

OIL & GAS PERFORMANCE DATA [2HW]

APRIL 18, 2013

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Performance Number: DM4437

Change Level:

Sales Model: 3508BDITA	Combustion: DI	Aspr: TA
Engine Power: 915 HP	Speed: 1,200 RPM	After Cooler: SCAC
Manifold Type: DRY	Governor Type: ADEM	After Cooler Temp(F): 140
Turbo Quantity: 2	Engine App: OF	Turbo Arrangement: Parallel
Application Type: OIL FLD-DIE	Engine Rating: OF	Strategy:
Rating Type: P/DRIL-ELECT	Certification: 2000 EPA/IMO	

General Performance Data

ENGINE SPEED RPM	ENGINE POWER BHP	ENGINE TORQUE LB.FT	ENGINE BMEP PSI	FUEL BSFC 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
1,200	915	4,002.74	286.74	0.36	46.57	161.24	77.53	2,087.1	1,129.1	820.76	5,198.32
1,200	822	3,597.82	257.74	0.36	41.98	158	72.97	2,016.47	1,062.86	773.78	4,838.11
1,200	731	3,198.06	229.02	0.36	37.51	155.12	66.75	1,910.53	1,008.32	743.9	4,456.72
1,200	685	2,999.66	214.8	0.36	35.35	153.86	62.78	1,836.36	985.82	734	4,248.36
1,200	640	2,801.25	200.59	0.36	33.15	152.78	58.66	1,758.67	963.14	723.92	4,032.94
1,200	550	2,408.13	172.45	0.37	28.85	150.8	50.22	1,592.69	918.32	703.94	3,591.5
1,200	461	2,017.23	144.46	0.37	24.54	149	41.43	1,416.12	873.86	684.14	3,132.41
1,200	374	1,638.12	117.34	0.38	20.37	147.56	32.66	1,236.01	821.3	656.42	2,669.79
1,200	285	1,247.21	89.34	0.39	16.06	146.3	23.63	1,052.38	757.58	619.52	2,193.04
1,200	239	1,047.34	74.99	0.41	13.87	145.76	19.01	957.03	721.22	597.38	1,949.37
1,200	193	844.51	60.48	0.43	11.76	145.22	14.98	875.8	672.08	567.68	1,726.89
1,200	98	429.26	30.75	0.54	7.63	144.32	8.44	741.61	543.02	482.9	1,334.9

General Performance Data 2

ENGINE SPEED RPM	ENGINE POWER BHP	COMPRESS OUT PRESS IN-HG	COMPRESS OUT TEMP DEG F
1,200	915	78.09	432.86
1,200	822	73.53	405.86
1,200	731	67.31	377.24
1,200	685	63.28	362.3
1,200	640	59.17	346.82
1,200	550	50.64	314.78
1,200	461	41.75	280.58
1,200	374	32.93	243.14

1,200	285	23.84	204.26
1,200	239	19.19	184.46
1,200	193	15.19	165.38
1,200	98	8.62	130.28

Engine Heat Rejection Data

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
1,200	915	15,525.5	5,971.3	36,055.5	18,369.0	4,998.9	10,066.0	38,785.3	99,920.4	106,460.4
1,200	822	14,445.0	5,345.8	32,415.8	15,866.7	4,504.1	8,871.7	34,861.2	90,081.9	95,939.5
1,200	731	13,364.4	4,947.7	29,060.5	13,876.2	4,026.4	7,506.8	30,994.1	80,584.6	85,873.5
1,200	685	12,795.7	4,777.1	27,411.3	12,966.3	3,793.2	6,824.4	29,060.5	75,921.3	80,869.0
1,200	640	12,227.0	4,606.5	25,818.9	12,056.4	3,560.1	6,085.1	27,126.9	71,258.0	75,921.3
1,200	550	11,089.6	4,322.1	22,577.3	10,350.3	3,093.7	4,720.2	23,316.7	61,931.3	66,025.9
1,200	461	9,895.4	4,037.8	19,335.8	8,644.2	2,633.1	3,298.4	19,563.2	52,661.5	56,130.6
1,200	374	8,701.1	3,753.4	16,094.2	6,881.3	2,183.8	2,161.1	15,866.7	43,676.1	46,519.6
1,200	285	7,336.2	3,412.2	12,738.8	5,118.3	1,723.2	1,137.4	12,113.3	34,463.1	36,737.9
1,200	239	6,653.8	3,298.4	10,975.9	4,265.2	1,490.0	682.4	10,122.8	29,799.8	31,733.4
1,200	193	5,914.5	3,071.0	9,383.5	3,412.2	1,262.5	284.4	8,189.3	25,250.2	26,899.4
1,200	98	4,379.0	2,729.8	6,369.4	1,706.1	818.9	-170.6	4,151.5	16,378.5	17,459.1

