR	O2 IN EXHAUST PERCENT	O2(DRY) BOSCH SMKE NO.
1280	100	38.24	3.70	0.19	1,931.1	0.230	9.16	1.28
1280	75	25.05	2.16	0.32	1,501.9	0.220	10.10	1.28
1280	50	15.00	1.40	0.37	1,013.1	0.210	11.07	1.28
1280	25	8.49	1.31	0.59	544.0	0.100	13.52	1.28
1280	10	4.31	2.81	1.44	273.7	0.070	16.41	1.28

Altitude Capability Data(Corrected Power Altitude Capability)

Ambient Operating Temp. / Altitude	50 F	68 F	86 F	104 F	122 F	NORMAL
0 F	2,201 hp	2,201 hp	2,201 hp	2,201 hp	2,201 hp	2,201 hp
984 F	2,201 hp	2,201 hp	2,201 hp	2,201 hp	2,136 hp	2,201 hp
1,640 F	2,201 hp	2,201 hp	2,201 hp	2,152 hp	2,085 hp	2,201 hp
3,281 F	2,201 hp	2,164 hp	2,093 hp	2,026 hp	1,963 hp	2,136 hp
4,921 F	2,108 hp	2,036 hp	1,969 hp	1,906 hp	1,847 hp	2,032 hp
6,562 F	1,982 hp	1,914 hp	1,851 hp	1,792 hp	1,737 hp	1,931 hp
8,202 F	1,863 hp	1,798 hp	1,739 hp	1,683 hp	1,632 hp	1,836 hp
9,843 F	1,749 hp	1,688 hp	1,633 hp	1,581 hp	1,531 hp	1,742 hp
10,499 F	1,704 hp	1,647 hp	1,592 hp	1,541 hp	1,494 hp	1,707 hp

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

Identification Reference and Notes

Engine Arrangement:	1731806	Lube Oil Press @ Rated Spd(PSI):	55.8
Effective Serial No:	8KN00368	Piston Speed @ Rated Eng SPD (FT/Min):	1,970.5
Primary Engine Test Spec:	0K1936	Max Operating Altitude(FT):	2,296.6
Performance Parm Ref:	TM0015	PEEC Elect Control Module Ref	
Performance Data Ref:	DM4422	PEEC Personality Cont Mod Ref	
Aux Coolant Pump Perf Ref:	DM1286		
Cooling System Perf Ref:	DM1299	Turbocharger Model	GT604104BL 56 80DR-1.70
Certification Ref:	IMO	Fuel Injector	1167010
Certification Year:	2000	Timing-Static (DEG):	–
Compression Ratio:	14.0	Timing-Static Advance (DEG):	–
Combustion System:	DI	Timing-Static (MM):	–
Aftercooler Temperature (F):	86	Unit Injector Timing (MM):	64.3
Crankcase Blowby Rate(CFH):	2,196.6	Torque Rise (percent)	–
Fuel Rate (Rated RPM) No Load (Gal/HR):	–	Peak Torque Speed RPM	–
Lube Oil Press @ Low Idle Spd (PSI):	20.0	Peak Torque (LB/FT):	–

Reference Number: DM4422 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, INLCUDING 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 LMITED 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 AIR FLOW	+/-	5%
INTAKE MANIFOLD PRESSURE - GAGE	+/-	10%
EXHAUST FLOW	+/-	6%
SPECIFIC FUEL CONSUMPTION	+/-	3%
HEAT REJECTION	+/-	5%
FUEL RATE	+/-	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 OOPERATION.

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

Caterpillar Confidential: Green
Content Owner: Alan Scott
Web Master(s): PSG Web Based Systems Support
Current Date: Monday, May 22, 2006 9:53:51 AM
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EMISSIONS DATA [8KN00407]

MAY 22, 2006

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ENGINE EMISSIONS DATA

Serial Number	8KN00407
Engine Arrangement Number	1731806
As - Shipped Certification	IMO Compliant
As - Shipped Certification	IMO Tech File - Electronic Engines
Labeled Model Year	
Spec Number	0K1936
Has Engine Been Rerated?	No
Interlock Code Actual Progression	No Interlock Code Progression
As - Shipped Interlock Code	No Interlock Code
As - Shipped Flash File	1834073
As - Shipped Flash File CRB	1834075
As - Shipped CORR FL Power at RPM	2,200 HP (1,640.5 KW) at 1600 rpms
Build Date	2000-05-02

Caterpillar Confidential: Green
Content Owner: Alan Scott
Web Master(s): PSG Web Based Systems Support
Current Date: Monday, May 22, 2006 9:54:35 AM
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This is not an official emission certificate. This is for emission data information only.

This emission data is Caterpillar's best estimate for this rating. If actual emissions are required then an emission test needs to be run on your engine.

MARINE ENGINE PERFORMANCE DATA [8KN00407]

MAY 22, 2006

Can't find what you're looking for? Click here

Performance Number: DM4422

Change Level: 02

Sales Model: 3516BDITA
Engine Power: 2,200 HP
Manifold Type: DRY
Turbo Quantity: 2

Combustion: DI
Speed: 1,600 RPM
Governor Type: ADEM2
Engine App: MP
Engine Rating: MP

Aspr: TA
After Cooler: SCAC
After Cooler Temp(F): 86
Turbo Arrangement: Parallel
Strategy:

Rating Type: C RATING (MAXIMUM CONTINUOUS)

Certification: IMO 2000 - EPA TIER-I 2004 - 2007

General Performance Data: Curve 1: Zone 1

ENGINE SPEED RPM	ENGINE POWER BHP	ENGINE TORQUE LB.FT	ENGINE BMEP PSI	FUEL RATE LB/BHP-HR	FUEL RATE GPH	INTAKE MFLD TEMP DEG F	INTAKE MFLD P IN-HG	INTAKE AIR FLOW CFM	EXH MFLD TEMP DEG F	EXH STACK TEMP DEG F	EXH GAS FLOW CFM
1600	2000	6,566	235	0.332	95.0	129.4	60.5	4,537.9	1,048.3	768.2	10,887.5
1500	2000	7,003	251	0.332	94.9	130.3	63.5	4,432.0	1,068.4	781.5	10,781.6
1400	2000	7,503	269	0.328	93.6	129.9	64.3	4,209.5	1,100.8	813.6	10,495.5
1300	2000	8,081	289	0.322	92.1	127.2	61.2	3,785.7	1,125.5	855.9	9,796.3
1200	1684	7,372	264	0.319	76.7	116.8	46.3	2,948.8	1,138.3	873.9	7,758.6
1100	1279	6,108	219	0.326	59.5	107.2	29.4	2,122.4	1,158.8	910.9	5,759.8
1000	900	4,726	169	0.336	43.2	104.4	16.5	1,525.6	1,151.1	915.4	4,153.0
900	712	4,155	149	0.346	35.2	104.5	10.7	1,211.3	1,156.6	886.3	3,227.8
800	543	3,565	128	0.356	27.6	104.0	6.3	960.6	1,086.3	800.6	2,383.7
700	439	3,290	118	0.366	22.9	105.4	4.3	773.4	1,063.0	772.5	1,878.7
650	401	3,240	116	0.372	21.3	108.5	3.4	681.6	1,067.5	792.1	1,684.5

