



Team Results for Clean Snowmobile Challenge 2013 Team 11



2012 Clean Snowmobile Competition - Lab Emission Event Emission Data Sheet

Test Date : 2013/03/08 18:24:45
Team Name : Buffalo
Team Number : 11
Model : Daihatsu
Engine : DM950DTH
Displacement[cc] : 952.00
100% Speed : 3171
100% Torque : 110.1
No of Strokes : 4
Fuel : DIESEL H/C: 1.90 O/C: 0.00

ModeNum	:	1	2	3	4	5
Weighting	:	0.12	0.27	0.25	0.31	0.05
Power kW	:	34.5	15.9	9.0	4.6	0.0
HC_m g/hr	:	0.16	0.02	0.02	0.05	0.20
CO_m g/hr	:	0.26	0.03	0.00	0.00	0.10
NOx_m g/hr	:	201.27	76.91	37.29	21.88	10.72
Soot_m mg/hr	:	2310.38	620.10	558.70	412.95	197.55
N2O_m mg/hr	:	0.03	0.02	0.01	0.02	0.01
CO2_m g/hr	:	29753.04	12863.10	7627.79	4622.98	1517.18
CH4_m g/hr	:	0.02	0.02	0.03	0.05	0.05
W_HC g/hr	:	0.02	0.01	0.00	0.01	0.01
W_CO g/hr	:	0.03	0.01	0.00	0.00	0.00
W_NOx g/hr	:	24.15	20.77	9.32	6.78	0.54
W_HCNOx g/hr	:	24.17	20.77	9.33	6.80	0.55
W_Soot mg/hr	:	277.25	167.43	139.68	128.02	9.88
W_N2O g/hr	:	0.00	0.00	0.00	0.00	0.00
W_CO2 g/hr	:	3570.36	3473.04	1906.95	1433.12	75.86
W_CH4 g/hr	:	0.00	0.00	0.01	0.02	0.00

Total Weighted Power [kW] 12.102

Weighted Emissions

	HC	CO	NOx	HC+NOx
Total Mass [g/hr]	0.05	0.05	61.56	61.61
Specific Mass [g/kW-hr]	0.00	0.00	5.09	5.09
BSFC [g/kW-hr]	268.1			

Total Soot [mg/hr] 722.24 Specific Soot [mg/kW-hr] 59.68

Not Used for Competition

Total N2O [mg/hr]	0.02	Specific N2O [mg/kW-hr]	0.00
Total CO2 [g/hr]	10459.33	Specific CO2 [g/kW-hr]	864.28
Total CH4 [g/hr]	0.03	Specific CH4 [g/kW-hr]	0.00

EMISSION TESTS:

	Value	Limit	Result
Power	36.57	<96.94 kW	PASS
Soot	59.68	<100 mg/kW-hr	PASS
CO	0.00	<275 g/kW-hr	PASS
HC + NOX	5.09	<90 g/kW-hr	PASS
E-Score	206.60	>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	600	1200	1200	1200	1200
PtsInMode	points	1200	1800	1800	1800	1800
Speed	rpm	3177.31	2694.68	2377.67	2061.63	1129.30
Torque	Nm	103.58	56.46	36.08	21.19	0.00
Power	kW	34.46	15.93	8.98	4.58	0.00
BSFC	g/kw-hr	273.22	255.50	268.73	319.80	**
Fuel	g/hr	9416.48	4070.93	2414.05	1463.12	480.41
T_int	degC	18.78	18.92	18.41	18.54	19.00
RelHumid	%	20.67	19.53	19.62	19.23	18.82
Baro	in Hg	29.11	29.12	29.11	29.11	29.11
Baro	mmHg	739.52	739.52	739.51	739.46	739.46
Pvap_kPa	kPa	0.38	0.36	0.36	0.35	0.35
Pvap_inHg	inHg	0.11	0.11	0.11	0.10	0.10
AbsHumidity	grains/lb	17.01	16.19	15.81	15.62	15.68
SatPres	kPa	98.21	98.23	98.24	98.23	98.23
Hum Factor		0.79	0.78	0.78	0.78	0.78
F_fac		0.99	0.99	0.99	0.99	0.99
K_fac		1.01	1.01	1.01	1.01	1.01
Humidity	g/kg	2.43	2.31	2.26	2.23	2.24
H2		0.00	0.00	0.00	0.00	0.00
WetDry Factor		0.92	0.93	0.94	0.95	0.97



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Modal Emissions Concentrations

ModeNum		1	2	3	4	5
THC	ppmC1	1.56	0.35	0.48	1.55	12.82
CO	%	0.00	0.00	0.00	0.00	0.00
N2O	ppm	1.04	0.92	0.98	1.66	1.57
CH4	ppm	0.15	0.26	0.74	1.48	3.01
CO2	%	9.29	7.69	6.30	4.78	3.03
O2	%	6.68	9.02	11.16	13.50	16.16
CNOx	ppm	601.12	439.66	294.70	216.19	204.79
AHC	ppm	0.00	0.00	0.00	0.00	0.09
C2H2	ppm	1.29	1.05	1.04	1.18	1.55
C2H4	ppm	0.16	0.16	0.15	0.20	3.14
C3H6	ppm	0.11	0.08	0.10	0.12	0.15
C4H6	ppm	0.16	0.09	0.01	0.06	0.33
ETOH	ppm	1.00	1.03	1.09	0.97	1.28
H2O	%	8.44	7.29	5.93	4.52	2.94
HCHO	ppm	0.22	0.06	0.09	0.11	1.43
HCN	ppm	0.61	0.45	0.40	0.32	0.16
HNCO	ppm	3.36	2.13	1.42	1.12	0.98
MECHO	ppm	0.00	0.00	0.00	0.01	1.45
NC5	ppm	0.71	0.77	0.83	0.79	0.83
NH3	ppm	0.01	0.01	0.03	0.01	0.01
NO	ppm	580.04	191.14	66.13	103.13	230.97
NO2	ppm	185.05	370.00	310.55	173.40	31.00
Soot	mg/m3	12.96	6.72	8.38	7.77	7.22
AFR	:1	21.81	26.33	32.25	42.73	67.51



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Measurement Accuracy (SAE paper 961804)

	H2_XLS %	ModalHC_Dry %	ModalFTIR_H2O %	N2 %	Ar %	AFR :1	Tr_Eff -
1	0.000	0.000	8.444	80.737	0.933	21.773	0.667
2	0.000	0.000	7.285	80.705	0.933	26.274	0.554
3	0.000	0.000	5.925	80.136	0.926	32.180	0.452
4	0.000	0.000	4.517	79.672	0.921	42.644	0.342
5	0.000	0.001	2.942	79.083	0.914	67.424	0.219

ModalWHC %	ModalC1 %	ModalC8 %	ModalSUM_HC %	ModalT_Emiss %	ModalError %
0.158	-3.375	-0.422	-3.796	95.397	4.603
0.019	-3.698	-0.462	-4.160	95.560	4.440
0.019	-3.670	-0.459	-4.128	95.533	4.467
0.048	-3.292	-0.411	-3.703	96.063	3.937
0.203	-2.439	-0.305	-2.744	97.055	2.945

Power Run

Team 11

TeamNumber	11
TeamName	Buffalo
Model	Daihatsu
Engine	DM950DTH

Displacement cc	952.00
RatedSpeed	3171
RatedTorque	110.1