EXHAUST Sound Data: 4.92 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
1,200	915	112	111	117	112	105	103	106	105	103
1,200	822	111	110	116	111	104	102	105	104	102
1,200	731	110	109	115	110	103	101	104	103	101
1,200	685	109	108	114	109	102	101	104	102	100
1,200	640	109	108	114	109	102	100	104	102	100
1,200	550	108	107	113	108	101	99	103	101	99
1,200	461	107	106	112	107	100	98	102	100	98
1,200	374	106	105	111	106	99	97	100	99	97
1,200	285	105	104	110	105	98	96	99	98	96
1,200	239	104	103	109	104	97	95	99	97	95
1,200	193	103	102	108	103	96	95	98	96	94
1,200	98	101	100	106	101	94	93	96	94	92

EXHAUST Sound Data: 22.97 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
1,200	915	98	100	105	99	92	92	93	92	87
1,200	822	97	99	104	98	91	91	92	91	86
1,200	731	97	99	103	98	91	90	91	91	86
1,200	685	96	98	103	97	90	90	91	90	85
1,200	640	96	98	102	97	90	89	90	90	85
1,200	550	95	97	101	96	89	88	89	89	84
1,200	461	94	96	100	95	88	87	88	88	83
1,200	374	93	95	99	94	87	86	87	87	82
1,200	285	91	93	98	92	85	85	86	85	80
1,200	239	91	93	97	92	85	84	85	85	80
1,200	193	90	92	96	91	84	84	84	84	79
1,200	98	88	90	94	89	82	82	82	82	77

EXHAUST Sound Data: 49.21 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
1,200	915	92	94	98	93	86	85	86	86	81
1,200	822	91	93	97	92	85	84	85	85	80
1,200	731	90	92	96	91	84	84	84	84	79
1,200	685	89	91	96	90	83	83	84	83	78
1,200	640	89	91	96	90	83	83	84	83	78
1,200	550	88	90	95	89	82	82	83	82	77
1,200	461	87	89	94	88	81	81	82	81	76
1,200	374	86	88	92	87	80	80	80	80	75
1,200	285	85	87	91	86	79	78	79	79	74
1,200	239	84	86	91	85	78	78	79	78	73
1,200	193	83	85	90	84	77	77	78	77	72
1,200	98	81	83	88	82	75	75	76	75	70

MECHANICAL Sound Data: 3.28 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
1,200	915	100	95	96	93	89	94	95	92	95
1,200	822	100	95	96	93	89	94	95	92	95
1,200	731	100	95	96	93	89	94	95	92	95
1,200	685	100	95	96	93	89	94	95	92	95
1,200	640	100	95	96	93	89	94	95	92	95
1,200	550	100	95	96	93	89	94	95	92	95
1,200	461	100	95	96	93	89	94	95	92	95
1,200	374	100	95	96	93	89	94	95	92	95
1,200	285	100	95	96	93	89	94	95	92	95
1,200	239	100	95	96	93	89	94	95	92	95
1,200	193	100	95	96	93	89	94	95	92	95
1,200	98	100	95	96	93	89	94	95	92	95