General Performance Data :Curve 2: Zone 1-2

ENGINE SPEED RPM	ENGINE POWER BHP	ENGINE TORQUE LB.FT	ENGINE BMEP PSI	FUEL RATE LB/BHP-HR	FUEL RATE GPH	INTAKE MFLD TEMP DEG F	INTAKE MFLD P IN-HG	INTAKE AIR FLOW CFM	EXH MFLD TEMP DEG F	EXH STACK TEMP DEG F	EXH GAS FLOW CFM
1600	2100	6,893	247	0.332	99.5	131.5	62.3	4,605.0	1,075.6	791.1	11,261.9
1500	2100	7,353	263	0.331	99.3	132.3	65.8	4,520.3	1,093.1	800.2	11,166.5
1400	2100	7,879	282	0.327	98.0	131.9	67.0	4,301.3	1,121.2	828.0	10,855.7
1300	2100	8,484	304	0.322	96.5	130.1	64.5	3,895.2	1,142.1	868.6	10,184.8
1200	1684	7,372	264	0.318	76.6	116.8	46.3	2,948.8	1,138.3	873.9	7,758.6
1100	1411	6,736	241	0.325	65.4	109.6	34.2	2,284.9	1,194.4	924.8	6,268.4
1000	971	5,099	183	0.336	46.6	105.1	18.8	1,599.8	1,186.0	938.8	4,439.1
900	742	4,328	155	0.347	36.8	105.3	11.6	1,239.5	1,191.9	911.3	3,369.0
800	543	3,565	128	0.357	27.7	104.0	6.3	960.6	1,086.3	800.6	2,383.7
700	439	3,290	118	0.366	22.9	105.4	4.3	773.4	1,063.0	772.5	1,878.7
650	401	3,240	116	0.372	21.3	108.5	3.4	681.6	1,067.5	792.1	1,684.5

General Performance Data :Curve 3: Zone 2-3

ENGINE SPEED RPM	ENGINE POWER BHP	ENGINE TORQUE LB.FT	ENGINE BMEP PSI	FUEL RATE LB/BHP-HR	FUEL RATE GPH	INTAKE MFLD TEMP DEG F	INTAKE MFLD P IN-HG	INTAKE AIR FLOW CFM	EXH MFLD TEMP DEG F	EXH STACK TEMP DEG F	EXH GAS FLOW CFM
1600	2200	7,221	259	0.332	104.4	134.1	64.3	4,672.1	1,108.8	820.0	11,706.8
1500	2200	7,703	276	0.330	103.8	134.4	68.0	4,594.4	1,119.4	821.7	11,551.4
1400	2200	8,253	296	0.326	102.4	133.9	69.4	4,382.6	1,142.2	844.5	11,215.9
1300	2200	8,888	318	0.321	100.8	133.2	67.6	4,001.2	1,160.1	884.7	10,590.9
1200	1684	7,372	264	0.318	76.6	116.8	46.3	2,948.8	1,138.3	873.9	7,758.6
1100	1621	7,741	277	0.325	75.2	115.7	42.7	2,578.0	1,247.2	942.8	7,183.0
1000	1070	5,620	201	0.337	51.5	106.2	22.3	1,709.2	1,232.4	963.1	4,831.1
900	791	4,617	165	0.349	39.4	106.2	13.3	1,285.5	1,248.4	950.0	3,605.6
800	543	3,565	128	0.357	27.7	104.0	6.3	960.6	1,086.3	800.6	2,383.7
700	439	3,290	118	0.366	22.9	105.4	4.3	773.4	1,063.0	772.5	1,878.7
650	401	3,240	116	0.372	21.3	108.5	3.4	681.6	1,067.5	792.1	1,684.5

General Performance Data :Maximum Limit

ENGINE SPEED RPM	ENGINE POWER BHP	ENGINE TORQUE LB.FT	ENGINE BMEP PSI	FUEL RATE LB/BHP-HR	FUEL RATE GPH	INTAKE MFLD TEMP DEG F	INTAKE MFLD P IN-HG	INTAKE AIR FLOW CFM	EXH MFLD TEMP DEG F	EXH STACK TEMP DEG F	EXH GAS FLOW CFM
1600	2200	7,221	259	0.332	104.4	134.1	64.3	4,672.1	1,108.8	820.0	11,706.8
1500	2200	7,703	276	0.330	103.8	134.4	68.0	4,594.4	1,119.4	821.7	11,551.4
1400	2200	8,253	296	0.326	102.4	133.9	69.4	4,382.6	1,142.2	844.5	11,215.9
1300	2200	8,888	318	0.321	100.8	133.2	67.6	4,001.2	1,160.1	884.7	10,590.9
1200	1684	7,372	264	0.318	76.5	116.8	46.3	2,948.8	1,138.3	873.9	7,758.6
1100	1624	7,754	278	0.324	75.3	115.7	42.8	2,581.5	1,247.9	943.0	7,193.6
1000	1204	6,325	227	0.338	58.1	107.8	27.0	1,861.1	1,293.4	985.8	5,353.7
900	836	4,875	175	0.351	41.9	106.9	14.8	1,331.4	1,291.8	978.3	3,810.5
800	578	3,795	136	0.361	29.8	105.1	7.2	985.3	1,151.6	845.2	2,535.6
700	464	3,481	125	0.371	24.6	106.0	4.9	787.5	1,129.3	815.4	1,977.6
650	421	3,402	122	0.377	22.7	109.2	3.8	688.6	1,130.0	835.5	1,765.7

General Performance Data :Prop Demand Curve P

ENGINE SPEED RPM	ENGINE POWER BHP	ENGINE TORQUE LB.FT	ENGINE BMEP PSI	FUEL RATE LB/BHP-HR	FUEL RATE GPH	INTAKE MFLD TEMP DEG F	INTAKE MFLD P IN-HG	INTAKE AIR FLOW CFM	EXH MFLD TEMP DEG F	EXH STACK TEMP DEG F	EXH GAS FLOW CFM
1600	2200	7,221	259	0.332	104.4	134.1	64.3	4,672.1	1,108.8	820.0	11,706.8
1500	1813	6,347	227	0.336	86.9	126.3	58.7	4,248.4	1,026.9	753.6	10,057.6
1400	1474	5,529	198	0.334	70.4	117.3	46.5	3,492.6	998.4	756.7	8,313.1
1300	1180	4,768	171	0.332	56.0	107.2	31.2	2,616.8	979.7	784.4	6,381.4
1200	928	4,062	145	0.330	43.8	101.7	19.7	1,956.4	960.1	788.9	4,795.7
1100	715	3,413	122	0.332	33.9	99.1	11.9	1,507.9	920.1	765.5	3,630.4
1000	537	2,821	101	0.338	26.0	97.7	6.9	1,214.8	841.8	686.5	2,733.4
900	392	2,285	82	0.348	19.4	97.0	4.0	1,017.1	740.8	592.0	2,073.0
800	275	1,806	65	0.362	14.2	95.9	2.1	858.1	628.2	477.5	1,553.8
700	184	1,382	49	0.388	10.2	94.5	0.9	706.3	517.3	375.4	1,137.1
650	148	1,192	43	0.407	8.6	93.9	0.5	635.7	467.4	339.4	978.2

