



Team Results for Clean Snowmobile Challenge 2015 Team 4



2015 Clean Snowmobile Competition - Lab Emission Event Emission Data Sheet

Test Date : 2015/03/05 11:35:23
Team Name : Madison
Team Number : 4
Model : SkiDoo
Engine : 600ACE
Displacement[cc] : 600.00
100% Speed : 6229
100% Torque : 52.3
No of Strokes : 4
Fuel : GASOLINE H/C: 1.92 O/C: 0.03

ModeNum	:	1	2	3	4	5	RMC
Weighting	:	0.12	0.27	0.25	0.31	0.05	1.00
Power kW	:	31.0	14.7	8.5	4.3	0.0	10.0
HC_m g/hr	:	3.36	1.02	0.59	0.76	0.07	0.35
CO_m g/hr	:	24.06	0.14	0.04	0.02	0.12	3.62
NOx_m g/hr	:	107.75	228.47	116.99	51.08	3.66	120.36
Soot_m mg/hr	:	32.03	4.71	2.18	2.63	0.43	5.63
N2O_m mg/hr	:	0.13	0.04	0.03	0.05	0.00	0.05
CO2_m g/hr	:	27307.02	14157.24	9544.30	6219.10	3589.23	11553.44
CH4_m g/hr	:	1.99	0.60	0.44	0.41	0.09	0.63
W_HC g/hr	:	0.40	0.28	0.15	0.24	0.00	0.35
W_CO g/hr	:	2.89	0.04	0.01	0.01	0.01	3.62
W_NOx g/hr	:	12.93	61.69	29.25	15.84	0.18	120.36
W_HCNOx g/hr	:	13.33	61.96	29.39	16.07	0.19	120.71
W_Soot mg/hr	:	3.84	1.27	0.54	0.82	0.02	5.63
W_N2O g/hr	:	0.02	0.01	0.01	0.01	0.00	0.05
W_CO2 g/hr	:	3276.84	3822.45	2386.07	1927.92	179.46	11553.44
W_CH4 g/hr	:	0.24	0.16	0.11	0.13	0.00	0.63

Total Weighted Power [kW] 11.133

Weighted Emissions

	HC	CO	NOx	HC+NOx
Total Mass [g/hr]	1.07	2.94	119.88	120.95
Specific Mass [g/kW-hr]	0.10	0.26	10.77	10.86
BSFC [g/kW-hr]	348.3			

Total Soot [mg/hr] 6.50 Specific Soot [mg/kW-hr] 0.58

Not Used for Competition

Total N2O [mg/hr]	0.05	Specific N2O [mg/kW-hr]	0.00
Total CO2 [g/hr]	11592.75	Specific CO2 [g/kW-hr]	1041.25
Total CH4 [g/hr]	0.64	Specific CH4 [g/kW-hr]	0.06
RMC BSFC [g/kW-hr]	366.27		

EMISSION TESTS:

	Value	Limit	Result
Power	34.13	<96.94 kW	PASS
Soot	0.58	<100 mg/kW-hr	PASS
CO	0.26	<275 g/kW-hr	PASS
HC + NOX	10.86	<90 g/kW-hr	PASS
E-Score	202.69	>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	RMC
Total Points	points	600	1200	1200	1200	1200	12032
PtsInMode	points	1210	3050	2720	3470	1480	12032
Speed	rpm	6228.19	5294.16	4671.16	4045.12	1901.45	4699.15
Torque	Nm	47.49	26.51	17.39	10.07	0.00	20.33
Power	kW	30.98	14.70	8.51	4.27	0.00	10.00
BSFC	g/kw-hr	279.93	305.45	355.75	462.39	**	366.27
Fuel	g/hr	8671.18	4488.68	3025.98	1972.12	1137.85	3664.39
T_int	degC	30.78	22.92	15.99	2.97	58.07	17.05
RelHumid	%	21.36	16.84	17.46	19.95	15.54	18.72
Baro	in Hg	29.17	29.17	29.17	29.17	29.17	29.17
Baro	mmHg	740.98	740.93	740.95	740.97	741.01	740.96
Pvap_kPa	kPa	0.75	0.39	0.28	0.15	1.96	0.32
Pvap_inHg	inHg	0.22	0.12	0.08	0.04	0.58	0.09
AbsHumidity	grains/lb	33.34	17.34	12.27	6.48	88.22	13.96
SatPres	kPa	98.04	98.39	98.51	98.64	96.83	98.47
Hum Factor		0.84	0.79	0.77	0.76	1.07	0.78
F_fac		1.02	1.00	0.98	0.95	1.10	0.99
K_fac		1.03	1.02	1.00	0.98	1.08	1.01
Humidity	g/kg	4.76	2.48	1.75	0.93	12.60	1.99
H2		0.01	0.00	0.00	0.00	0.00	0.00
WetDry Factor		0.86	0.88	0.87	0.88	0.87	1.00



