



Team Results for Clean Snowmobile Challenge 2011

2011 Clean Snowmobile Competition - Lab Emission Event Emission Data Sheet

Test Date :
 Team Name : SUNY - Buffalo
 Team Number : 4
 Model : SUNY-B
 Engine : SUNY-B
 Displacement[cc] : 980cc
 100% Speed : 4487
 100% Torque : 60.0
 No of Strokes : 4
 Fuel : Diesel H/C: 1.69 O/C: 0.01

ModeNum	:	1	2	3	4	5
Weighting	:	0.12	0.27	0.25	0.31	0.05
Power kW	:	23.3	11.7	6.6	3.6	0.0
HC_m g/hr	:	4.94	3.56	2.22	3.00	0.24
CO_m g/hr	:	0.62	0.24	0.01	0.08	0.01
NOx_m g/hr	:	317.46	213.92	109.15	53.62	9.75
Soot_m mg/hr	:	0.00	0.00	0.00	0.00	0.00
N2O_m mg/hr	:	0.10	0.12	0.18	0.16	0.01
CO2_m g/hr	:	44759.87	27033.26	16349.27	9574.27	1370.81
CH4_m g/hr	:	0.19	0.16	0.18	0.17	0.03
W_HC g/hr	:	0.59	0.96	0.56	0.93	0.01
W_CO g/hr	:	0.07	0.07	0.00	0.02	0.00
W_NOx g/hr	:	38.10	57.76	27.29	16.62	0.49
W_HCNOx g/hr	:	38.69	58.72	27.84	17.55	0.50
W_Soot mg/hr	:	0.00	0.00	0.00	0.00	0.00
W_N2O g/hr	:	0.01	0.03	0.04	0.05	0.00
W_CO2 g/hr	:	5371.18	7298.98	4087.32	2968.02	68.54
W_CH4 g/hr	:	0.02	0.04	0.05	0.05	0.00

Total Weighted Power [kW] 8.710

Weighted Emissions

	HC	CO	NOx	HC+NOx
Total Mass [g/hr]	3.05	0.17	140.25	143.30
Specific Mass [g/kW-hr]	0.35	0.02	16.10	16.45
BSFC [g/kW-hr]	717.3			

Total Soot [mg/hr] 0.00 Specific Soot [mg/kW-hr] 0.00

Not Used for Competition

Total N2O [mg/hr]	0.14	Specific N2O [mg/kW-hr]	0.02
Total CO2 [g/hr]	19794.05	Specific CO2 [g/kW-hr]	2272.51
Total CH4 [g/hr]	0.17	Specific CH4 [g/kW-hr]	0.02

EMISSION TESTS:

	Value	Limit	Result
Power	28.19	<96.94 kW	PASS
Soot	0.00	<100 mg/kW-hr	PASS
CO	0.02	<275 g/kW-hr	PASS
HC + NOX	16.45	<90 g/kW-hr	PASS
E-Score	199.03	>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	583	1201	1140	1116	1201
PtsInMode	points	607	1201	1201	1211	1201
Speed	rpm	4475.22	3825.68	3377.46	2926.41	1089.04
Torque	Nm	49.67	29.11	18.71	11.73	0.00
Power	kW	23.28	11.66	6.62	3.60	0.00
BSFC	g/kw-hr	599.60	722.93	770.56	830.80	**
Fuel	g/hr	13956.52	8429.72	5098.15	2987.26	427.51
T_int	degC	17.90	14.79	17.52	17.58	16.85
RelHumid	%	29.63	27.08	26.07	24.90	24.30
Baro	in Hg	28.64	28.64	28.63	28.62	28.62
Baro	mmHg	727.54	727.38	727.18	727.03	726.95
Pvap kPa	kPa	0.52	0.40	0.45	0.43	0.40
Pvap inHg	inHg	0.15	0.12	0.13	0.13	0.12
AbsHumidity	grains/lb	23.65	18.12	20.36	19.52	18.27
SatPres	kPa	96.47	96.57	96.50	96.50	96.51
Hum Factor		0.81	0.79	0.80	0.79	0.79
F_fac		1.01	1.00	1.01	1.01	1.01
K_fac		1.03	1.02	1.03	1.03	1.03
Humidity	g/kg	3.38	2.59	2.91	2.79	2.61
H2		0.00	0.00	0.00	0.00	0.00
WetDry Factor		0.93	0.95	0.96	0.96	0.97



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Modal Emissions Concentrations

ModeNum		1	2	3	4	5
THC	ppmC1	24.84	20.71	18.07	37.27	17.94
CO	%	0.00	0.00	0.00	0.00	0.00
N2O	ppm	1.51	2.10	4.51	6.37	2.31
CH4	ppm	0.81	0.81	1.26	1.83	1.74
CO2	%	7.02	4.90	4.15	3.70	3.18
O2	%	10.00	13.21	14.35	15.04	15.82
CNOx	ppm	476.12	370.87	264.78	198.45	216.52
AHC	ppm	0.75	0.52	0.41	1.41	0.11
C2H2	ppm	0.08	0.09	0.11	0.17	0.17
C2H4	ppm	0.41	0.39	0.41	1.22	1.53
C3H6	ppm	0.02	0.03	0.09	0.09	0.05
C4H6	ppm	0.11	0.10	0.09	0.11	0.07
ETOH	ppm	0.19	0.10	0.09	0.05	0.53
H2O	%	6.87	4.82	4.29	3.85	3.29
HCHO	ppm	1.15	1.18	1.24	1.97	0.78
HCN	ppm	0.11	0.07	0.06	0.05	0.04
HNCO	ppm	4.91	3.85	3.04	2.03	2.18
MECHO	ppm	0.00	0.00	0.00	0.16	0.12
NC5	ppm	3.67	3.01	2.66	5.11	2.22
NH3	ppm	0.05	0.03	0.03	0.04	0.03
NO	ppm	363.66	269.39	256.46	225.10	231.91
NO2	ppm	227.39	200.62	76.31	25.09	42.41
Soot	mg/m3	0.00	0.00	0.00	0.00	0.00
AFR	:1	28.52	41.24	48.88	54.77	63.97



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Measurement Accuracy (SAE paper 961804)

H2_XLS %	ModalHC_Dry %	ModalFTIR_H2O %	N2 %	Ar %	AFR :1	Tr_Eff -
0.000	0.003	6.873	80.877	0.935	28.672	0.507
0.000	0.002	4.815	79.816	0.923	41.453	0.356
0.000	0.002	4.294	79.929	0.924	49.127	0.303
0.000	0.004	3.853	79.721	0.922	55.107	0.271
0.000	0.002	3.288	79.263	0.916	64.297	0.235

ModalWHC %	ModalC1 %	ModalC8 %	ModalSUM_HC %	ModalT_Emiss %	ModalError %
4.939	-3.712	-0.464	-4.176	95.972	4.028
3.562	-3.315	-0.414	-3.729	96.083	3.917
2.221	-3.019	-0.377	-3.396	96.813	3.187
3.003	-2.807	-0.351	-3.158	97.001	2.999
0.241	-2.518	-0.315	-2.832	97.025	2.975

Power Run

TeamNumber	4
TeamName	SUNY - Buffalo
Model	SUNY-B
Engine	SUNY-B

Displacement cc	980cc
RatedSpeed	4487
RatedTorque	60.0