General Performance Data :Max Power Curve M

ENGINE SPEED RPM	ENGINE POWER BHP	ENGINE TORQUE LB.FT	ENGINE BMEP PSI	FUEL RATE LB/BHP-HR	FUEL RATE GPH	INTAKE MFLD TEMP DEG F	INTAKE MFLD P IN-HG	INTAKE AIR FLOW CFM	EXH MFLD TEMP DEG F	EXH STACK TEMP DEG F	EXH GAS FLOW CFM
1600	2200	7,221	259	0.332	104.4	134.1	64.3	4,672.1	1,108.8	820.0	11,706.8
1500	2200	7,703	276	0.330	103.8	134.4	68.0	4,594.4	1,119.4	821.7	11,551.4
1400	2200	8,253	296	0.326	102.4	133.9	69.4	4,382.6	1,142.2	844.5	11,215.9
1300	2200	8,888	318	0.321	100.8	133.2	67.6	4,001.2	1,160.1	884.7	10,590.9
1200	1684	7,372	264	0.318	76.5	116.8	46.3	2,948.8	1,138.3	873.9	7,758.6
1100	1624	7,754	278	0.324	75.3	115.7	42.8	2,581.5	1,247.9	943.0	7,193.6
1000	1204	6,325	227	0.338	58.1	107.8	27.0	1,861.1	1,293.4	985.8	5,353.7
900	836	4,875	175	0.351	41.9	106.9	14.8	1,331.4	1,291.8	978.3	3,810.5
800	578	3,795	136	0.361	29.8	105.1	7.2	985.3	1,151.6	845.2	2,535.6
700	464	3,481	125	0.371	24.6	106.0	4.9	787.5	1,129.3	815.4	1,977.6
650	421	3,402	122	0.377	22.7	109.2	3.8	688.6	1,130.0	835.5	1,765.7

Heat Rejection Data :Maximum Limit

ENGINE SPEED RPM	ENGINE POWER BHP	REJ TO JW BTU/MN	REJ TO ATMOS BTU/MN	REJ TO EXHAUST BTU/MN	EXH RCOV TO 350F BTU/MN	FROM OIL CLR BTU/MN	FROM AFT CLR BTU/MN	WORK ENERGY BTU/MN	LHV ENERGY BTU/MN	HHV ENERGY BTU/MN
1600	2200	34,122	7,621	81,324	41,117	11,203	21,667	93,323	223,442	238,000
1500	2200	33,781	7,734	80,414	40,605	11,146	21,440	93,323	222,134	236,636
1400	2200	33,269	7,962	79,504	40,776	11,033	20,303	93,323	220,030	234,361
1300	2200	32,473	8,132	77,002	40,548	10,748	17,800	93,323	214,684	228,731
1200	1684	27,980	7,905	56,586	29,345	8,189	10,237	71,429	163,501	174,136
1100	1624	29,345	9,099	54,766	29,515	8,019	8,644	68,869	160,259	170,723
1000	1204	25,136	9,725	41,913	23,089	6,199	4,322	51,069	124,033	132,166
900	836	20,189	9,668	29,970	16,322	4,550	1,649	35,430	90,992	96,906
800	578	15,241	8,076	18,995	9,384	3,185	512	24,511	63,239	67,334
700	464	13,364	8,076	14,900	7,052	2,673	227	19,677	52,775	56,244
650	421	12,568	7,848	13,478	6,483	2,445	57	17,857	48,624	51,808

EXHAUST Sound Data: 6.6 FEET

ENGINE SPEED RPM	ENGINE POWER BHP	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	2200	114	109	119	115	107	106	107	108	105
1500	2200	112	107	117	113	105	104	106	106	103
1400	2200	111	106	116	111	104	102	104	105	101
1300	2200	109	108	114	109	102	101	104	102	100
1200	1684	108	107	113	108	101	100	103	101	99
1100	1624	107	106	112	107	100	98	101	100	98
1000	1204	105	113	109	103	99	98	101	94	90
900	836	104	112	108	102	98	97	100	93	89
800	578	103	111	107	101	97	96	99	92	88
700	464	102	110	106	100	96	95	98	91	87
650	421	102	109	106	100	96	95	98	91	86

EXHAUST Sound Data: 23.0 FEET

ENGINE SPEED RPM	ENGINE POWER BHP	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	2200	101	97	108	102	93	93	94	94	90
1500	2200	99	96	107	101	92	91	92	93	88
1400	2200	98	94	105	99	90	90	91	91	87
1300	2200	96	98	103	97	90	90	91	90	85
1200	1684	95	97	101	96	89	88	89	89	84
1100	1624	93	95	100	94	87	87	88	87	82
1000	1204	92	103	100	91	88	87	86	81	77
900	836	91	101	99	90	87	85	85	80	76
800	578	90	100	98	89	86	84	84	79	75
700	464	89	99	97	88	85	83	83	78	74
650	421	88	99	96	87	84	83	82	77	73

EXHAUST Sound Data: 49.2 FEET

ENGINE SPEED RPM	ENGINE POWER BHP	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	2200	94	91	102	96	87	86	87	88	83
1500	2200	92	89	100	94	85	84	86	86	81
1400	2200	91	88	98	92	83	83	84	85	80
1300	2200	89	91	96	90	83	83	84	83	78
1200	1684	88	90	95	89	82	82	83	82	77
1100	1624	87	89	93	88	81	80	81	81	76
1000	1204	85	96	93	84	81	80	79	74	70
900	836	84	95	92	83	80	79	78	73	69
800	578	83	94	91	82	79	78	77	72	68
700	464	82	93	90	81	78	77	76	71	67
650	421	82	92	90	81	78	76	76	71	67

MECHANICAL Sound Data: 3.3 FEET

ENGINE SPEED RPM	ENGINE POWER BHP	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	2200	104	95	100	99	96	99	99	97	101
1500	2200	103	95	99	98	95	98	98	96	100
1400	2200	103	94	98	97	94	97	98	96	99
1300	2200	102	98	99	96	92	97	97	94	98
1200	1684	102	97	98	95	91	96	97	94	97
1100	1624	101	97	97	95	90	95	96	93	96
1000	1204	100	96	97	94	90	95	96	92	96
900	836	100	95	96	93	89	94	95	92	95
800	578	99	95	96	93	89	93	94	91	95
700	464	98	94	95	92	88	93	94	91	94
650	421	98	94	95	92	88	92	93	90	94

MECHANICAL Sound Data: 23.0 FEET

ENGINE SPEED RPM	ENGINE POWER BHP	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	2200	92	84	88	87	84	87	87	85	89
1500	2200	92	83	87	86	83	86	87	85	88
1400	2200	91	83	87	86	83	86	86	84	88
1300	2200	91	86	87	84	80	85	86	83	86
1200	1684	90	86	86	84	79	84	85	82	85
1100	1624	89	85	86	83	79	84	85	81	85
1000	1204	89	84	85	82	78	83	84	81	84
900	836	88	84	85	82	78	82	83	80	84
800	578	87	83	84	81	77	82	83	80	83
700	464	87	82	83	80	76	81	82	79	82
650	421	86	82	83	80	76	81	82	79	82

