



Team Results for Clean Snowmobile Challenge 2011

2011 Clean Snowmobile Competition - Lab Emission Event Emission Data Sheet

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Test Date       :
Team Name      : Univ of Idaho
Team Number    : 3
Model         : UI
Engine        : UI
Displacement[cc] : 593cc
100% Speed    : 8080
100% Torque   : 98.0
No of Strokes : 2
Fuel          : Gasoline           H/C: 1.92       O/C: 0.10
  
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ModeNum	:	1	2	3	4	5
Weighting	:	0.12	0.27	0.25	0.31	0.05
Power kW	:	68.8	37.3	20.6	10.5	0.0
HC_m g/hr	:	5029.85	300.75	336.22	695.92	17.76
CO_m g/hr	:	46707.95	4712.58	1232.52	359.22	1.66
NOx_m g/hr	:	46.38	103.81	207.78	61.20	1.36
Soot_m mg/hr	:	1088.66	0.00	0.00	0.00	0.00
N2O_m mg/hr	:	0.01	0.02	0.03	0.02	0.00
CO2_m g/hr	:	80330.84	66324.68	40230.97	22524.62	2227.36
CH4_m g/hr	:	768.43	75.92	17.26	7.69	1.33
W_HC g/hr	:	603.58	81.20	84.05	215.73	0.89
W_CO g/hr	:	5604.95	1272.40	308.13	111.36	0.08
W_NOx g/hr	:	5.57	28.03	51.94	18.97	0.07
W_HCNOx g/hr	:	609.15	109.23	136.00	234.71	0.96
W_Soot mg/hr	:	130.64	0.00	0.00	0.00	0.00
W_N2O g/hr	:	0.00	0.01	0.01	0.01	0.00
W_CO2 g/hr	:	9639.70	17907.66	10057.74	6982.63	111.37
W_CH4 g/hr	:	92.21	20.50	4.31	2.38	0.07

Total Weighted Power [kW] 26.731

Weighted Emissions

	HC	CO	NOx	HC+NOx
Total Mass [g/hr]	985.46	7296.92	104.58	1090.04
Specific Mass [g/kW-hr]	36.87	272.98	3.91	40.78
BSFC [g/kW-hr]	668.4			

Total Soot [mg/hr] 130.64 Specific Soot [mg/kW-hr] 4.89

Not Used for Competition

Total N2O [mg/hr]	0.02	Specific N2O [mg/kW-hr]	0.00
Total CO2 [g/hr]	44699.11	Specific CO2 [g/kW-hr]	1672.20
Total CH4 [g/hr]	119.47	Specific CH4 [g/kW-hr]	4.47

EMISSION TESTS:

	Value	Limit	Result
Power	82.92	<96.94 kW	PASS
Soot	4.89	<100 mg/kW-hr	PASS
CO	272.98	<275 g/kW-hr	PASS
HC + NOX	40.78	<90 g/kW-hr	PASS
E-Score	114.57	>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	604	528	1205	1206	1211
PtsInMode	points	606	621	1206	1206	1211
Speed	rpm	7926.35	6852.85	6057.48	5252.82	1195.70
Torque	Nm	82.89	51.96	32.55	19.02	0.00
Power	kW	68.80	37.29	20.65	10.46	0.00
BSFC	g/kw-hr	781.18	634.72	663.49	765.86	**
Fuel	g/hr	53749.18	23668.23	13700.65	8013.67	724.52
T_int	degC	7.25	18.32	16.34	15.00	15.22
RelHumid	%	40.53	24.83	24.44	25.39	25.74
Baro	in Hg	28.98	28.85	28.85	28.85	28.85
Baro	mmHg	736.21	732.92	732.85	732.92	732.89
Pvap kPa	kPa	0.39	0.45	0.40	0.38	0.39
Pvap inHg	inHg	0.11	0.13	0.12	0.11	0.12
AbsHumidity	grains/lb	17.24	20.12	17.72	17.07	17.52
SatPres	kPa	97.77	97.26	97.31	97.33	97.32
Hum Factor		1.00	1.00	1.00	1.00	1.00
F_fac		0.97	1.00	1.00	0.99	0.99
K_fac		1.00	1.02	1.02	1.01	1.01
Humidity	g/kg	2.46	2.87	2.53	2.44	2.50
H2		3.36	0.47	0.16	0.06	0.00
WetDry Factor		0.86	0.86	0.89	0.92	0.95



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Modal Emissions Concentrations

ModeNum		1	2	3	4	5
THC	ppmC1	15484.79	1751.46	2704.17	7170.34	1110.54
CO	%	7.16	1.37	0.49	0.18	0.01
N2O	ppm	0.13	0.46	0.81	0.76	0.75
CH4	ppm	2062.33	385.45	120.99	69.08	72.22
CO2	%	7.84	12.24	10.26	7.36	4.41
O2	%	0.34	0.14	4.20	9.09	13.91
CNOx	ppm	43.29	183.29	506.67	191.20	25.82
AHC	ppm	686.75	65.66	89.10	261.55	4.70
C2H2	ppm	56.41	21.99	27.19	3.49	0.41
C2H4	ppm	1614.36	209.30	430.77	189.13	12.91
C3H6	ppm	358.71	13.94	61.86	55.61	3.32
C4H6	ppm	50.49	3.46	9.02	3.40	0.32
ETOH	ppm	153.64	6.96	27.68	275.22	8.40
H2O	%	13.96	13.56	11.26	7.83	4.66
HCHO	ppm	268.28	45.96	271.81	251.20	20.51
HCN	ppm	5.53	3.80	3.09	0.39	0.04
HNCO	ppm	30.04	12.22	45.60	1.10	1.97
MECHO	ppm	294.03	16.32	65.38	260.18	15.12
NC5	ppm	59.16	0.05	10.10	610.86	139.49
NH3	ppm	53.91	11.78	0.36	0.71	0.10
NO	ppm	42.41	182.80	430.98	137.91	1.76
NO2	ppm	0.889	0.455	75.624	53.285	24.061
Soot	mg/m3	2.125	0.000	0.000	0.000	0.000
AFR	:1	7.57	11.86	14.91	18.16	38.05



**Team Results for
Clean Snowmobile Challenge 2011**

Measurement Accuracy (SAE paper 961804)

H2_XLS %	ModalHC_Dry %	ModalFTIR_H2O %	N2 %	Ar %	AFR :1	Tr_Eff -
3.911	1.800	13.964	76.827	0.888	10.445	0.982
0.543	0.203	13.557	81.480	0.942	13.927	0.993
0.184	0.305	11.259	82.690	0.956	17.791	0.789
0.065	0.778	7.834	81.367	0.941	24.130	0.549
0.002	0.116	4.655	80.181	0.927	44.653	0.323

ModalWHC %	ModalC1 %	ModalC8 %	ModalSUM_HC %	ModalT_Emiss %	ModalError %
5029.851	1.457	0.182	1.640	101.100	1.100
300.750	0.089	0.011	0.100	98.990	1.010
336.217	-2.320	-0.290	-2.610	98.125	1.875
695.917	-3.262	-0.408	-3.669	96.770	3.230
17.762	-3.102	-0.388	-3.490	96.850	3.150

Power Run

TeamNumber	3
TeamName	Univ of Idaho
Model	UI
Engine	UI

Displacement cc	593cc
RatedSpeed	8080
RatedTorque	98.0

