



# Team Results for Clean Snowmobile Challenge 2014 Team 3



## 2014 Clean Snowmobile Competition - Lab Emission Event Emission Data Sheet

Test Date : 2014/03/06 17:43:06  
Team Name : Idaho  
Team Number : 3  
Model : Ski-Doo MXZTNT  
Engine : Rotax  
Displacement[cc] : 797.00  
100% Speed : 6968  
100% Torque : 96.3  
No of Strokes : 2  
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	:	64.9	30.5	17.4	8.7	0.0	20.2
HC_m g/hr	:	3244.00	11.72	36.07	26.27	18.78	61.66
CO_m g/hr	:	31259.56	250.65	84.85	10.87	14.42	1486.87
NOx_m g/hr	:	21.13	311.42	68.56	5.78	4.39	110.22
Soot_m mg/hr	:	2353.01	335.48	203.55	7.10	799.89	445.98
N2O_m mg/hr	:	0.00	0.08	0.01	0.01	0.01	0.03
CO2_m g/hr	:	41536.09	27017.78	16691.34	12246.80	10655.59	24967.19
CH4_m g/hr	:	441.06	2.07	3.75	2.01	2.12	22.24
W_HC g/hr	:	389.28	3.16	9.02	8.14	0.94	61.66
W_CO g/hr	:	3751.15	67.68	21.21	3.37	0.72	1486.87
W_NOx g/hr	:	2.54	84.08	17.14	1.79	0.22	110.22
W_HCNOx g/hr	:	391.82	87.25	26.16	9.93	1.16	171.88
W_Soot mg/hr	:	282.36	90.58	50.89	2.20	39.99	445.98
W_N2O g/hr	:	0.00	0.02	0.00	0.00	0.00	0.03
W_CO2 g/hr	:	4984.33	7294.80	4172.83	3796.51	532.78	24967.19
W_CH4 g/hr	:	52.93	0.56	0.94	0.62	0.11	22.24

Total Weighted Power [kW] 23.068

### Weighted Emissions

	HC	CO	NOx	HC+NOx
Total Mass [g/hr]	410.54	3844.13	105.77	516.31
Specific Mass [g/kW-hr]	17.80	166.64	4.59	22.38
BSFC [g/kW-hr]	355.0			

Total Soot [mg/hr] 466.03 Specific Soot [mg/kW-hr] 20.20

### Not Used for Competition

Total N2O [mg/hr]	0.03	Specific N2O [mg/kW-hr]	0.00
Total CO2 [g/hr]	20781.25	Specific CO2 [g/kW-hr]	900.86
Total CH4 [g/hr]	55.15	Specific CH4 [g/kW-hr]	2.39
RMC BSFC [g/kW-hr]	433.23		

### EMISSION TESTS:

	Value	Limit	Result
Power	70.29	<96.94 kW	PASS
Soot	20.20	<100 mg/kW-hr	PASS
CO	166.64	<275 g/kW-hr	PASS
HC + NOX	22.38	<90 g/kW-hr	PASS
E-Score	153.42	>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	6966.17	5923.57	5225.90	4529.32	1199.08	5163.34
Torque	Nm	89.01	49.20	31.82	18.24	0.00	37.38
Power	kW	64.94	30.52	17.41	8.65	0.00	20.21
BSFC	g/kw-hr	494.52	286.41	309.76	454.33	**	433.23
Fuel	g/hr	32111.93	8740.89	5393.85	3931.68	3419.25	8756.37
T_int	degC	18.33	19.54	15.79	14.92	14.06	17.14
RelHumid	%	17.04	15.12	15.26	16.01	14.96	16.18
Baro	in Hg	28.71	28.71	28.71	28.71	28.70	28.71
Baro	mmHg	729.30	729.16	729.13	729.22	729.11	729.21
Pvap_kPa	kPa	0.31	0.29	0.24	0.24	0.21	0.27
Pvap_inHg	inHg	0.09	0.09	0.07	0.07	0.06	0.08
AbsHumidity	grains/lb	13.86	13.15	10.77	10.75	9.56	12.31
SatPres	kPa	96.92	96.92	96.97	96.98	96.99	96.94
Hum Factor		1.00	1.00	1.00	1.00	1.00	1.00
F_fac		1.01	1.01	1.00	1.00	0.99	1.00
K_fac		1.02	1.03	1.02	1.02	1.02	1.02
Humidity	g/kg	1.98	1.88	1.54	1.54	1.37	1.76
H2		4.27	0.05	0.03	0.01	0.00	0.34
WetDry Factor		0.87	0.89	0.90	0.89	0.95	1.00