MECHANICAL Sound Data: 49.2 FEET

ENGINE SPEED RPM	ENGINE POWER BHP	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	2200	87	78	83	82	79	82	82	80	84
1500	2200	86	78	82	81	78	81	81	79	83
1400	2200	86	77	81	80	77	80	81	79	83
1300	2200	85	81	82	79	75	80	81	77	81
1200	1684	85	80	81	78	74	79	80	77	80
1100	1624	84	80	80	78	73	78	79	76	79
1000	1204	83	79	80	77	73	78	79	75	79
900	836	83	78	79	76	72	77	78	75	78
800	578	82	78	79	76	72	76	77	74	78
700	464	81	77	78	75	71	76	77	74	77
650	421	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

EXHAUST STACK DIAMETER	11 IN
WET EXHAUST MASS	21,415.7 LB/HR
WET EXHAUST FLOW (818.60 F STACK TEMP)	11,713.89 CFM
WET EXHAUST FLOW RATE (32 DEG F AND 29.98 IN HG)	4,441.00 STD CFM
DRY EXHAUST FLOW RATE (32 DEG F AND 29.98 IN HG)	4,068.25 STD CFM
FUEL FLOW RATE	104 GAL/HR

RATED SPEED "Not to exceed data"

ENGINE SPEED RPM	PERCENT LOAD	ENGINE POWER BHP	TOTAL NOX (AS NO2) LB/HR	TOTAL CO LB/HR	TOTAL HC LB/HR	PART MATTER LB/HR	OXYGEN IN EXHAUST PERCENT	BOSCH SMOKE NUMBER
1600	100	2200	43.88	2.06	0.64	.400	10.40	1.28
1600	75	1650	23.50	1.90	0.82	.460	12.10	1.28
1600	50	1100	15.18	2.00	0.76	.420	13.20	1.28
1600	25	550	8.09	2.87	0.78	.210	14.80	1.28
1600	10	220	3.85	9.00	3.18	.140	16.80	1.28

RATED SPEED "Nominal Data"

ENGINE SPEED RPM	PERCENT LOAD	ENGINE POWER BHP	TOTAL NOX (AS NO2) LB/HR	TOTAL CO LB/HR	TOTAL HC LB/HR	TOTAL CO2 LB/HR	PART MATTER LB/HR	OXYGEN IN EXHAUST PERCENT	BOSCH SMOKE NUMBER
1600	100	2200	36.57	1.14	0.48	2,170.2	0.290	10.40	1.28
1600	75	1650	19.59	1.05	0.62	1,648.9	0.330	12.10	1.28
1600	50	1100	12.65	1.11	0.57	1,116.4	0.300	13.20	1.28
1600	25	550	6.74	1.60	0.59	612.9	0.150	14.80	1.28
1600	10	220	3.21	5.00	2.39	335.4	0.100	16.80	1.28

INTERMEDIATE SPEED "Not to exceed data"

ENGINE SPEED RPM	PERCENT LOAD	TOTAL NOX (AS NO2) LB/HR	TOTAL CO LB/HR	TOTAL CO LB/HR	PART MATTER LB/HR	O2 IN EXHAUST PERCENT	O2(DRY) BOSCH SMKE NO.
1280	100	45.89	6.67	0.25	0.320	9.16	1.28
1280	75	30.06	3.89	0.42	0.300	10.10	1.28
1280	50	18.01	2.52	0.49	0.290	11.07	1.28
1280	25	10.19	2.36	0.79	0.140	13.52	1.28
1280	10	5.17	5.06	1.92	0.090	16.41	1.28

INTERMEDIATE SPEED "Nominal Data"

ENGINE SPEED RPM	PERCENT LOAD	TOTAL NOX (AS NO2) LB/HR	TOTAL CO LB/HR	TOTAL CO LB/HR	TOTAL CO2 LB/HR	PART MATTER LB/HR	O2 IN EXHAUST PERCENT	O2(DRY) BOSCH SMKE NO.
1280	100	38.24	3.70	0.19	1,931.1	0.230	9.16	1.28
1280	75	25.05	2.16	0.32	1,501.9	0.220	10.10	1.28
1280	50	15.00	1.40	0.37	1,013.1	0.210	11.07	1.28
1280	25	8.49	1.31	0.59	544.0	0.100	13.52	1.28
1280	10	4.31	2.81	1.44	273.7	0.070	16.41	1.28

Altitude Capability Data(Corrected Power Altitude Capability)

Ambient Operating Temp. / Altitude	50 F	68 F	86 F	104 F	122 F	NORMAL
0 F	2,201 hp	2,201 hp	2,201 hp	2,201 hp	2,201 hp	2,201 hp
984 F	2,201 hp	2,201 hp	2,201 hp	2,201 hp	2,136 hp	2,201 hp
1,640 F	2,201 hp	2,201 hp	2,201 hp	2,152 hp	2,085 hp	2,201 hp
3,281 F	2,201 hp	2,164 hp	2,093 hp	2,026 hp	1,963 hp	2,136 hp
4,921 F	2,108 hp	2,036 hp	1,969 hp	1,906 hp	1,847 hp	2,032 hp
6,562 F	1,982 hp	1,914 hp	1,851 hp	1,792 hp	1,737 hp	1,931 hp
8,202 F	1,863 hp	1,798 hp	1,739 hp	1,683 hp	1,632 hp	1,836 hp
9,843 F	1,749 hp	1,688 hp	1,633 hp	1,581 hp	1,531 hp	1,742 hp
10,499 F	1,704 hp	1,647 hp	1,592 hp	1,541 hp	1,494 hp	1,707 hp

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

Identification Reference and Notes

Engine Arrangement:	1731806	**Lube Oil Press @ Rated Spd(PSI):**	55.8
Effective Serial No:	8KN00368	**Piston Speed @ Rated Eng SPD (FT/Min):**	1,970.5
Primary Engine Test Spec:	0K1936	**Max Operating Altitude(FT):**	2,296.6
Performance Parm Ref:	TM0015	**PEEC Elect Control Module Ref**	
Performance Data Ref:	DM4422	**PEEC Personality Cont Mod Ref**	
Aux Coolant Pump Perf Ref:	DM1286		
Cooling System Perf Ref:	DM1299	**Turbocharger Model**	GT604104BL 56 80DR-1.70
Certification Ref:	IMO	**Fuel Injector**	1167010
Certification Year:	2000	**Timing-Static (DEG):**	–
Compression Ratio:	14.0	**Timing-Static Advance (DEG):**	–
Combustion System:	DI	**Timing-Static (MM):**	–
Aftercooler Temperature (F):	86	**Unit Injector Timing (MM):**	64.3
Crankcase Blowby Rate(CFH):	2,196.6	**Torque Rise (percent)**	–
Fuel Rate (Rated RPM) No Load (Gal/HR):	–	**Peak Torque Speed RPM**	–
Lube Oil Press @ Low Idle Spd (PSI):	20.0	**Peak Torque (LB/FT):**	–

Reference Number: DM4422 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, INLCUDING 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 LMITED 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 AIR FLOW	+/-	5%
INTAKE MANIFOLD PRESSURE - GAGE	+/-	10%
EXHAUST FLOW	+/-	6%
SPECIFIC FUEL CONSUMPTION	+/-	3%
HEAT REJECTION	+/-	5%
FUEL RATE	+/-	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 OOPERATION.

