



Team Results for Clean Snowmobile Challenge 2010

2010 Clean Snowmobile Competition - Lab Emission Event Emission Data Sheet

Team Name : Michigan Tech Univ
 Model : MTU
 Engine : MTU
 Displacement[cc] : 750cc
 100% Speed : 7750
 100% Torque : 42.8
 No of Strokes : 4
 Fuel : Gasoline H/C: 1.85 O/C: 0.07

ModeNum	:	1	2	3	4	5
Weighting	:	0.12	0.27	0.25	0.31	0.05
Power kW	:	7.3	11.2	10.0	4.3	0.0
HC_m g/hr	:	108.79	13.54	1.52	38.41	41.64
CO_m g/hr	:	298.41	469.09	87.29	2496.57	678.97
NOx_m g/hr	:	147.71	17.86	44.60	0.03	0.00
N2O_m g/hr	:	0.00	0.00	0.00	0.00	0.00
Soot_m mg/hr	:	63.35	45.35	49.43	19.62	3.58
W_HC g/hr	:	13.05	3.65	0.38	11.91	2.08
W_CO g/hr	:	35.81	126.65	21.82	773.94	33.95
W_NOx g/hr	:	17.72	4.82	11.15	0.01	0.00
W_HCNOx g/hr	:	30.78	8.48	11.53	11.92	2.08
W_Soot mg/hr	:	7.60	12.24	12.36	6.08	0.18

Total Weighted Power [kW] 7.756

Weighted Emissions

	HC	CO	NOx	HC+NOx
Total Mass [g/hr]	31.1	992.2	33.7	64.8
Specific Mass [g/kW-hr]	4.0	127.9	4.3	8.4
Total Soot [mg/hr]	38.5	Specific Soot [mg/kW-hr] 5.0		
BSFC [g/kW-hr]	709.7			

Not Used for Competition

	CO2	N2O	CH4
Total Mass [g/hr]	27028	0.00	10.78
Specific Mass [g/kW-hr]	3243	0.00	1.29

EMISSION TESTS:

	Value	Limit	Result
Power	11.2	<96.94 kW	PASS
Soot	4.960	<100 mg/kW-hr	PASS
CO	127.93	<275 g/kW-hr	PASS
HC + NOX	8.35	<90 g/kW-hr	PASS
E-Score	172.4	>100	PASS
Valid Data for All 5 Modes			PASS

LAB EMISSION TEST PASS



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Modal Raw Data : Engine / Environmental

ModeNum		1	2	3	4	5
Total Points	points	292	1191	1206	1201	1192
PtsInMode	points	292	1191	1206	1201	1192
Speed	rpm	7187.40	6429.30	5819.09	5040.19	1817.62
Torque	Nm	9.65	16.63	16.49	8.24	0.00
Power	kW	7.26	11.20	10.05	4.35	0.00
BSFC	g/kw-hr	1208.16	578.85	486.52	925.13	**
Fuel	g/hr	8775.58	6482.16	4889.18	4023.35	1161.21
T_int	degC	18.10	10.60	2.98	2.46	4.89
RelHumid	%	69.40	50.74	25.93	42.41	46.67
Baro	in Hg	29.76	29.75	29.75	29.75	29.75
Baro	mmHg	755.82	755.65	755.65	755.64	755.65
Pvap_kPa	kPa	1.24	0.59	0.19	0.30	0.39
Pvap_inHg	inHg	0.37	0.17	0.06	0.09	0.11
AbsHumidity	grains/lb	54.29	25.71	8.27	13.11	16.77
SatPres	kPa	99.53	100.15	100.55	100.44	100.36
Hum Factor		0.91	0.81	0.76	0.77	0.79
F_fac		0.98	0.96	0.93	0.93	0.94
K_fac		0.99	0.98	0.96	0.96	0.97
Humidity	g/kg	7.76	3.67	1.18	1.87	2.40
H2		0.05	0.15	0.04	1.79	1.68
WetDry Factor		0.87	0.87	0.87	0.87	0.87



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Modal Emissions Concentrations

ModeNum		1	2	3	4	5
THC	ppmC1	1221.61	282.98	41.18	1433.01	5422.93
CO	%	0.17	0.49	0.12	4.61	4.38
N2O	ppm	2.19	0.51	1.83	0.35	0.38
CH4	ppm	104.97	62.66	17.38	477.89	1148.68
CO2	%	9.57	13.04	13.10	10.25	10.20
O2	%	4.73	0.22	0.63	0.00	0.26
CNOx	ppm	500.12	112.57	363.68	0.32	0.00
AHC	ppm	61.84	15.47	1.10	75.17	331.87
C2H2	ppm	21.53	5.87	0.57	0.56	0.19
C2H4	ppm	104.71	19.81	1.82	109.51	274.87
C3H6	ppm	27.81	4.11	0.79	10.79	53.19
C4H6	ppm	4.36	2.62	0.69	4.37	4.88
ETOH	ppm	9.83	3.50	2.65	6.73	3.24
H2O	%	12.83	13.25	12.88	12.71	12.62
HCHO	ppm	30.18	2.23	0.56	0.34	1.63
HCN	ppm	5.47	1.30	0.38	5.60	1.23
HNCO	ppm	10.34	3.66	2.26	3.55	4.47
MECHO	ppm	10.02	0.58	0.05	0.00	0.92
NC5	ppm	0.32	0.22	0.31	0.00	0.00
NH3	ppm	7.51	39.30	16.14	132.35	47.80
NO	ppm	530.62	138.57	476.01	0.18	0.00
SO2	ppm	4.65	5.57	2.06	2.62	1.57
Soot	mg/m3	0.454	0.596	0.832	0.478	0.295
ModalAFR_MO	-	18.092	13.118	13.606	11.261	11.526