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## Modal Emissions Concentrations

ModeNum		1	2	3	4	5	RMC
THC	ppmC1	17080.65	151.07	728.51	758.44	320.75	804.40
CO	%	8.24	0.16	0.09	0.02	0.01	0.97
N2O	ppm	0.00	3.22	0.81	0.75	0.58	1.13
CH4	ppm	2034.20	23.33	66.28	50.90	31.66	254.17
CO2	%	6.96	11.09	10.74	11.26	5.80	10.37
O2	%	0.27	3.19	3.85	3.15	11.85	3.77
CNOx	ppm	33.90	1223.29	421.84	50.83	22.82	438.06
AHC	ppm	656.67	0.03	14.37	22.42	5.80	87.78
C2H2	ppm	158.44	8.58	4.82	2.52	1.81	23.03
C2H4	ppm	2072.07	39.25	96.91	26.76	10.35	263.69
C3H6	ppm	529.80	0.10	25.77	13.21	6.07	75.66
C4H6	ppm	110.45	0.08	1.71	0.25	0.18	12.94
ETOH	ppm	0.14	3.22	1.03	0.32	1.02	1.32
H2O	%	13.22	10.78	10.31	10.77	5.49	0.00
HCHO	ppm	144.86	11.22	66.78	22.18	17.48	52.10
HCN	ppm	9.51	4.73	1.81	1.12	0.56	2.92
HNCO	ppm	4.15	5.05	5.15	1.43	0.94	4.44
MECHO	ppm	24.93	0.28	11.54	4.54	3.85	9.89
NC5	ppm	7.47	2.16	7.23	43.54	16.51	17.92
NH3	ppm	85.37	0.45	0.01	0.03	0.01	9.23
NO	ppm	34.16	1193.80	372.55	45.96	6.09	413.81
NO2	ppm	0.01	29.49	49.29	4.88	16.73	24.27
Soot	mg/m3	8.07	2.50	2.38	0.12	7.89	3.34
AFR	:1	7.85	16.67	17.08	16.39	32.91	16.38



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Measurement Accuracy (SAE paper 961804)

ModeNum	H2_XLS %	ModalHC_Dry %	ModalFTIR_H2O %	N2 %	Ar %	AFR :1	Tr_Eff -
1	4.922	1.968	13.221	73.270	0.847	9.897	0.986
2	0.061	0.017	10.782	80.208	0.927	17.463	0.839
3	0.032	0.081	10.310	79.947	0.924	18.085	0.806
4	0.006	0.085	10.769	80.140	0.926	17.357	0.842
5	0.004	0.034	5.486	79.678	0.921	34.611	0.419

ModeNum	ModalWHC %	ModalC1 %	ModalC8 %	ModalSUM_HC %	ModalT_Emiss %	ModalError %
1	3244.005	1.691	0.211	1.902	98.774	1.226
2	11.716	-2.012	-0.252	-2.264	95.261	4.739
3	36.070	-2.270	-0.284	-2.554	94.756	5.244
4	26.267	-1.931	-0.241	-2.173	95.069	4.931
5	18.780	-3.553	-0.444	-3.997	95.290	4.710

# Power Run

Team 3

TeamNumber	3
TeamName	Idaho
Model	Ski-Doo MXZTNT
Engine	Rotax

Displacement cc	797.00
RatedSpeed	6968
RatedTorque	96.3