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

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Web Master(s): PSG Web Based Systems Support
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EMISSIONS DATA [4TN00038]

MAY 22, 2006

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ENGINE EMISSIONS DATA

Serial Number	4TN00038
Engine Arrangement Number	
As - Shipped Certification	engine_certification@cat.com
Spec Number	2T6937
Has Engine Been Rerated?	No
Interlock Code Actual Progression	No Interlock Code Progression
As - Shipped Interlock Code	No Interlock Code
As - Shipped Flash File	1166379
As - Shipped Flash File CRB	1166379
As - Shipped CORR FL Power at RPM	1,500 HP (1,118.5 KW) at 0 rpms
Build Date	1995-01-16

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Current Date: Monday, May 22, 2006 9:56:01 AM
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This emission data is Caterpillar's best estimate for this rating. If actual emissions are required then an emission test needs to be run on your engine.

CERTIFICATE ONLY
NO PERFORMANCE DATA

CF Campbell

EMISSIONS DATA [8KN00074]

MAY 22, 2006

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ENGINE EMISSIONS DATA

Serial Number	8KN00074
Engine Arrangement Number	
As - Shipped Certification	engine_certification@cat.com
Spec Number	2T7848
Has Engine Been Rerated?	No
Interlock Code Actual Progression	No Interlock Code Progression
As - Shipped Interlock Code	No Interlock Code
As - Shipped Flash File	1315257
As - Shipped Flash File CRB	1315257
As - Shipped CORR FL Power at RPM	2,000 HP (1,491.5 KW) at 0 rpms
Build Date	1995-11-09

Caterpillar Confidential: Green
Content Owner: Alan Scott
Web Master(s): PSG Web Based Systems Support
Current Date: Monday, May 22, 2006 9:59:17 AM
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Data Privacy Statement.

This is not an official emission certificate. This is for emission data information only.

This emission data is Caterpillar's best estimate for this rating. If actual emissions are required then an emission test needs to be run on your engine.

MARINE ENGINE PERFORMANCE DATA [8KN00074]

MAY 22, 2006

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Performance Number: DM1476

Change Level: 09

Sales Model: 3516BDITA
Engine Power: 2,000 HP
Manifold Type: DRY
Turbo Quantity: 2

Combustion: DI
Speed: 1,600 RPM
Governor Type: ADEM2
Engine App: MP
Engine Rating: MP

Aspr: TA
After Cooler: SCAC
After Cooler Temp(F): 86
Turbo Arrangement: Par
Strategy: Low BSFC Strat

Rating Type: A RATING (UNRESTRICTED CONTINUOUS) Certification: N-C 1970 - 2100

General Performance Data: Curve 1: Zone 1

ENGINE SPEED RPM	ENGINE POWER BHP	ENGINE TORQUE LB.FT	ENGINE BMEP PSI	FUEL RATE LB/BHP-HR	FUEL RATE GPH	INTAKE MFLD TEMP DEG F	INTAKE MFLD P IN-HG	INTAKE AIR FLOW CFM	EXH MFLD TEMP DEG F	EXH STACK TEMP DEG F	EXH GAS FLOW CFM
1600	2000	6,566	235	0.313	89.5	99.0	46.5	4,273.1	975.4	759.0	10,181.2
1500	1860	6,513	233	0.315	83.7	102.7	43.9	3,909.3	1,020.4	795.4	9,517.3
1400	1849	6,937	248	0.323	85.3	98.1	43.7	3,630.4	1,089.1	865.8	9,414.9
1300	1475	5,959	213	0.332	70.0	93.6	31.7	2,782.8	1,165.8	979.0	7,843.4
1200	1098	4,807	172	0.341	53.5	91.9	17.8	1,967.0	1,169.1	1,030.1	5,738.6
1100	881	4,207	151	0.348	43.8	91.2	9.9	1,507.9	1,166.4	1,019.7	4,407.3
1000	736	3,867	139	0.355	37.4	91.2	6.3	1,225.4	1,165.5	1,010.5	3,588.0
900	616	3,592	129	0.362	31.9	91.8	4.4	1,020.6	1,165.8	973.8	2,895.8
800	469	3,082	110	0.367	24.6	91.6	2.5	833.4	1,064.1	866.8	2,193.0
700	349	2,616	94	0.367	18.3	91.0	0.7	649.8	886.5	759.7	1,560.9

General Performance Data :Curve 2: Zone 1-2

ENGINE SPEED RPM	ENGINE POWER BHP	ENGINE TORQUE LB.FT	ENGINE BMEP PSI	FUEL RATE LB/BHP-HR	FUEL RATE GPH	INTAKE MFLD TEMP DEG F	INTAKE MFLD P IN-HG	INTAKE AIR FLOW CFM	EXH MFLD TEMP DEG F	EXH STACK TEMP DEG F	EXH GAS FLOW CFM
1600	2000	6,566	235	0.313	89.5	99.0	46.5	4,273.1	975.4	759.0	10,181.2
1500	1985	6,949	249	0.314	88.9	106.3	48.4	4,153.0	1,031.7	796.1	10,121.2
1400	2000	7,503	269	0.320	91.6	99.5	49.3	3,916.4	1,096.2	849.4	10,057.6
1331	1954	7,709	283	0.328	91.6	99.9	50.9	3,701.0	1,224.5	948.6	10,195.4
1300	1703	6,881	246	0.332	80.7	96.1	40.5	3,210.1	1,202.2	966.6	8,962.9
1200	1188	5,201	186	0.341	57.9	93.4	21.2	2,097.7	1,203.6	1,052.6	6,218.9
1100	928	4,431	159	0.349	46.2	92.1	11.3	1,560.9	1,202.5	1,042.5	4,633.3
1000	768	4,036	144	0.356	39.1	91.6	7.0	1,250.1	1,199.7	1,036.9	3,736.3
900	640	3,733	134	0.363	33.2	92.1	4.7	1,027.7	1,200.4	1,000.2	2,980.6
800	469	3,082	110	0.367	24.6	91.6	2.5	833.4	1,064.1	866.8	2,193.0
700	349	2,616	94	0.367	18.3	91.0	0.7	649.8	886.5	759.7	1,560.9

General Performance Data :Curve 3: Zone 2-3

ENGINE SPEED RPM	ENGINE POWER BHP	ENGINE TORQUE LB.FT	ENGINE BMEP PSI	FUEL RATE LB/BHP-HR	FUEL RATE GPH	INTAKE MFLD TEMP DEG F	INTAKE MFLD P IN-HG	INTAKE AIR FLOW CFM	EXH MFLD TEMP DEG F	EXH STACK TEMP DEG F	EXH GAS FLOW CFM
1600	2000	6,566	235	0.313	89.5	99.0	46.5	4,273.1	975.4	759.0	10,181.2
1500	2000	7,003	251	0.314	89.7	106.7	49.0	4,184.8	1,033.2	796.1	10,195.4
1400	2000	7,503	269	0.320	91.5	99.5	49.3	3,916.4	1,096.2	849.4	10,057.6
1331	1954	7,709	283	0.328	91.5	99.9	50.9	3,701.0	1,224.5	948.6	10,195.4
1300	1877	7,585	272	0.331	88.8	98.6	47.7	3,549.1	1,219.8	954.0	9,821.0
1200	1306	5,717	205	0.342	63.8	95.2	25.8	2,270.7	1,242.9	1,077.8	6,858.1
1100	1017	4,853	174	0.351	50.9	93.9	14.2	1,659.8	1,263.0	1,086.8	5,085.3
1000	818	4,296	154	0.358	41.8	92.3	8.1	1,289.0	1,251.9	1,076.9	3,962.3
900	677	3,952	142	0.364	35.2	92.8	5.4	1,045.3	1,254.7	1,042.0	3,121.8
800	469	3,082	110	0.367	24.6	91.6	2.5	833.4	1,064.1	866.8	2,193.0
700	349	2,616	94	0.367	18.3	91.0	0.7	649.8	886.5	759.7	1,560.9