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Modal Emissions Concentrations

ModeNum		1	2	3	4	5	RMC
THC	ppmC1	52.40	28.27	24.30	48.30	7.99	12.08
CO	%	0.02	0.00	0.00	0.00	0.00	0.01
N2O	ppm	6.58	3.61	3.95	9.32	0.65	5.45
CH4	ppm	26.99	14.60	15.83	22.50	8.93	18.77
CO2	%	13.50	12.45	12.47	12.45	12.53	12.55
O2	%	0.03	1.66	1.65	1.67	1.56	1.73
CNOx	ppm	509.57	1922.22	1461.91	978.65	122.34	1250.41
AHC	ppm	0.07	0.00	0.00	0.00	0.00	0.04
C2H2	ppm	0.58	0.35	0.29	0.28	0.59	0.36
C2H4	ppm	2.27	1.40	0.65	0.67	0.16	1.21
C3H6	ppm	0.46	0.26	0.31	0.19	0.21	0.30
C4H6	ppm	1.54	0.62	0.62	0.65	0.36	1.02
ETOH	ppm	0.59	1.12	1.30	0.92	1.44	1.13
H2O	%	13.67	12.50	12.50	12.44	12.61	0.00
HCHO	ppm	0.35	0.55	0.39	0.43	0.10	0.45
HCN	ppm	0.71	0.53	0.51	0.48	0.39	0.55
HNCO	ppm	1.81	1.34	1.47	1.70	0.87	1.64
MECHO	ppm	0.03	0.00	0.00	0.00	0.00	0.01
NC5	ppm	1.25	1.07	0.99	3.23	0.46	1.63
NH3	ppm	17.57	0.11	0.07	0.33	0.88	10.63
NO	ppm	607.81	2311.33	1737.13	1152.17	102.72	1499.07
NO2	ppm	1.52	131.79	155.35	141.63	12.02	110.25
Soot	mg/m3	0.28	0.07	0.05	0.09	0.03	0.11
AFR	:1	14.00	15.32	15.30	15.29	15.17	15.34



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Measurement Accuracy (SAE paper 961804)

ModeNum	H2_XLS %	ModalHC_Dry %	ModalFTIR_H2O %	N2 %	Ar %	AFR :1	Tr_Eff -
1	0.007	0.006	13.668	83.905	0.970	14.676	0.998
2	0.000	0.003	12.500	83.777	0.968	16.058	0.916
3	0.000	0.003	12.500	83.687	0.967	16.027	0.916
4	0.000	0.006	12.442	83.442	0.965	16.017	0.915
5	0.000	0.001	12.608	83.434	0.964	15.878	0.921

ModeNum	ModalWHC %	ModalC1 %	ModalC8 %	ModalSUM_HC %	ModalT_Emiss %	ModalError %
1	3.360	-0.020	-0.002	-0.022	100.627	0.627
2	1.019	-1.195	-0.149	-1.344	99.812	0.188
3	0.590	-1.189	-0.149	-1.338	99.671	0.329
4	0.764	-1.199	-0.150	-1.349	99.342	0.658
5	0.073	-1.131	-0.141	-1.272	99.259	0.741

Power Run

Team 4

TeamNumber	4
TeamName	Madison
Model	SkiDoo
Engine	600ACE

Displacement cc	600.00
RatedSpeed	6229
RatedTorque	52.3

