



Team Results for Clean Snowmobile Challenge 2014 Team 1



2014 Clean Snowmobile Competition - Lab Emission Event Emission Data Sheet

Test Date : 2014/03/06 11:22:42
Team Name : Madison
Team Number : 1
Model : Skidoo MX2 Sport 6000ACE
Engine : Rotax
Displacement[cc] : 600.00
100% Speed : 7413
100% Torque : 56.8
No of Strokes : 4
Fuel : gasoline H/C: 1.99 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	:	41.4	19.1	12.2	5.4	0.0	13.0
HC_m g/hr	:	62.58	0.00	0.00	0.00	3.03	1.15
CO_m g/hr	:	4529.55	0.30	0.12	0.01	66.05	243.34
NOx_m g/hr	:	6.48	281.48	206.13	106.23	0.02	174.76
Soot_m mg/hr	:	28.29	1.02	0.98	0.79	1.18	3.31
N2O_m mg/hr	:	0.00	0.07	0.05	0.03	0.00	0.04
CO2_m g/hr	:	38999.34	20986.58	15965.59	15387.22	14224.35	20056.68
CH4_m g/hr	:	20.98	0.09	0.35	0.05	1.17	1.32
W_HC g/hr	:	7.51	0.00	0.00	0.00	0.15	1.15
W_CO g/hr	:	543.55	0.08	0.03	0.00	3.30	243.34
W_NOx g/hr	:	0.78	76.00	51.53	32.93	0.00	174.76
W_HCNOx g/hr	:	8.29	76.00	51.53	32.93	0.15	175.91
W_Soot mg/hr	:	3.39	0.27	0.24	0.25	0.06	3.31
W_N2O g/hr	:	0.00	0.02	0.01	0.01	0.00	0.04
W_CO2 g/hr	:	4679.92	5666.38	3991.40	4770.04	711.22	20056.68
W_CH4 g/hr	:	2.52	0.02	0.09	0.02	0.06	1.32

Total Weighted Power [kW] 14.868

Weighted Emissions

	HC	CO	NOx	HC+NOx
Total Mass [g/hr]	7.66	546.96	161.24	168.90
Specific Mass [g/kW-hr]	0.52	36.79	10.84	11.36
BSFC [g/kW-hr]	520.1			

Total Soot [mg/hr] 4.22 Specific Soot [mg/kW-hr] 0.28

Not Used for Competition

Total N2O [mg/hr]	0.04	Specific N2O [mg/kW-hr]	0.00
Total CO2 [g/hr]	19818.95	Specific CO2 [g/kW-hr]	1332.99
Total CH4 [g/hr]	2.70	Specific CH4 [g/kW-hr]	0.18
RMC BSFC [g/kW-hr]	502.22		

EMISSION TESTS:

	Value	Limit	Result
Power	44.07	<96.94 kW	PASS
Soot	0.28	<100 mg/kW-hr	PASS
CO	36.79	<275 g/kW-hr	PASS
HC + NOX	11.36	<90 g/kW-hr	PASS
E-Score	193.23	>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	12031
PtsInMode	points	1210	3050	2720	3470	1480	12031
Speed	rpm	7412.67	6301.31	5560.18	4818.31	2020.84	5505.64
Torque	Nm	53.29	28.95	21.01	10.79	0.00	22.48
Power	kW	41.36	19.10	12.23	5.45	0.00	12.96
BSFC	g/kw-hr	356.54	349.84	415.64	899.83	**	502.22
Fuel	g/hr	14748.22	6683.29	5084.27	4900.04	4565.80	6509.91
T_int	degC	40.29	43.78	41.57	36.88	33.83	39.90
RelHumid	%	15.45	14.45	14.34	14.21	14.01	14.70
Baro	in Hg	28.96	28.95	28.95	28.95	28.95	28.95
Baro	mmHg	735.53	735.40	735.28	735.46	735.23	735.43
Pvap_kPa	kPa	0.87	0.96	0.86	0.68	0.57	0.81
Pvap_inHg	inHg	0.26	0.28	0.25	0.20	0.17	0.24
AbsHumidity	grains/lb	38.96	43.04	38.45	30.31	25.66	36.36
SatPres	kPa	97.19	97.08	97.17	97.37	97.45	97.24
Hum Factor		0.86	0.87	0.85	0.83	0.81	0.85
F_fac		1.06	1.06	1.06	1.05	1.04	1.05
K_fac		1.05	1.06	1.06	1.05	1.04	1.05
Humidity	g/kg	5.57	6.15	5.49	4.33	3.67	5.19
H2		0.80	0.00	0.00	0.00	0.03	0.08
WetDry Factor		0.88	0.88	0.88	0.88	0.87	1.00



