MARINE ENGINE PERFORMANCE DATA [9PW00878]

NOVEMBER 01, 2023

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Performance Number: DM6390 **Change Level:** 01

Sales Model: 3412EDITA **Combustion:** DI **Aspr:** TA
Engine Power: 447.5 KW **Speed:** 1,800 RPM **After Cooler:** JWAC
Manifold Type: W/C **Governor Type:** **After Cooler Temp(C):** --
Turbo Quantity: 1 **Engine App:** MP **Turbo Arrangement:**
Application Type: M PROP ENG **Engine Rating:** MP **Strategy:**
Rating Type: A RATING (UNRESTRICTED CONTINUOUS) **Certification:** IMO - 2000 - 2006

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
1800	447.5	2,374	1,103	215.500	114.9	87.6	108.4	37.5	456.3	350.3	82.8
1700	447.5	2,513	1,168	213.600	113.9	87.2	106.8	35.5	468.7	366.1	80.6
1600	447.5	2,671	1,241	212.600	113.4	86.7	105.9	33.9	480.8	381.7	78.8
1500	447.5	2,849	1,324	212.800	113.5	86.1	104.9	32.3	492.9	398.3	77.0
1400	447.3	3,051	1,418	213.400	113.8	85.3	105.0	30.8	509.8	419.9	75.8
1300	447.5	3,287	1,528	215.000	114.7	84.8	103.1	28.9	534.4	448.3	73.9
1200	408.1	3,248	1,509	219.100	106.6	83.5	84.6	24.3	540.2	472.5	64.6
1100	307.3	2,668	1,240	227.300	83.3	81.9	51.5	18.0	514.4	474.8	47.9
1000	246.2	2,351	1,093	239.000	70.1	81.5	34.0	14.3	483.9	459.7	37.6

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
1800	447.5	2,374	1,103	215.500	114.9	87.6	108.4	37.5	456.3	350.3	82.8
1700	447.5	2,513	1,168	213.600	113.9	87.2	106.8	35.5	468.7	366.1	80.6
1600	447.5	2,671	1,241	212.600	113.4	86.7	105.9	33.9	480.8	381.7	78.8
1500	447.5	2,849	1,324	212.800	113.5	86.1	104.9	32.3	492.9	398.3	77.0
1400	447.5	3,052	1,419	213.400	113.8	85.3	105.1	30.8	509.9	419.9	75.8
1300	447.5	3,287	1,528	215.000	114.7	84.8	103.1	28.9	534.4	448.3	73.9
1200	408.1	3,248	1,509	219.100	106.6	83.5	84.6	24.3	540.2	472.5	64.6
1100	307.3	2,668	1,240	227.300	83.3	81.9	51.5	18.0	514.4	474.8	47.9
1000	246.2	2,351	1,093	239.000	70.1	81.5	34.0	14.3	483.9	459.7	37.6

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
1800	447.5	2,374	1,103	215.500	114.9	87.6	108.4	37.5	456.3	350.3	82.8
1700	376.9	2,117	984	217.100	97.5	85.1	85.6	31.9	444.3	357.0	71.2
1600	314.3	1,876	872	218.100	81.7	83.3	63.2	26.6	422.6	355.9	59.2
1500	258.9	1,649	766	219.300	67.7	82.1	44.3	22.1	394.2	346.2	48.4
1400	210.5	1,436	667	223.600	56.1	81.5	30.4	18.6	367.2	333.3	39.9
1300	168.6	1,238	575	234.600	47.1	81.3	21.3	16.1	345.9	320.4	33.8
1200	132.6	1,055	490	249.200	39.4	80.7	14.3	14.1	323.1	305.8	28.7
1100	102.1	887	412	264.500	32.2	80.4	8.7	12.3	294.9	281.6	23.9
1000	76.7	733	341	280.500	25.7	80.3	4.2	10.6	264.7	253.9	19.6

