

Estimated Average Engine Performance NOT FOR GUARANTEE, REFER TO PROJECT F&ID FOR DESIGN



GE Energy

Performance By: **Neil Karr**
Project Info: **LM2500 (Gas Fuel, Without Water Injection)**

Engine: **LM2500 PE**
Deck Info: **GE166B - 48f.scp**
Generator: **BDAX 167ER 60Hz, 13.8kV, 0.9PF (10807)**
Fuel: **Gas Fuel #10-1, 19000 Btu/lb,LHV**

Date: **01/30/2009**
Time: **8:47:56 AM**
Version: **3.7.6**

Case #	100	101	102	103	104
Ambient Conditions					
Dry Bulb, °F	32.0	50.0	68.0	86.0	104.0
Wet Bulb, °F	30.6	47.7	64.9	82.1	99.4
RH, %	85.0	85.0	85.0	85.0	85.0
Altitude, ft	17.1	17.1	17.1	17.1	17.1
Ambient Pressure, psia	14.687	14.687	14.687	14.687	14.687
Engine Inlet					
Comp Inlet Temp, °F	32.0	50.0	68.0	86.0	104.0
RH, %	85.0	85.0	85.0	85.0	85.0
Conditioning	NONE	NONE	NONE	NONE	NONE
Tons or kBtu/hr	0	0	0	0	0
Pressure Losses					
Inlet Loss, inH2O	4.00	4.00	4.00	4.00	4.00
Exhaust Loss, inH2O	4.00	4.00	4.00	4.00	4.00
kW, Gen Terms					
Est. Btu/kW-hr, LHV	24175	23332	22357	21273	19941
	9369	9389	9446	9544	9730
Fuel Flow					
MMBtu/hr, LHV	226.5	219.1	211.2	203.0	194.0
lb/hr	11921	11530	11115	10686	10212
NOx Control					
	NONE	NONE	NONE	NONE	NONE
Control Parameters					
HP Speed, RPM	9681	9610	9513	9485	9482
PT Speed, RPM	3600	3600	3600	3600	3600
PS3 - CDP, psia	276.0	268.7	260.2	250.8	239.3
T3CRF - CDT, °F	839	850	859	869	876
T48IN, °R	1990	1990	1990	1990	1990
T48IN, °F	1530	1530	1530	1530	1530
Exhaust Parameters					
Temperature, °F	986.6	993.5	1002.3	1013.2	1028.4
lb/sec	157.7	153.7	149.0	143.6	136.7
lb/hr	567545	553310	536517	517018	492284
Energy, Btu/s- Ref 0 °R	58091	57068	55957	54811	53516
Cp, Btu/lb-R	0.2752	0.2761	0.2778	0.2806	0.2854
Emissions (NOT FOR USE IN ENVIRONMENTAL PERMITS)					
NOx ppmvd Ref 15% O2	193	185	167	140	101
NOx as NO2, lb/hr	177	164	143	115	80
CO ppmvd Ref 15% O2	5	5	5	5	5
CO, lb/hr	2.80	2.69	2.59	2.50	2.40
CO2, lb/hr	30153.25	29165.39	28114.17	27027.27	25824.54
HC ppmvd Ref 15% O2	2	2	2	2	2
HC, lb/hr	0.49	0.47	0.46	0.44	0.42
SOX as SO2, lb/hr	0.00	0.00	0.00	0.00	0.00

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Exh Wght % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)					
AR	1.2569	1.2531	1.2458	1.2331	1.2116
N2	73.8754	73.6481	73.2246	72.4793	71.2224
O2	15.2070	15.1966	15.1110	14.9009	14.4906
CO2	5.3129	5.2711	5.2401	5.2275	5.2459
H2O	4.3257	4.6102	5.1596	6.1433	7.8179
SO2	0.0000	0.0000	0.0000	0.0000	0.0000
CO	0.0005	0.0005	0.0005	0.0005	0.0005
HC	0.0001	0.0001	0.0001	0.0001	0.0001
NOX	0.0215	0.0204	0.0183	0.0152	0.0111