General Performance Data :Maximum Limit

ENGINE SPEED RPM	ENGINE POWER BHP	ENGINE TORQUE LB.FT	ENGINE BMEP PSI	FUEL RATE LB/BHP-HR	FUEL RATE GPH	INTAKE MFLD TEMP DEG F	INTAKE MFLD P IN-HG	INTAKE AIR FLOW CFM	EXH MFLD TEMP DEG F	EXH STACK TEMP DEG F	EXH GAS FLOW CFM
1600	2000	6,566	235	0.313	89.5	99.0	46.5	4,273.1	975.4	759.0	10,181.2
1500	2000	7,003	251	0.317	90.6	106.7	49.0	4,184.8	1,033.2	796.1	10,195.4
1331	1931	7,620	283	0.330	91.0	100.4	50.4	3,602.1	1,241.1	975.4	10,100.0
1285	1557	6,364	228	0.334	74.4	95.0	35.1	2,895.8	1,199.1	992.3	8,242.5
1260	1415	5,898	211	0.337	68.2	94.3	29.8	2,585.0	1,199.5	1,022.2	7,507.9
1200	1306	5,718	205	0.344	64.1	95.2	25.9	2,270.7	1,242.9	1,077.8	6,858.1
1100	1090	5,205	186	0.353	54.9	95.4	17.1	1,741.0	1,293.1	1,133.4	5,516.2
1000	852	4,475	160	0.359	43.7	92.8	8.9	1,317.2	1,287.0	1,103.2	4,114.2
900	703	4,102	147	0.365	36.6	93.2	5.8	1,059.4	1,292.0	1,070.8	3,224.2
800	471	3,092	111	0.367	24.7	91.6	2.5	833.4	1,067.4	869.0	2,196.6
700	350	2,622	94	0.367	18.3	91.0	0.7	649.8	888.4	761.0	1,564.4

General Performance Data :Prop Demand Curve P

ENGINE SPEED RPM	ENGINE POWER BHP	ENGINE TORQUE LB.FT	ENGINE BMEP PSI	FUEL RATE LB/BHP-HR	FUEL RATE GPH	INTAKE MFLD TEMP DEG F	INTAKE MFLD P IN-HG	INTAKE AIR FLOW CFM	EXH MFLD TEMP DEG F	EXH STACK TEMP DEG F	EXH GAS FLOW CFM
1600	2000	6,566	235	0.313	89.5	99.0	46.5	4,273.1	975.4	759.0	10,181.2
1500	1648	5,771	207	0.321	75.6	99.9	36.5	3,499.7	1,005.4	807.6	8,606.2
1400	1340	5,026	180	0.330	63.1	95.4	25.5	2,673.3	1,050.6	915.3	7,207.7
1300	1073	4,335	155	0.338	51.9	89.1	17.7	2,097.7	1,059.3	968.0	5,865.8
1200	844	3,693	132	0.344	41.5	88.5	9.9	1,628.0	1,034.6	952.0	4,509.7
1100	650	3,103	111	0.351	32.6	88.5	4.6	1,271.3	968.9	900.1	3,404.3
1000	488	2,564	92	0.363	25.3	88.9	2.3	1,073.6	896.7	792.5	2,645.1
900	356	2,078	74	0.379	19.3	88.7	1.2	935.8	813.2	678.2	2,083.6
800	250	1,641	59	0.397	14.2	88.5	0.1	784.0	678.0	565.3	1,568.0
700	168	1,257	45	0.420	10.0	89.2	0.9	618.0	530.8	462.2	1,105.4

General Performance Data :Max Power Curve M

ENGINE SPEED RPM	ENGINE POWER BHP	ENGINE TORQUE LB.FT	ENGINE BMEP PSI	FUEL RATE LB/BHP-HR	FUEL RATE GPH	INTAKE MFLD TEMP DEG F	INTAKE MFLD P IN-HG	INTAKE AIR FLOW CFM	EXH MFLD TEMP DEG F	EXH STACK TEMP DEG F	EXH GAS FLOW CFM
1600	2000	6,566	235	0.313	89.5	99.0	46.5	4,273.1	975.4	759.0	10,181.2
1500	2000	7,003	251	0.317	90.6	106.7	49.0	4,184.8	1,033.2	796.1	10,195.4
1331	1931	7,620	283	0.330	91.0	100.4	50.4	3,602.1	1,241.1	975.4	10,100.0
1285	1557	6,364	228	0.334	74.4	95.0	35.1	2,895.8	1,199.1	992.3	8,242.5
1260	1415	5,898	211	0.337	68.2	94.3	29.8	2,585.0	1,199.5	1,022.2	7,507.9
1200	1306	5,718	205	0.344	64.1	95.2	25.9	2,270.7	1,242.9	1,077.8	6,858.1
1100	1090	5,205	186	0.353	54.9	95.4	17.1	1,741.0	1,293.1	1,133.4	5,516.2
1000	852	4,475	160	0.359	43.7	92.8	8.9	1,317.2	1,287.0	1,103.2	4,114.2
900	703	4,102	147	0.365	36.6	93.2	5.8	1,059.4	1,292.0	1,070.8	3,224.2
800	471	3,092	111	0.367	24.7	91.6	2.5	833.4	1,067.4	869.0	2,196.6
700	350	2,622	94	0.367	18.3	91.0	0.7	649.8	888.4	761.0	1,564.4

Heat Rejection Data :Maximum Limit

ENGINE SPEED RPM	ENGINE POWER BHP	REJ TO JW BTU/MN	REJ TO ATMOS BTU/MN	REJ TO EXHAUST BTU/MN	EXH RCOV TO 350F BTU/MN	FROM OIL CLR BTU/MN	FROM AFT CLR BTU/MN	WORK ENERGY BTU/MN	LHV ENERGY BTU/MN	HHV ENERGY BTU/MN
1600	2000	30,312	6,483	67,903	32,416	9,611	14,957	84,850	191,936	204,504
1500	2000	30,255	6,995	69,609	34,804	9,668	14,047	84,850	193,073	205,698
1400	1931	30,425	8,929	75,523	42,994	9,782	12,455	81,893	196,429	209,281
1300	1557	25,762	8,417	61,761	35,601	7,962	7,848	66,026	159,406	169,813
1200	1415	24,454	8,417	57,040	33,383	7,336	6,199	59,998	146,554	156,108
1100	1306	24,113	8,872	53,742	32,075	6,881	4,834	55,391	138,023	147,009
1000	1090	22,577	9,554	44,586	26,899	5,914	2,673	46,235	118,005	125,682
900	852	19,563	9,497	33,439	19,563	4,663	1,308	36,112	93,835	99,920
800	703	17,743	9,554	26,558	15,071	3,924	853	29,800	79,390	84,566
700	471	13,023	7,222	16,492	8,303	2,673	455	19,961	53,685	57,154