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
1800	447.5	2,374	1,103	215.500	114.9	87.6	108.4	37.5	456.3	350.3	82.8
1700	447.5	2,513	1,168	213.600	113.9	87.2	106.8	35.5	468.7	366.1	80.6
1600	447.5	2,671	1,241	212.600	113.4	86.7	105.9	33.9	480.8	381.7	78.8
1500	447.5	2,849	1,324	212.900	113.5	86.1	104.9	32.3	492.9	398.3	77.0
1400	447.5	3,052	1,419	213.400	113.8	85.3	105.1	30.8	509.9	419.9	75.8
1300	447.5	3,287	1,528	214.900	114.6	84.8	103.1	28.9	534.4	448.3	73.9
1200	424.5	3,378	1,570	219.200	111.0	84.0	90.6	25.1	548.7	477.3	67.3
1100	324.2	2,814	1,308	228.700	88.4	82.1	56.7	18.7	533.0	489.9	50.5
1000	254.1	2,427	1,128	242.900	73.6	81.7	36.8	14.6	499.5	473.7	39.0

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
1800	447.5	400.0	68.0	315.0	129.0	62.0	27.0	447.0	1,154.0	1,230.0
1700	447.5	397.0	66.0	308.0	131.0	61.0	24.0	447.0	1,143.0	1,218.0
1600	447.5	398.0	63.0	306.0	135.0	61.0	22.0	447.0	1,140.0	1,214.0
1500	447.5	400.0	61.0	308.0	140.0	61.0	20.0	447.0	1,142.0	1,216.0
1400	447.5	402.0	58.0	309.0	146.0	61.0	19.0	447.0	1,143.0	1,218.0
1300	447.5	397.0	56.0	297.0	145.0	60.0	18.0	447.0	1,123.0	1,196.0
1200	408.1	366.0	51.0	280.0	142.0	55.0	10.0	408.0	1,038.0	1,106.0
1100	307.3	316.0	46.0	287.0	153.0	48.0	-.0	307.0	897.0	956.0
1000	246.2	251.0	40.0	229.0	119.0	38.0	-5.0	246.0	718.0	765.0

EMISSIONS DATA

IMO - 2000 - 2006 ********** 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 ÝIMO¨ regulations.

REFERENCE EXHAUST STACK DIAMETER	203 MM
WET EXHAUST MASS	2,763.0 KG/HR
WET EXHAUST FLOW (350.00 C STACK TEMP)	82.87 M3/MIN
WET EXHAUST FLOW RATE (0 DEG C AND 101.2 KPA)	36.29 M3/MIN
DRY EXHAUST FLOW RATE (0 DEG C AND 101.2 KPA)	32.53 M3/MIN
FUEL FLOW RATE	115 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
1800	100	447.2	5,224.00	559.00	28.00	45.70	9.6000
1800	75	335.4	3,479.00	505.00	26.00	58.80	10.8000
1800	50	223.6	2,426.00	455.00	30.00	81.80	12.6000
1800	25	111.8	1,866.00	505.00	45.00	83.30	15.2000
1800	10	44.7	1,695.00	574.00	58.00	79.30	17.3000

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
1800	100	447.2	3,963.2	424.3	19.6	28.800	9.6000
1800	75	335.4	3,377.2	490.3	22.9	48.300	10.8000
1800	50	223.6	3,323.5	623.9	37.7	97.000	12.6000
1800	25	111.8	4,273.3	1,157.1	96.6	170.600	15.2000
1800	10	44.7	5,220.1	1,620.8	147.3	226.000	17.3000

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
1800	100	447.2	1,892	334	34	9.6000
1800	75	335.4	1,619	387	40	10.8000
1800	50	223.6	1,604	494	65	12.6000
1800	25	111.8	2,115	939	168	15.2000
1800	10	44.7	3,300	1,786	360	17.3000

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
1800	100	447.2	8.71	0.93	0.05	0.076	9.6000
1800	75	335.4	7.73	1.12	0.06	0.131	10.8000
1800	50	223.6	8.09	1.52	0.10	0.273	12.6000
1800	25	111.8	12.45	3.37	0.30	0.556	15.2000
1800	10	44.7	28.26	9.56	0.96	1.323	17.3000

