



Team Results for Clean Snowmobile Challenge 2017 Team 111



2017 Clean Snowmobile Competition - Lab Emission Event Emission Data Sheet

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Test Date       : 2017/03/07 13:04:31
Team Name      : Plattville
Team Number    : 111
Model         : Kubota
Engine        : Kubota
Displacement[cc] : 898.00
100% Speed    : 3572
100% Torque   : 46.2
No of Strokes : 4
Fuel          : DIESEL
H/C: 1.79     O/C: 0.03
  
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ModeNum	:	1	2	3	4	5
Weighting	:	0.12	0.27	0.25	0.31	0.05
Power kW	:	17.2	8.0	6.9	1.8	0.0
HC_m g/hr	:	0.00	0.05	0.22	1.02	0.51
CO_m g/hr	:	2.23	0.28	0.94	11.38	6.17
NOx_m g/hr	:	43.88	40.27	36.16	24.12	19.06
Soot_m mg/hr	:	6987.80	355.91	401.12	231.87	86.52
N2O_m mg/hr	:	0.02	0.02	0.02	0.01	0.01
CO2_m g/hr	:	17205.36	7699.89	6607.37	3261.62	1831.93
CH4_m g/hr	:	0.02	0.04	0.03	0.06	0.04
W_HC g/hr	:	0.00	0.01	0.05	0.32	0.03
W_CO g/hr	:	0.27	0.08	0.24	3.53	0.31
W_NOx g/hr	:	5.27	10.87	9.04	7.48	0.95
W_HCNOx g/hr	:	5.27	10.89	9.10	7.79	0.98
W_Soot mg/hr	:	838.54	96.09	100.28	71.88	4.33
W_N2O g/hr	:	0.00	0.00	0.01	0.00	0.00
W_CO2 g/hr	:	2064.64	2078.97	1651.84	1011.10	91.60
W_CH4 g/hr	:	0.00	0.01	0.01	0.02	0.00

Total Weighted Power [kW] 6.478

Weighted Emissions

	HC	CO	NOx	HC+NOx
Total Mass [g/hr]	0.41	4.42	33.61	34.02
Specific Mass [g/kW-hr]	0.06	0.68	5.19	5.25
BSFC [g/kW-hr]	375.7			

Total Soot [mg/hr] 1111.12 Specific Soot [mg/kW-hr] 171.53

Not Used for Competition

Total N2O [mg/hr]	0.02	Specific N2O [mg/kW-hr]	0.00
Total CO2 [g/hr]	6898.15	Specific CO2 [g/kW-hr]	1064.93
Total CH4 [g/hr]	0.04	Specific CH4 [g/kW-hr]	0.01
RMC BSFC [g/kW-hr]	0		

EMISSION TESTS:

	Value	Limit	Result
Power	17.27	<96.94 kW	PASS
Soot	171.53	<50 mg/kW-hr	FAIL
CO	0.68	<275 g/kW-hr	PASS
HC + NOX	5.25	<90 g/kW-hr	PASS
E-Score	206.33	>175	PASS
Valid Data for All 5 Modes			PASS
RMC			PASS
LAB EMISSION TEST			FAIL



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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	1210	3050	2720	3470	1480
Speed	rpm	3572.21	3032.74	2712.19	2342.33	1684.14
Torque	Nm	45.92	25.06	24.20	7.22	0.00
Power	kW	17.18	7.96	6.87	1.77	0.00
BSFC	g/kw-hr	314.59	303.87	301.95	582.04	**
Fuel	g/hr	5404.06	2418.17	2075.58	1030.88	578.83
T_int	degC	20.50	20.54	19.60	21.00	20.46
RelHumid	%	19.96	19.47	19.30	18.64	19.98
Baro	in Hg	28.23	28.22	28.22	28.23	28.22
Baro	mmHg	716.93	716.82	716.85	717.02	716.71
Pvap_kPa	kPa	0.41	0.40	0.37	0.39	0.41
Pvap_inHg	inHg	0.12	0.12	0.11	0.12	0.12
AbsHumidity	grains/lb	18.64	18.22	17.16	17.88	18.62
SatPres	kPa	95.18	95.17	95.20	95.20	95.15
Hum Factor		0.79	0.79	0.79	0.79	0.79
F_fac		1.03	1.03	1.03	1.03	1.03
K_fac		1.05	1.05	1.04	1.05	1.05
Humidity	g/kg	2.66	2.60	2.45	2.55	2.66
H2		0.00	0.00	0.00	0.00	0.00
WetDry Factor		0.89	0.94	0.94	0.96	0.97



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Modal Emissions Concentrations

ModeNum		1	2	3	4	5
THC	ppmC1	0.00	1.38	6.03	29.82	20.17
CO	%	0.00	0.00	0.00	0.02	0.01
N2O	ppm	1.03	1.31	2.08	1.28	0.95
CH4	ppm	0.45	0.79	0.82	1.61	1.24
CO2	%	11.60	6.25	5.74	2.99	2.26
O2	%	2.79	10.90	11.90	15.39	16.37
CNOx	ppm	283.04	312.89	300.75	211.58	225.28
AHC	ppm	0.80	1.30	1.48	1.76	1.67
C2H2	ppm	0.71	0.42	0.52	0.59	0.36
C2H4	ppm	0.46	0.58	1.03	3.93	2.82
C3H6	ppm	1.22	0.93	0.92	1.42	1.37
C4H6	ppm	0.50	0.58	0.54	0.58	0.59
ETOH	ppm	0.00	0.00	0.00	0.00	0.00
H2O	%	11.26	6.11	5.70	3.54	2.85
HCHO	ppm	0.32	1.18	2.08	4.19	2.86
HCN	ppm	0.22	0.29	0.31	0.22	0.19
HNCO	ppm	1.91	1.96	2.18	2.28	2.02
MECHO	ppm	0.19	0.17	0.58	1.50	0.79
NC5	ppm	0.00	0.00	0.00	0.00	0.00
NH3	ppm	0.14	0.08	0.08	0.10	0.08
NO	ppm	357.79	359.86	361.54	251.82	263.17
NO2	ppm	0.39	36.43	21.02	16.51	21.87
Soot	mg/m3	86.93	5.38	6.43	4.07	2.06
AFR	:1	16.20	30.73	33.89	63.15	83.22



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Measurement Accuracy (SAE paper 961804)

ModeNum	H2_XLS %	ModalHC_Dry %	ModalFTIR_H2O %	N2 %	Ar %	AFR :1	Tr_Eff -
1	0.001	0.000	11.257	81.350	0.940	16.876	0.859
2	0.000	0.000	6.113	79.418	0.918	31.887	0.465
3	0.000	0.001	5.696	80.258	0.928	35.154	0.417
4	0.005	0.003	3.541	77.553	0.896	65.480	0.256
5	0.004	0.002	2.848	76.740	0.887	86.223	0.211

ModeNum	ModalWHC %	ModalC1 %	ModalC8 %	ModalSUM_HC %	ModalT_Emiss %	ModalError %
1	0.000	**	**	**	**	**
2	0.053	-3.566	-0.446	-4.012	94.638	5.362
3	0.218	-3.549	-0.444	-3.993	95.941	4.059
4	1.021	-2.319	-0.290	-2.609	94.945	5.055
5	0.513	-1.847	-0.231	-2.078	94.778	5.222

Power Run

Team 111

TeamNumber	111
TeamName	Plattville
Model	Kubota
Engine	Kubota

Displacement cc	898.00
RatedSpeed	3572
RatedTorque	46.2