MECHANICAL Sound Data: 22.97 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
1,200	915	88	83	84	81	77	82	83	80	83
1,200	822	88	83	84	81	77	82	83	80	83
1,200	731	88	83	84	81	77	82	83	80	83
1,200	685	88	83	84	81	77	82	83	80	83
1,200	640	88	83	84	81	77	82	83	80	83
1,200	550	88	83	84	81	77	82	83	80	83
1,200	461	88	83	84	81	77	82	83	80	83
1,200	374	88	83	84	81	77	82	83	80	83
1,200	285	88	83	84	81	77	82	83	80	83
1,200	239	88	83	84	81	77	82	83	80	83
1,200	193	88	83	84	81	77	82	83	80	83
1,200	98	88	83	84	81	77	82	83	80	83

MECHANICAL Sound Data: 49.21 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
1,200	915	82	77	78	75	71	76	77	74	77
1,200	822	82	77	78	75	71	76	77	74	77
1,200	731	82	77	78	75	71	76	77	74	77
1,200	685	82	77	78	75	71	76	77	74	77
1,200	640	82	77	78	75	71	76	77	74	77
1,200	550	82	77	78	75	71	76	77	74	77
1,200	461	82	77	78	75	71	76	77	74	77
1,200	374	82	77	78	75	71	76	77	74	77
1,200	285	82	77	78	75	71	76	77	74	77
1,200	239	82	77	78	75	71	76	77	74	77
1,200	193	82	77	78	75	71	76	77	74	77
1,200	98	82	77	78	75	71	76	77	74	77

EMISSIONS DATA

Certification: 2000 EPA/IMO

REFERENCE EXHAUST STACK DIAMETER	8 IN
WET EXHAUST MASS	9,528.4 LB/HR
WET EXHAUST FLOW (820.40 F STACK TEMP)	5,201.86 CFM
WET EXHAUST FLOW RATE (32 DEG F AND 29.98 IN HG)	1,991.00 STD CFM
DRY EXHAUST FLOW RATE (32 DEG F AND 29.98 IN HG)	1,824.36 STD CFM
FUEL FLOW RATE	46 GAL/HR

RATED SPEED "Potential site variation"

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	DRY SMOKE OPACITY PERCENT	BOSCH SMOKE NUMBER
1,200	100	915	16.7100	4.4700	.1300	.2400	10.5000	1.2000	1.2800
1,200	75	686	10.3900	2.1100	.1900	.1800	12.0000	1.0000	1.2800
1,200	50	457	6.8600	.9400	.1700	.1400	12.9000	.9000	1.2800
1,200	25	229	3.9500	.2800	.1500	.0700	14.4000	.7000	1.2800
1,200	10	91	2.6200	.7000	.1800	.0600	16.4000	.7000	1.2800

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	DRY SMOKE OPACITY PERCENT	BOSCH SMOKE NUMBER
1,200	100	915	13.9200	2.4800	.1000	1,035.7	.1700	10.5000	1.2000	1.2800
1,200	75	686	8.6600	1.1700	.1400	785.1	.1300	12.0000	1.0000	1.2800
1,200	50	457	5.7100	.5200	.1300	545	.1000	12.9000	.9000	1.2800
1,200	25	229	3.2900	.1600	.1100	307.2	.0500	14.4000	.7000	1.2800
1,200	10	91	2.1800	.3900	.1400	173.3	.0400	16.4000	.7000	1.2800

Altitude Capability Data(Corrected Power Altitude Capability)

Ambient Operating Temp.	50 F	68 F	86 F	104 F	122 F	NORMAL
Altitude						
0 F	914.58 hp	914.58 hp	914.58 hp	914.58 hp	914.58 hp	914.58 hp
984.25 F	914.58 hp	914.58 hp	914.58 hp	914.58 hp	914.58 hp	914.58 hp
1,640.42 F	914.58 hp	914.58 hp	914.58 hp	914.58 hp	914.58 hp	914.58 hp
3,280.84 F	914.58 hp	914.58 hp	914.58 hp	914.58 hp	914.58 hp	914.58 hp
4,921.26 F	914.58 hp	914.58 hp	914.58 hp	914.58 hp	909.21 hp	914.58 hp
6,561.68 F	914.58 hp	914.58 hp	911.89 hp	882.39 hp	855.57 hp	914.58 hp
8,202.1 F	914.58 hp	886.41 hp	856.91 hp	828.75 hp	803.27 hp	903.85 hp
9,842.52 F	860.93 hp	831.43 hp	804.61 hp	779.13 hp	754.99 hp	858.25 hp
10,498.69 F	839.48 hp	811.32 hp	784.5 hp	759.02 hp	734.88 hp	840.82 hp