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
1800	100	447.2	4,317.00	299.00	15.00	323.1	23.50	9.6000
1800	75	335.4	2,875.00	270.00	14.00	254.6	30.20	10.8000
1800	50	223.6	2,005.00	243.00	16.00	180.5	42.00	12.6000
1800	25	111.8	1,542.00	270.00	24.00	108.9	42.70	15.2000
1800	10	44.7	1,401.00	307.00	31.00	67.2	40.70	17.3000

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
1800	100	447.2	3,275.4	226.9	10.3	14.8	9.6000
1800	75	335.4	2,791.1	262.2	12.1	24.8	10.8000
1800	50	223.6	2,746.7	333.7	20.0	49.7	12.6000
1800	25	111.8	3,531.6	618.8	51.1	87.5	15.2000
1800	10	44.7	4,314.2	866.7	77.9	115.9	17.3000

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
1800	100	447.2	1,564	179	18	9.6000
1800	75	335.4	1,338	207	21	10.8000
1800	50	223.6	1,326	264	34	12.6000
1800	25	111.8	1,748	502	89	15.2000
1800	10	44.7	2,727	955	190	17.3000

RATED SPEED "Nominal Data"

ENGINE SPEED RPM	PERCENT LOAD	ENGINE POWER BKW	TOTAL NOX (AS NO2) G/HP-HR	TOTAL C0 G/HP-HR	TOTAL HC G/HP-HR	PART MATTER G/HP-HR	OXYGEN IN EXHAUST PERCENT
1800	100	447.2	7.20	0.50	0.03	0.04	9.6000
1800	75	335.4	6.39	0.60	0.03	0.07	10.8000
1800	50	223.6	6.68	0.81	0.05	0.14	12.6000
1800	25	111.8	10.29	1.80	0.16	0.28	15.2000
1800	10	44.7	23.36	5.11	0.51	0.68	17.3000

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

Identification Reference and Notes

Engine Arrangement:	1833879	**Lube Oil Press @ Rated Spd(KPA):**	165.0
Effective Serial No:	9PW00413	**Piston Speed @ Rated Eng SPD(M/Sec):**	9.1
Primary Engine Test Spec:	0K2879	**Max Operating Altitude(M):**	--
Performance Parm Ref:	TM0015	**PEEC Elect Control Module Ref**	
Performance Data Ref:	DM6390	**PEEC Personality Cont Mod Ref**	
Aux Coolant Pump Perf Ref:			
Cooling System Perf Ref:		**Turbocharger Model**	TW9101-1.25 VOW
Certification Ref:	IMO -	**Fuel Injector**	1747526
Certification Year:	2000	**Timing-Static (DEG):**	--
Compression Ratio:	15.5	**Timing-Static Advance (DEG):**	--
Combustion System:	DI	**Timing-Static (MM):**	--
Aftercooler Temperature (C):	--	**Unit Injector Timing (MM):**	--
Crankcase Blowby Rate(M3/H):	--	**Torque Rise (percent)**	--
Fuel Rate (Rated RPM) No Load(L/HR):	--	**Peak Torque Speed RPM**	--
Lube Oil Press @ Low Idle Spd(KPA):	388.0	**Peak Torque (NM):**	--

Reference Number: DM6390

THIS PERFROMANCE CURVE IS ALSO APPLICABLE WITH ENGINE ARRANGEMENTS 183-3881, 183-3882, AND 183-3885.
THIS IS ALSO APPLICABLE WITH THE DUAL ECM TEST SPEC 0K2808.
THIS PERFORMANCE CURVE SUPPORTS INJECTOR AND SOFTWARE MAP CHANGES TO IMPROVE SMOKE REDUCTION.
IMO - 20002006M1

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 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 O0PERATION.

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

SOUND DEFINITIONS:

Sound Power : DM8702
Sound Pressure : TM7080

Date Released : 03/21/12