EXHAUST Sound Data: 6.6 FEET

ENGINE SPEED RPM	ENGINE POWER BHP	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	2000	113	108	118	114	106	105	106	107	104
1500	2000	112	106	117	112	105	103	105	105	102
1331	1931	110	105	115	111	103	102	103	104	101
1285	1557	109	108	114	109	102	100	103	102	100
1260	1415	108	107	113	108	101	99	102	101	99
1200	1306	106	105	111	106	99	98	101	99	97
1100	1090	105	113	109	103	99	98	101	94	90
1000	852	104	111	108	102	98	97	100	93	88
900	703	103	110	107	101	97	96	99	92	87
800	471	102	109	106	100	96	95	98	91	86

EXHAUST Sound Data: 23.0 FEET

ENGINE SPEED RPM	ENGINE POWER BHP	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	2000	100	97	107	101	92	92	93	94	89
1500	2000	98	95	106	100	91	90	91	92	87
1331	1931	97	94	104	98	89	89	90	91	86
1285	1557	96	98	102	97	90	89	90	90	85
1260	1415	94	96	101	95	88	88	89	88	83
1200	1306	93	95	99	94	87	87	87	87	82
1100	1090	92	102	100	91	88	86	86	81	77
1000	852	91	101	99	90	87	85	85	80	76
900	703	90	100	98	89	86	84	84	79	74
800	471	89	99	97	88	85	83	83	78	73

EXHAUST Sound Data: 49.2 FEET

ENGINE SPEED RPM	ENGINE POWER BHP	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	2000	93	90	101	95	86	85	86	87	82
1500	2000	92	88	99	93	84	84	85	85	81
1331	1931	90	87	98	92	83	82	83	84	79
1285	1557	89	91	95	90	83	83	83	83	78
1260	1415	88	90	94	89	82	81	82	82	77
1200	1306	86	88	93	87	80	80	81	80	75
1100	1090	85	96	93	84	81	80	79	74	70
1000	852	84	94	92	83	80	78	78	73	69
900	703	83	93	91	82	79	77	77	72	68
800	471	82	92	90	81	78	76	76	71	67

MECHANICAL Sound Data: 3.3 FEET

ENGINE SPEED RPM	ENGINE POWER BHP	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	2000	104	95	100	99	96	99	99	97	101
1500	2000	103	95	99	98	95	98	98	96	100
1331	1931	103	94	98	97	94	97	98	96	99
1285	1557	102	98	99	96	92	97	97	94	98
1260	1415	102	97	98	95	91	96	97	94	97
1200	1306	101	97	97	95	90	95	96	93	96
1100	1090	100	96	97	94	90	95	96	92	96
1000	852	100	95	96	93	89	94	95	92	95
900	703	99	95	96	93	89	93	94	91	95
800	471	98	94	95	92	88	93	94	91	94

MECHANICAL Sound Data: 23.0 FEET

ENGINE SPEED RPM	ENGINE POWER BHP	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	2000	92	84	88	87	84	87	87	85	89
1500	2000	92	83	87	86	83	86	87	85	88
1331	1931	91	83	87	86	83	86	86	84	88
1285	1557	91	86	87	84	80	85	86	83	86
1260	1415	90	86	86	84	79	84	85	82	85
1200	1306	89	85	86	83	79	84	85	81	85
1100	1090	89	84	85	82	78	83	84	81	84
1000	852	88	84	85	82	78	82	83	80	84
900	703	87	83	84	81	77	82	83	80	83
800	471	87	82	83	80	76	81	82	79	82

MECHANICAL Sound Data: 49.2 FEET

ENGINE SPEED RPM	ENGINE POWER BHP	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	2000	87	78	83	82	79	82	82	80	84
1500	2000	86	78	82	81	78	81	81	79	83
1331	1931	86	77	81	80	77	80	81	79	83
1285	1557	85	81	82	79	75	80	81	77	81
1260	1415	85	80	81	78	74	79	80	77	80
1200	1306	84	80	80	78	73	78	79	76	79
1100	1090	83	79	80	77	73	78	79	75	79
1000	852	83	78	79	76	72	77	78	75	78
900	703	82	78	79	76	72	76	77	74	78
800	471	81	77	78	75	71	76	77	74	77

EMISSIONS DATA

N-C 1970 - 2100 ********** N1
This engine rating is not emission certified by any domestic or foreign agency.

EXHAUST STACK DIAMETER	11 IN
WET EXHAUST MASS	19,548.4 LB/HR
WET EXHAUST FLOW (757.40 F STACK TEMP)	10,188.29 CFM
WET EXHAUST FLOW RATE (32 DEG F AND 29.98 IN HG)	4,067.00 STD CFM
DRY EXHAUST FLOW RATE (32 DEG F AND 29.98 IN HG)	3,725.70 STD CFM
FUEL FLOW RATE	89 GAL/HR

RATED SPEED "Not to exceed data"

ENGINE SPEED RPM	PERCENT LOAD	ENGINE POWER BHP	TOTAL NOX (AS NO2) LB/HR	TOTAL CO LB/HR	TOTAL HC LB/HR	PART MATTER LB/HR	OXYGEN IN EXHAUST PERCENT	BOSCH SMOKE NUMBER
1600	100	2000	59.82	1.56	1.41	.330	11.20	1.28
1600	75	1500	55.94	1.80	1.08	.280	11.70	1.28
1600	50	1000	41.64	1.49	0.78	.200	12.30	1.28
1600	25	500	26.20	1.44	0.56	.150	14.50	1.28
1600	10	200	12.86	3.41	0.47	.130	16.80	1.28

RATED SPEED "Nominal Data"

ENGINE SPEED RPM	PERCENT LOAD	ENGINE POWER BHP	TOTAL NOX (AS NO2) LB/HR	TOTAL CO LB/HR	TOTAL HC LB/HR	TOTAL CO2 LB/HR	PART MATTER LB/HR	OXYGEN IN EXHAUST PERCENT	BOSCH SMOKE NUMBER
1600	100	2000	49.85	0.87	1.06	3,082.5	0.240	11.20	1.28
1600	75	1500	46.62	1.00	0.81	2,580.7	0.200	11.70	1.28
1600	50	1000	34.70	0.83	0.58	1,981.6	0.140	12.30	1.28
1600	25	500	21.83	0.80	0.42	1,754.5	0.110	14.50	1.28
1600	10	200	10.72	1.90	0.35	1,723.7	0.090	16.80	1.28

INTERMEDIATE SPEED "Not to exceed data"

ENGINE SPEED RPM	PERCENT LOAD	TOTAL NOX (AS NO2) LB/HR	TOTAL CO LB/HR	TOTAL CO LB/HR	PART MATTER LB/HR	O2 IN EXHAUST PERCENT	O2(DRY) BOSCH SMKE NO.
1280	100	38.61	2.42	0.81	0.570	8.80	1.28
1280	75	29.28	2.79	0.60	0.420	9.07	1.28
1280	50	22.82	1.56	0.42	0.220	10.28	1.28
1280	25	14.91	1.09	0.31	0.100	13.46	1.28
1280	10	7.68	2.10	0.28	0.110	16.40	1.28