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

Identification Reference and Notes

Engine Arrangement:	1744949	Lube Oil Press @ Rated Spd(PSI):	64.5
Effective Serial No:	2HW	Piston Speed @ Rated Eng SPD(FT/Min):	1,389.8
Primary Engine Test Spec:	0K2455	Max Operating Altitude(FT):	7,824.8
Performance Parm Ref:	TM5741	PEEC Elect Control Module Ref	
Performance Data Ref:	DM4437	PEEC Personality Cont Mod Ref	
Aux Coolant Pump Perf Ref:			
Cooling System Perf Ref:		Turbocharger Model	BTV75-46T-0.96
Certification Ref:	EPA/IMO	Fuel Injector	1440726
Certification Year:	2000	Timing-Static (DEG):	--
Compression Ratio:	14.0	Timing-Static Advance (DEG):	--
Combustion System:	DI	Timing-Static (MM):	--
Aftercooler Temperature (F):	140	Unit Injector Timing (MM):	64.3
Crankcase Blowby Rate(CFH):	911.1	Torque Rise (percent)	--
Fuel Rate (Rated RPM) No Load(Gal/HR):	5.3	Peak Torque Speed RPM	--
Lube Oil Press @ Low Idle Spd(PSI):	20.0	Peak Torque (LB/FT):	--

Reference
Number: DM4437 --

Parameters
Reference: TM5741

OIL FIELD - MECHANICAL

TOLERANCES:

AMBIENT AIR CONDITIONS AND FUEL USED WILL AFFECT THESE VALUES.

EACH OF THE VALUES MAY VARY IN ACCORDANCE WITH THE FOLLOWING TOLERANCES.

	+/- 3%
Power	
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%
Heat rejection exhaust only	+/- 10%

CONDITIONS:

PERFORMANCE IS OBTAINED AND CORRECTED IN ACCORDANCE WITH ISO 3046/1

STANDARD ATMOSPHERIC CONDITIONS OF 100 KPA (29.61 IN HG), 30%

RELATIVE HUMIDITY AND 25 DEG C (77 DEG F) AT THE STATED AFTERCOOLER

TEMPERATURE. PERFORMANCE IS ALSO IN ACCORDANCE WITH SAE J1995,

BS5514/1 AND DIN6271/1 STANDARD REFERENCE CONDITIONS.

PERFORMANCE AND FUEL CONSUMPTION ARE BASED ON 35 DEGREE API GRAVITY

FUEL 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/LITER (7.002 LBS/GAL).

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.

DEFINITIONS:

WELL SERVICING (FRACTURING & CEMENTING/KILL PUMP) - THE
POWER AND
SPEED CAPABILITY OF THE ENGINE WHICH CAN BE USED TO POWER
HIGH
PRESSURE WELL SERVICING EQUIPMENT.

HOISTING - THE POWER AND SPEED CAPABILITY OF THE ENGINE
WHICH CAN
BE USED TO POWER THE DRAWWORKS ONLY OF A DRILLING OR
WORKOVER
RIG THROUGH A MECHANICAL DRIVE.

PUMPING/DRILLING (AIR OR MECHANICAL DRIVE) - THE POWER
AND SPEED
CAPABILITY OF THE ENGINE WHICH CAN BE USED TO POWER MUD
PUMPS,
ROTARY TABLES AND DRAWWORKS THROUGH AN AIR OR
MECHANICAL DRIVE.

PUMPING/DRILLING (ELECTRICAL DRIVE) - THE POWER AND
SPEED
CAPABILITY OF THE ENGINE WHICH CAN BE USED TO POWER MUD
PUMPS,
ROTARY TABLES AND DRAWWORKS ON AN ELECTRIC
DRIVE.

ALTITUDE:

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

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.