Exh Mole % Dry (NOT FOR USE IN ENVIRONMENTAL PERMITS)					
AR	0.9636	0.9635	0.9635	0.9637	0.9644
N2	80.7628	80.7498	80.7503	80.7736	80.8351
O2	14.5549	14.5874	14.5892	14.5386	14.3987
CO2	3.6973	3.6789	3.6784	3.7084	3.7900
H2O	0.0000	0.0000	0.0000	0.0000	0.0000
SO2	0.0000	0.0000	0.0000	0.0000	0.0000
CO	0.0005	0.0005	0.0005	0.0005	0.0006
HC	0.0002	0.0002	0.0002	0.0002	0.0002
NOX	0.0208	0.0198	0.0179	0.0151	0.0112

Exh Mole % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)					
AR	0.8976	0.8932	0.8851	0.8710	0.8474
N2	75.2305	74.8652	74.1864	73.0016	71.0339
O2	13.5579	13.5244	13.4033	13.1397	12.6528
CO2	3.4440	3.4108	3.3794	3.3516	3.3304
H2O	6.8500	7.2875	8.1287	9.6220	12.1250
SO2	0.0000	0.0000	0.0000	0.0000	0.0000
CO	0.0005	0.0005	0.0005	0.0005	0.0005
HC	0.0002	0.0002	0.0002	0.0002	0.0002
NOX	0.0194	0.0183	0.0164	0.0136	0.0098

Aero Energy Fuel Number	10-1 (GEDEF)	
	Volume %	Weight %
Hydrogen	0.0000	0.0000
Methane	84.5000	71.8447
Ethane	5.5800	8.8924
Ethylene	0.0000	0.0000
Propane	2.0500	4.7909
Propylene	0.0000	0.0000
Butane	0.7800	2.4027
Butylene	0.0000	0.0000
Butadiene	0.0000	0.0000
Pentane	0.1800	0.6883
Cyclopentane	0.0000	0.0000
Hexane	0.1700	0.7764
Heptane	0.0000	0.0000
Carbon Monoxide	0.0000	0.0000
Carbon Dioxide	0.6700	1.5628
Nitrogen	5.9300	8.8044
Water Vapor	0.0000	0.0000
Oxygen	0.1400	0.2374
Hydrogen Sulfide	0.0000	0.0000
Ammonia	0.0000	0.0000
Btu/lb, LHV	19000	
Btu/scf, LHV	946	
Btu/scf, HHV	1047	
Btu/lb, HHV	20996	
Fuel Temp, °F	77.0	
NOx Scalar	0.998	
Specific Gravity	0.65	

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Ambient Conditions					
Dry Bulb, °C	0.0	10.0	20.0	30.0	40.0
Wet Bulb, °C	-0.8	8.7	18.3	27.8	37.5
RH, %	85.0	85.0	85.0	85.0	85.0
Altitude, m	5.2	5.2	5.2	5.2	5.2
Ambient Pressure, kPa	101.263	101.263	101.263	101.263	101.263
Engine Inlet					
Comp Inlet Temp, °C	0.0	10.0	20.0	30.0	40.0
RH, %	85.0	85.0	85.0	85.0	85.0
Conditioning	NONE	NONE	NONE	NONE	NONE
Tons or kBtu/hr	0	0	0	0	0
Pressure Losses					
Inlet Loss, mmH2O	101.60	101.60	101.60	101.60	101.60
Exhaust Loss, mmH2O	101.60	101.60	101.60	101.60	101.60
kW, Gen Terms					
Est. kJ/kWh, LHV	24175	23332	22357	21273	19941
	9885	9906	9966	10069	10266
Fuel Flow					
GJ/hr, LHV	239.0	231.1	222.8	214.2	204.7
kg/hr	5407	5230	5042	4847	4632
NOx Control					
	NONE	NONE	NONE	NONE	NONE
Control Parameters					
HP Speed, RPM	9681	9610	9513	9485	9482
PT Speed, RPM	3600	3600	3600	3600	3600
PS3 - CDP, kPa	1902.8	1852.9	1793.8	1729.4	1649.8
T3CRF - CDT, °C	448	455	459	465	469
T48IN, °K	1105	1106	1106	1106	1106
T48IN, °C	832	832	832	832	832
Exhaust Parameters					
Temperature, °C	530.3	534.2	539.0	545.1	553.5
kg/sec	71.5	69.7	67.6	65.1	62.0
kg/hr	257437	250980	243363	234518	223299
Energy, KJ/s- Ref 0 °K	61290	60210	59038	57828	56463
KJ/kg-R	1.1520	1.1558	1.1629	1.1746	1.1947
Emissions (NOT FOR USE IN ENVIRONMENTAL PERMITS)					
NOx mg/Nm3 Ref 15% O2	396	379	343	286	208
NOx as NO2, kg/hr	80	74	65	52	36
CO mg/Nm3 Ref 15% O2	6	6	6	6	6
CO, kg/hr	1.27	1.22	1.18	1.13	1.09
CO2, kg/hr	13677.42	13229.34	12752.50	12259.49	11713.94
HC mg/Nm3 Ref 15% O2	1	1	1	1	1
HC, kg/hr	0.22	0.22	0.21	0.20	0.19
SOX as SO2, kg/hr	0.00	0.00	0.00	0.00	0.00

