



Team Results for Clean Snowmobile Challenge 2015 Team 3



2015 Clean Snowmobile Competition - Lab Emission Event Emission Data Sheet

Test Date : 2015/03/04 13:53:31
Team Name : Idaho
Team Number : 3
Model : Skidoo
Engine : Rotax
Displacement[cc] : 797.00
100% Speed : 7172
100% Torque : 95.7
No of Strokes : 2
Fuel : GASOLINE H/C: 1.92 O/C: 0.03

ModeNum	:	1	2	3	4	5
Weighting	:	0.12	0.27	0.25	0.31	0.05
Power kW	:	65.4	31.1	17.8	9.2	0.0
HC_m g/hr	:	9823.31	46.24	12.14	25.78	9.54
CO_m g/hr	:	35047.48	294.68	126.21	58.63	5.57
NOx_m g/hr	:	42.48	187.91	38.05	4.78	0.29
Soot_m mg/hr	:	11883.72	541.19	805.36	21.09	48.75
N2O_m mg/hr	:	1.29	0.05	0.01	0.00	0.00
CO2_m g/hr	:	37954.98	27792.02	18910.41	11607.37	1861.68
CH4_m g/hr	:	157.39	9.82	4.24	6.76	0.99
W_HC g/hr	:	1178.80	12.49	3.03	7.99	0.48
W_CO g/hr	:	4205.70	79.56	31.55	18.18	0.28
W_NOx g/hr	:	5.10	50.74	9.51	1.48	0.01
W_HCNOx g/hr	:	1183.89	63.22	12.55	9.47	0.49
W_Soot mg/hr	:	1426.05	146.12	201.34	6.54	2.44
W_N2O g/hr	:	0.15	0.01	0.00	0.00	0.00
W_CO2 g/hr	:	4554.60	7503.85	4727.60	3598.28	93.08
W_CH4 g/hr	:	18.89	2.65	1.06	2.09	0.05

Total Weighted Power [kW] 23.540

Weighted Emissions

	HC	CO	NOx	HC+NOx
Total Mass [g/hr]	1202.79	4335.27	66.84	1269.63
Specific Mass [g/kW-hr]	51.10	184.17	2.84	53.94
BSFC [g/kW-hr]	361.3			

Total Soot [mg/hr] 1782.48 Specific Soot [mg/kW-hr] 75.72

Not Used for Competition

Total N2O [mg/hr]	0.17	Specific N2O [mg/kW-hr]	0.01
Total CO2 [g/hr]	20477.41	Specific CO2 [g/kW-hr]	869.91
Total CH4 [g/hr]	24.74	Specific CH4 [g/kW-hr]	1.05
RMC BSFC [g/kW-hr]			

EMISSION TESTS:

	Value	Limit	Result
Power	71.89	<96.94 kW	PASS
Soot	75.72	<100 mg/kW-hr	PASS
CO	184.17	<275 g/kW-hr	PASS
HC + NOX	53.94	<90 g/kW-hr	PASS
E-Score	128.00	>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	146	1200	1200	1200	1200
PtsInMode	points	400	1800	1800	1800	1800
Speed	rpm	6998.97	6095.16	5379.85	4661.11	1197.80
Torque	Nm	89.22	48.68	31.57	18.88	0.00
Power	kW	65.39	31.07	17.79	9.22	0.00
BSFC	g/kw-hr	601.17	289.76	341.22	405.12	**
Fuel	g/hr	39309.78	9002.58	6069.26	3734.32	602.43
T_int	degC	8.60	7.88	10.15	13.88	2.31
RelHumid	%	18.37	18.11	17.43	16.54	16.98
Baro	in Hg	28.87	28.86	28.86	28.86	28.86
Baro	mmHg	733.31	732.94	733.01	732.99	732.96
Pvap_kPa	kPa	0.19	0.18	0.20	0.23	0.12
Pvap_inHg	inHg	0.06	0.05	0.06	0.07	0.04
AbsHumidity	grains/lb	8.49	8.02	8.83	10.41	5.35
SatPres	kPa	97.58	97.54	97.53	97.49	97.60
Hum Factor		1.00	1.00	1.00	1.00	1.00
F_fac		0.98	0.97	0.98	0.99	0.96
K_fac		1.00	1.00	1.00	1.01	0.99
Humidity	g/kg	1.21	1.15	1.26	1.49	0.76
H2		4.08	0.06	0.04	0.03	0.01
WetDry Factor		0.89	0.88	0.87	0.86	0.92



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Modal Emissions Concentrations

ModeNum		1	2	3	4	5
THC	ppmC1	43312.09	631.42	259.22	922.96	1288.10
CO	%	7.70	0.20	0.13	0.10	0.04
N2O	ppm	18.01	2.01	0.95	0.33	0.72
CH4	ppm	605.05	116.97	78.97	210.91	116.09
CO2	%	5.30	12.03	12.80	13.17	7.97
O2	%	3.91	2.12	0.94	0.37	8.38
CNOx	ppm	56.80	778.09	246.45	51.84	12.05
AHC	ppm	1395.10	8.89	3.76	13.96	4.29
C2H2	ppm	447.50	7.80	7.81	5.28	1.45
C2H4	ppm	621.76	111.14	19.86	50.58	48.85
C3H6	ppm	439.78	12.49	4.54	29.06	31.89
C4H6	ppm	3.46	1.52	1.63	3.73	1.15
ETOH	ppm	1068.44	1.50	1.77	2.64	3.28
H2O	%	10.99	12.18	13.20	13.63	8.42
HCHO	ppm	214.79	41.73	9.17	20.51	46.08
HCN	ppm	15.27	3.94	2.28	0.64	0.31
HNCO	ppm	0.16	6.53	2.05	2.24	1.66
MECHO	ppm	267.93	7.20	0.47	5.84	14.22
NC5	ppm	2324.67	3.09	1.06	27.62	115.72
NH3	ppm	13.92	0.72	0.53	0.16	0.18
NO	ppm	52.60	741.91	241.17	50.57	3.72
NO2	ppm	5.35	36.20	5.34	1.30	8.32
Soot	mg/m3	33.09	4.20	9.80	0.43	3.80
AFR	:1	6.30	15.33	14.54	13.91	22.85



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Measurement Accuracy (SAE paper 961804)

ModeNum	H2_XLS %	ModalHC_Dry %	ModalFTIR_H2O %	N2 %	Ar %	AFR :1	Tr_Eff -
1	4.580	4.866	10.993	75.039	0.867	9.974	0.795
2	0.074	0.072	12.184	83.191	0.962	16.202	0.893
3	0.050	0.030	13.204	83.794	0.969	15.274	0.952
4	0.039	0.107	13.630	83.908	0.970	14.769	0.981
5	0.013	0.141	8.416	82.144	0.950	24.573	0.585

ModeNum	ModalWHC %	ModalC1 %	ModalC8 %	ModalSUM_HC %	ModalT_Emiss %	ModalError %
1	9823.308	0.881	0.110	0.991	100.479	0.479
2	46.241	-1.429	-0.179	-1.607	99.049	0.951
3	12.136	-0.681	-0.085	-0.766	100.061	0.061
4	25.784	-0.185	-0.023	-0.208	100.514	0.514
5	9.540	-3.549	-0.444	-3.992	97.009	2.991

Power Run

Team 3

TeamNumber	3
TeamName	Idaho
Model	Skidoo
Engine	Rotax

Displacement cc	797.00
RatedSpeed	7172
RatedTorque	95.7

