

Team Results for Clean Snowmobile Challenge 2012

2012 Clean Snowmobile Competition - Lab Emission Event Emission Data Sheet

Test Date : 2012/03/09 16:17:32
 Team Name : Alaska Fairbanks
 Team Number : 8
 Model : Yamaha
 Engine : Phazer
 Displacement [cc] : 499cc
 100% Speed [rpm] : 9898
 100% Torque [Nm] : 33.9
 No of Strokes : 4
 Fuel : Gasoline H/C: 2.09 O/C: 0.13

ModeNum	:	1	2	3	4	5
Weighting	:	0.12	0.27	0.25	0.31	0.05
Power kW	:	35.2	14.8	8.8	4.2	0.0
HC_m g/hr	:	108.90	3.89	4.37	5.62	2.18
CO_m g/hr	:	17542.76	2.39	784.04	1023.29	111.05
NOx_m g/hr	:	3.85	230.88	0.02	0.02	0.00
Soot_m mg/hr	:	73.83	24.84	1.10	0.49	0.12
N2O_m mg/hr	:	0.05	0.05	0.00	0.00	0.00
CO2_m g/hr	:	23901.30	17157.06	12281.07	9672.06	5539.12
CH4_m g/hr	:	80.92	1.47	2.94	4.52	1.80
W_HC g/hr	:	13.07	1.05	1.09	1.74	0.11
W_CO g/hr	:	2105.13	0.64	196.01	317.22	5.55
W_NOx g/hr	:	0.46	62.34	0.00	0.01	0.00
W_HCNOx g/hr	:	13.53	63.39	1.10	1.75	0.11
W_Soot mg/hr	:	8.86	6.71	0.28	0.15	0.01
W_N2O g/hr	:	0.01	0.01	0.00	0.00	0.00
W_CO2 g/hr	:	2868.16	4632.41	3070.27	2998.34	276.96
W_CH4 g/hr	:	9.71	0.40	0.73	1.40	0.09

Total Weighted Power [kW] 11.726

Weighted Emissions

	HC	CO	NOx	HC+NOx
Total Mass [g/hr]	17.06	2624.56	62.81	79.87
Specific Mass [g/kW-hr]	1.46	223.83	5.36	6.81
BSFC [g/kW-hr]	545.6			

Total Soot [mg/hr] 16.00 Specific Soot [mg/kW-hr] 1.36

Not Used for Competition

Total N2O [mg/hr]	0.02	Specific N2O [mg/kW-hr]	0.00
Total CO2 [g/hr]	13846.13	Specific CO2 [g/kW-hr]	1180.84
Total CH4 [g/hr]	12.33	Specific CH4 [g/kW-hr]	1.05

EMISSION TESTS:

	Value	Limit	Result
Power	35.10	<96.94 kW	PASS
Soot	1.36	<100 mg/kW-hr	PASS
CO	223.83	<275 g/kW-hr	PASS
HC + NOX	6.81	<90 g/kW-hr	PASS
E-Score	149.50	>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	350	1191	1194	1195	1195
PtsInMode	points	435	1195	1194	1195	1195
Speed	rpm	9879.09	8397.13	7360.83	6406.80	3323.70
Torque	Nm	34.07	16.80	11.37	6.33	0.00
Power	kW	35.25	14.77	8.76	4.24	0.00
BSFC	g/kw-hr	471.43	372.80	494.99	853.71	**
Fuel	g/hr	16615.68	5508.02	4338.51	3623.51	1834.75
T_int	degC	13.75	14.41	14.98	14.26	14.62
RelHumid	%	22.21	19.47	17.65	18.36	17.73
Baro	in Hg	29.32	29.32	29.31	29.32	29.31
Baro	mmHg	744.73	744.67	744.56	744.64	744.53
Pvap_kPa	kPa	0.31	0.28	0.26	0.26	0.26
Pvap_inHg	inHg	0.09	0.08	0.08	0.08	0.08
AbsHumidity	grains/lb	13.67	12.44	11.65	11.63	11.46
SatPres	kPa	98.98	99.00	99.00	99.01	99.00
Hum Factor		0.78	0.77	0.77	0.77	0.77
F_fac		0.97	0.98	0.98	0.97	0.98
K_fac		1.00	1.00	1.00	1.00	1.00
Humidity	g/kg	1.95	1.78	1.66	1.66	1.64
H2		4.46	0.00	0.46	0.77	0.15
WetDry Factor		0.87	0.87	0.87	0.87	0.86