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H2O	4.3257	4.6102	5.1596	6.1433	7.8179
SO2	0.0000	0.0000	0.0000	0.0000	0.0000
CO	0.0005	0.0005	0.0005	0.0005	0.0005
HC	0.0001	0.0001	0.0001	0.0001	0.0001
NOX	0.0215	0.0204	0.0183	0.0152	0.0111

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CO2	3.6973	3.6789	3.6784	3.7084	3.7900
H2O	0.0000	0.0000	0.0000	0.0000	0.0000
SO2	0.0000	0.0000	0.0000	0.0000	0.0000
CO	0.0005	0.0005	0.0005	0.0005	0.0006
HC	0.0002	0.0002	0.0002	0.0002	0.0002
NOX	0.0208	0.0198	0.0179	0.0151	0.0112

Exh Mole % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)

AR	0.8976	0.8932	0.8851	0.8710	0.8474
N2	75.2305	74.8652	74.1864	73.0016	71.0339
O2	13.5579	13.5244	13.4033	13.1397	12.6528
CO2	3.4440	3.4108	3.3794	3.3516	3.3304
H2O	6.8500	7.2875	8.1287	9.6220	12.1250
SO2	0.0000	0.0000	0.0000	0.0000	0.0000
CO	0.0005	0.0005	0.0005	0.0005	0.0005
HC	0.0002	0.0002	0.0002	0.0002	0.0002
NOX	0.0194	0.0183	0.0164	0.0136	0.0098

Aero Energy Fuel Number	10-1 (GEDEF)	
	Volume %	Weight %
Hydrogen	0.0000	0.0000
Methane	84.5000	71.8447
Ethane	5.5800	8.8924
Ethylene	0.0000	0.0000
Propane	2.0500	4.7909
Propylene	0.0000	0.0000
Butane	0.7800	2.4027
Butylene	0.0000	0.0000
Butadiene	0.0000	0.0000
Pentane	0.1800	0.6883
Cyclopentane	0.0000	0.0000
Hexane	0.1700	0.7764
Heptane	0.0000	0.0000
Carbon Monoxide	0.0000	0.0000
Carbon Dioxide	0.6700	1.5628
Nitrogen	5.9300	8.8044
Water Vapor	0.0000	0.0000
Oxygen	0.1400	0.2374
Hydrogen Sulfide	0.0000	0.0000
Ammonia	0.0000	0.0000
kJ/kg, LHV	44194	
kJ/Nm3, LHV	37155	
kJ/Nm3, HHV	41122	
kJ/kg, HHV	48836	
Fuel Temp, °C	25.0	
NOx Scalar	0.998	
Specific Gravity	0.65	