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Modal Emissions Concentrations

ModeNum		1	2	3	4	5	RMC
THC	ppmC1	598.82	0.00	0.00	0.00	89.30	22.14
CO	%	2.17	0.00	0.00	0.00	0.10	0.23
N2O	ppm	0.00	3.85	3.69	2.38	0.02	2.43
CH4	ppm	175.85	1.38	7.48	1.21	30.20	22.30
CO2	%	11.88	12.36	12.29	12.26	13.33	12.32
O2	%	0.00	1.52	1.63	1.66	0.00	1.50
CNOx	ppm	18.90	1586.23	1518.54	809.75	0.20	1026.77
AHC	ppm	28.08	0.00	0.00	0.00	2.74	3.69
C2H2	ppm	4.12	2.30	2.22	2.16	2.61	2.51
C2H4	ppm	50.74	0.13	0.29	0.07	2.89	6.05
C3H6	ppm	2.05	0.02	0.04	0.02	0.50	0.64
C4H6	ppm	28.29	0.24	0.19	0.16	3.14	3.50
ETOH	ppm	5.43	0.68	0.89	0.42	3.85	1.22
H2O	%	12.13	11.68	11.59	11.64	12.57	0.00
HCHO	ppm	0.50	0.38	0.38	0.31	0.26	0.41
HCN	ppm	1.83	1.03	0.98	0.94	1.14	1.15
HNCO	ppm	13.83	2.07	2.26	2.48	1.05	3.49
MECHO	ppm	0.22	0.02	0.00	0.00	0.01	0.06
NC5	ppm	0.00	0.51	0.50	0.54	1.55	0.55
NH3	ppm	821.66	0.17	0.16	0.29	56.85	99.27
NO	ppm	22.18	1783.16	1708.33	914.94	0.52	1172.97
NO2	ppm	0.04	41.34	71.08	64.92	0.00	40.79
Soot	mg/m3	0.16	0.01	0.01	0.01	0.02	0.04
AFR	:1	12.96	15.31	15.40	15.39	14.00	15.13



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Measurement Accuracy (SAE paper 961804)

ModeNum	H2_XLS %	ModalHC_Dry %	ModalFTIR_H2O %	N2 %	Ar %	AFR :1	Tr_Eff -
1	0.912	0.068	12.133	77.478	0.896	13.675	1.000
2	0.000	0.000	11.683	80.606	0.932	16.019	0.923
3	0.000	0.000	11.594	80.545	0.931	16.112	0.917
4	0.000	0.000	11.640	80.469	0.930	16.107	0.916
5	0.037	0.010	12.569	80.309	0.928	14.678	1.000

ModeNum	ModalWHC %	ModalC1 %	ModalC8 %	ModalSUM_HC %	ModalT_Emiss %	ModalError %
1	62.576	0.068	0.009	0.077	95.359	4.641
2	0.000	**	**	**	**	**
3	0.000	-1.148	-0.144	-1.292	96.140	3.860
4	0.000	**	**	**	**	**
5	3.034	0.010	0.001	0.011	96.645	3.355

Power Run

Team 1

TeamNumber	1
TeamName	Madison
Model	Skidoo MX2 Sport 6000ACE
Engine	Rotax

Displacement cc	600.00
RatedSpeed	7413
RatedTorque	56.8