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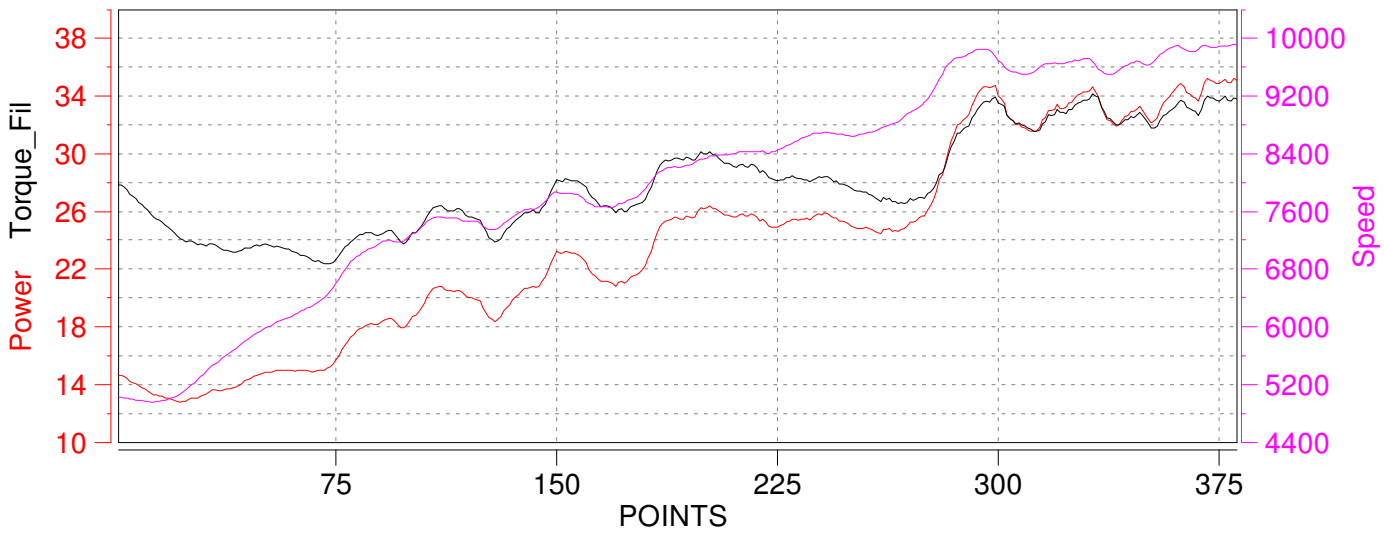
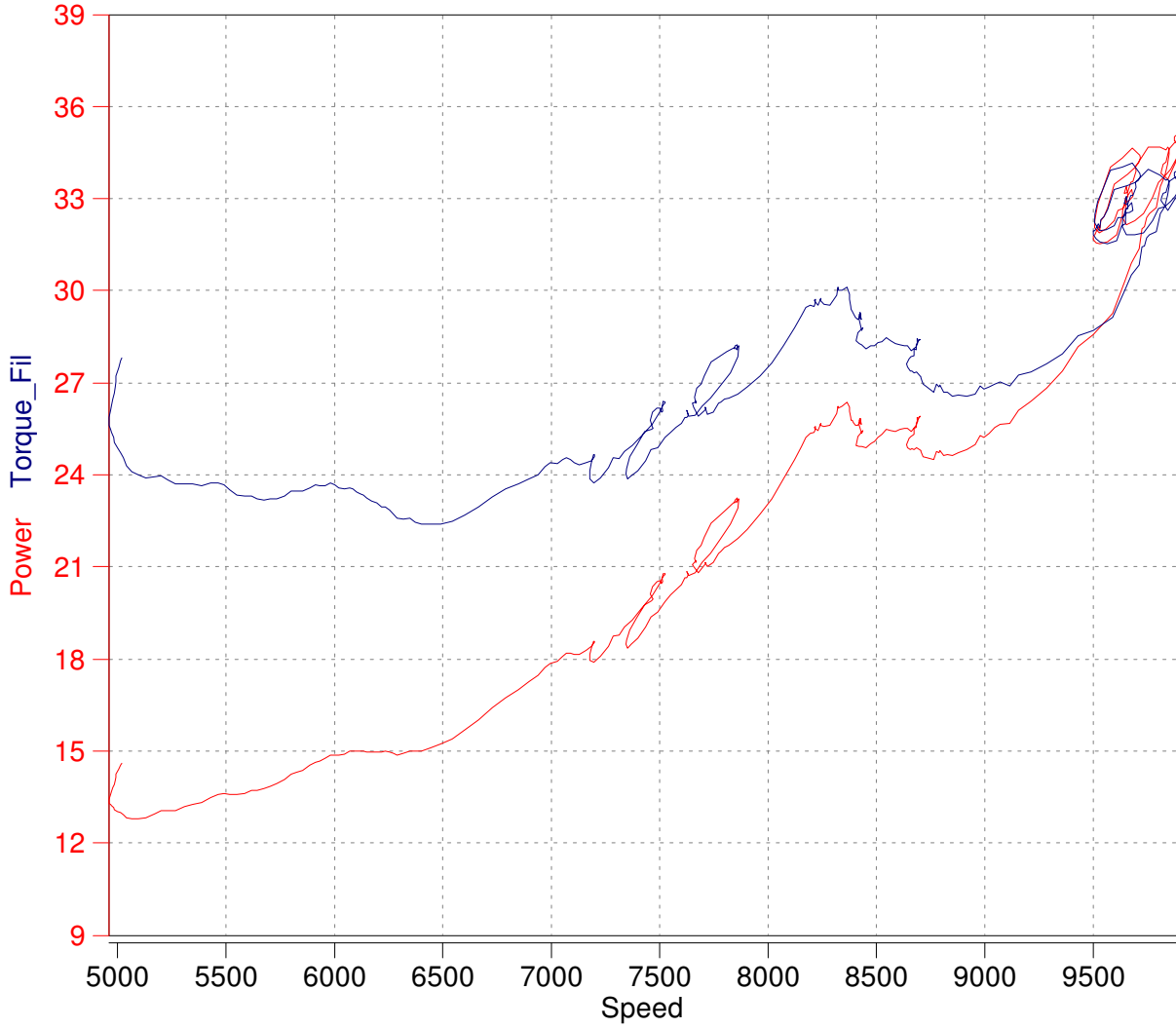
Modal Emissions Concentrations