INTERMEDIATE SPEED "Nominal Data"

ENGINE SPEED RPM	PERCENT LOAD	TOTAL NOX (AS NO2) LB/HR	TOTAL CO LB/HR	TOTAL CO LB/HR	TOTAL CO2 LB/HR	PART MATTER LB/HR	O2 IN EXHAUST PERCENT	O2(DRY) BOSCH SMKE NO.
1280	100	32.17	1.34	0.61	1,593.5	0.410	8.80	1.28
1280	75	24.40	1.55	0.45	1,263.1	0.300	9.07	1.28
1280	50	19.01	0.87	0.32	1,079.8	0.160	10.28	1.28
1280	25	12.43	0.61	0.23	1,126.5	0.070	13.46	1.28
1280	10	6.40	1.16	0.21	1,277.6	0.080	16.40	1.28

Altitude Capability Data(Corrected Power Altitude Capability)

Ambient Operating Temp. / Altitude	50 F	68 F	86 F	104 F	122 F	NORMAL
0 F	2,001 hp	2,001 hp	2,001 hp	2,001 hp	2,001 hp	2,001 hp
984 F	2,001 hp	2,001 hp	2,001 hp	2,001 hp	2,001 hp	2,001 hp
1,640 F	2,001 hp	2,001 hp	2,001 hp	2,001 hp	2,001 hp	2,001 hp
3,281 F	2,001 hp	2,001 hp	2,001 hp	2,001 hp	2,001 hp	2,001 hp
4,921 F	2,001 hp	2,001 hp	2,001 hp	2,001 hp	1,939 hp	2,001 hp
6,562 F	2,001 hp	2,001 hp	1,943 hp	1,881 hp	1,824 hp	2,001 hp
8,202 F	1,955 hp	1,888 hp	1,826 hp	1,767 hp	1,712 hp	1,927 hp
9,843 F	1,836 hp	1,773 hp	1,714 hp	1,660 hp	1,608 hp	1,829 hp
10,499 F	1,789 hp	1,729 hp	1,671 hp	1,617 hp	1,568 hp	1,792 hp

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

Identification Reference and Notes

Engine Arrangement:	1008318	Lube Oil Press @ Rated Spd (PSI):	55.8
Effective Serial No:	8KN00313	Piston Speed @ Rated Eng SPD(FT/Min):	1,970.5
Primary Engine Test Spec:	2T7848	Max Operating Altitude(FT):	7,007.9
Performance Parm Ref:	TM0015	PEEC Elect Control Module Ref	
Performance Data Ref:	DM1476	PEEC Personality Cont Mod Ref	
Aux Coolant Pump Perf Ref:			
Cooling System Perf Ref:	DM1276	Turbocharger Model	L15107VG15HF12WG06AF08
Certification Ref:	NOT CERTIFIED	Fuel Injector	1167010
Certification Year:		Timing-Static (DEG):	–
Compression Ratio:	14.0	Timing-Static Advance (DEG):	–
Combustion System:	DI	Timing-Static (MM):	–
Aftercooler Temperature (F):	86	Unit Injector Timing (MM):	64.3
Crankcase Blowby Rate(CFH):	1,998.8	Torque Rise (percent)	–
Fuel Rate (Rated RPM) No Load(Gal/HR):	–	Peak Torque Speed RPM	–
Lube Oil Press @ Low Idle Spd (PSI):	20.0	Peak Torque (LB/FT):	–

Reference Number: DM1476 N-C 19702100N1

Parameters Reference: TM0015 MARINE PROP - ALL EXCEPT 3600

LIMIT DEFINITIONS FOR USE WITH A, B AND C RATED ENGINES:
ZONE 1 - FOR CONTINUOUS OPERATION, INLCUDING 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 LMITED 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 AIR FLOW	+/-	5%
INTAKE MANIFOLD PRESSURE - GAGE	+/-	10%
EXHAUST FLOW	+/-	6%
SPECIFIC FUEL CONSUMPTION	+/-	3%
HEAT REJECTION	+/-	5%
FUEL RATE	+/-	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 OOPERATION.

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

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NOx gm/bhp hr E-3

8/1/01	01-159	Point Vicente	B. Blair	Port Main	GM 12-645-E6	7HA1-1115	1250	850	1506	12.86	4175	14.5		
								774	1175	14.42	3790			
								680	731	16.03	3137			
								536	401	17.71	2627			
8/3/01 Enerac	01-161 3000E	Pacific Escort	B. Blair	Star. Main	GM 12-645-E6	82H1-1035	1250	860	857	15.91	3589	12.3	561	
								783	579	16.68	2868		938	
								688	331	17.52	2047		288	
								542	233	18.29	1866			
8/3/01 Enerac	01-161 3000	Pacific Escort	B. Blair	Port Main	GM 12-645-E6	82H1-1027	1250	860	[illegible]	[illegible]	[illegible]			
								783	906	15.15	[illegible]	12.6	626	
								688	554	16.51	2637		1402	
								542	297	18.13	2241		1175	
													727	
8/7/01 Enerac	01-162 3000	Cat Express		Star. Main	Caterpillar 3512 2W8862	50Y01043	1800	1750	1870	9.03	3293	14.4		
								1593	2777	9.17	3701			
								1400	2208	8.34	3674			
								1103	2196	8.07	4066			
8/7/01 Enerac	01-162 3000E	Cat Express		Port Main	Caterpillar 3512 2W8862	50Y01139	1800	1785	2368	9.94	5088	21.8		
								1638	2787	10.24	5484			
								1440	3341	10.02	6418			
								1134	3237	9.19	5777			
8/15/01	01-165	Doug C	J. Grey	Port Main	Detroit 12-7111	12VA65768	500	2000	1173	13.33	4067	17.0		
								1820	1371	14.57	4538			
								1600	859	15.62	3400			
								1260	504	17.36	2993			
8/15/01	01-165	Doug C	J. Grey	Center Main	Detroit 12-7111	12VA17301	500	2000	1736	13.55	4936	20.8		
								1820	1423	14.26	4479			
								1600	1090	15.18	3983			
								1260	585	17.1	3218			
8/15/01	01-165	Doug C	J. Grey	Star. Main	Detroit 12-7111	12VA10788	500	2000	1561	12.34	3811	16.7		
								1820	1495	12.22	3600			
								1600	1215	13.34	3359			
								1260	698	15.35	2629			
8/15/01 Enerac	01-166 3000	Slim Fun	M. Hansen	Star. Main	Detroit 6-71N		165	1500	917	13.96	2762	14.8		
								1365	739	15.04	2636			
								1200	513	16.99	2742			
								945	396	17.92	2777			
8/15/01 Enerac	01-166 3000E	Slim Fun	M. Hansen	Port Main	Detroit 6-71N		165	1500	1328	12.91	[illegible]			

average of four = 18.2 g/bhp-hr
SEE 3572B

Baseline testing by JCAQMD
Data provided by JCAQMD