ModeNum		1	2	3	4	5
THC	ppmC1	1014.57	85.15	138.69	218.86	159.00
CO	%	8.24	0.00	1.25	2.01	0.41
N2O	ppm	1.45	3.83	0.07	0.15	0.04
CH4	ppm	665.12	28.30	82.12	155.34	116.07
CO2	%	7.14	12.05	12.49	12.08	12.96
O2	%	0.00	1.84	0.04	0.04	0.05
CNOx	ppm	11.02	1551.08	0.15	0.23	0.08
AHC	ppm	131.21	2.10	2.78	4.41	1.57
C2H2	ppm	16.28	0.41	0.35	0.22	0.16
C2H4	ppm	145.54	5.91	1.73	2.49	4.65
C3H6	ppm	34.99	0.67	0.02	0.18	0.01
C4H6	ppm	8.21	0.07	9.84	4.09	2.72
ETOH	ppm	38.08	2.26	10.95	7.74	5.66
H2O	%	12.90	12.86	13.22	12.64	13.59
HCHO	ppm	3.78	2.24	0.14	0.18	0.13
HCN	ppm	6.80	0.15	0.08	0.26	0.47
HNCO	ppm	5.12	3.86	8.77	4.02	2.48
MECHO	ppm	22.43	0.86	0.39	0.60	0.44
NC5	ppm	87.21	1.62	2.62	1.33	1.51
NH3	ppm	180.39	0.45	333.59	141.12	52.81
NO	ppm	13.86	1993.46	0.16	0.19	0.21
NO2	ppm	0.36	13.67	0.08	0.14	0.01
Soot	mg/m3	0.45	0.31	0.02	0.01	0.01
AFR	:1	8.93	13.76	11.92	11.61	12.26

Power Run

TeamNumber	8
TeamName	Alaska Fairbanks
Model	Yamaha
Engine	Phazer

Displacement cc	499cc
RatedSpeed	9898
RatedTorque	33.9



Measurement Accuracy (SAE paper 961804)

H2_XLS %	ModalHC_Dry %	ModalFTIR_H2O %	N2 %	Ar %	AFR :1	Tr_Eff -
5.119	0.116	12.902	72.096	0.833	10.920	1.000
0.001	0.010	12.858	83.626	0.967	16.431	0.907
0.535	0.016	13.224	80.981	0.936	14.298	0.998
0.884	0.025	12.642	79.417	0.918	13.954	0.998
0.168	0.018	13.586	82.185	0.950	14.701	0.997

ModalWHC %	ModalC1 %	ModalC8 %	ModalSUM_HC %	ModalT_Emiss %	ModalError %
108.896	0.116	0.015	0.131	95.838	4.162
3.889	-1.274	-0.159	-1.434	99.328	0.672
4.374	-0.015	-0.002	-0.017	98.314	1.686
5.620	-0.011	-0.001	-0.012	97.384	2.616
2.179	-0.025	-0.003	-0.028	98.811	1.189