



Team Results for Clean Snowmobile Challenge 2017 Team 102



2017 Clean Snowmobile Competition - Lab Emission Event Emission Data Sheet

Test Date : 2017/03/07 10:15:44
Team Name : Buffalo
Team Number : 102
Model : Mercedes
Engine : Mercedes
Displacement[cc] : 799.00
100% Speed : 3652
100% Torque : 82.1
No of Strokes : 4
Fuel : DIESEL H/C: 1.79 O/C: 0.03

ModeNum	:	1	2	3	4	5
Weighting	:	0.12	0.27	0.25	0.31	0.05
Power kW	:	29.9	13.6	7.8	3.9	0.0
HC_m g/hr	:	0.25	0.00	0.00	0.00	0.12
CO_m g/hr	:	1.46	0.02	0.00	0.00	0.00
NOx_m g/hr	:	204.07	83.71	39.23	14.77	3.81
Soot_m mg/hr	:	13199.38	1751.64	908.70	507.17	78.06
N2O_m mg/hr	:	0.07	0.03	0.02	0.03	0.03
CO2_m g/hr	:	25781.82	12434.11	7823.82	5055.96	2069.34
CH4_m g/hr	:	0.25	0.08	0.12	0.19	0.21
W_HC g/hr	:	0.03	0.00	0.00	0.00	0.01
W_CO g/hr	:	0.18	0.00	0.00	0.00	0.00
W_NOx g/hr	:	24.49	22.60	9.81	4.58	0.19
W_HCNOx g/hr	:	24.52	22.60	9.81	4.58	0.20
W_Soot mg/hr	:	1583.93	472.94	227.17	157.22	3.90
W_N2O g/hr	:	0.01	0.01	0.01	0.01	0.00
W_CO2 g/hr	:	3093.82	3357.21	1955.95	1567.35	103.47
W_CH4 g/hr	:	0.03	0.02	0.03	0.06	0.01

Total Weighted Power [kW] 10.413

Weighted Emissions

	HC	CO	NOx	HC+NOx
Total Mass [g/hr]	0.04	0.18	61.67	61.70
Specific Mass [g/kW-hr]	0.00	0.02	5.92	5.93
BSFC [g/kW-hr]	316.2			

Total Soot [mg/hr] 2445.17 Specific Soot [mg/kW-hr] 234.82

Not Used for Competition

Total N2O [mg/hr]	0.03	Specific N2O [mg/kW-hr]	0.00
Total CO2 [g/hr]	10077.80	Specific CO2 [g/kW-hr]	967.81
Total CH4 [g/hr]	0.15	Specific CH4 [g/kW-hr]	0.01
RMC BSFC [g/kW-hr]	0		

EMISSION TESTS:

	Value	Limit	Result
Power	31.40	<96.94 kW	PASS
Soot	234.82	<50 mg/kW-hr	FAIL
CO	0.02	<275 g/kW-hr	PASS
HC + NOX	5.93	<90 g/kW-hr	PASS
E-Score	206.05	>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	3651.34	3103.89	2738.36	2370.13	1274.17
Torque	Nm	78.28	41.88	27.18	15.56	0.00
Power	kW	29.93	13.61	7.79	3.86	0.00
BSFC	g/kw-hr	270.52	286.85	315.19	411.14	**
Fuel	g/hr	8097.18	3904.66	2456.90	1587.71	649.95
T_int	degC	23.08	14.69	15.91	14.06	16.09
RelHumid	%	31.74	26.98	26.15	25.67	25.86
Baro	in Hg	28.15	28.18	28.19	28.18	28.19
Baro	mmHg	715.00	715.81	715.99	715.70	716.15
Pvap_kPa	kPa	0.74	0.40	0.41	0.37	0.41
Pvap_inHg	inHg	0.22	0.12	0.12	0.11	0.12
AbsHumidity	grains/lb	34.31	18.25	18.94	16.74	18.93
SatPres	kPa	94.58	95.03	95.04	95.05	95.06
Hum Factor		0.84	0.79	0.79	0.79	0.79
F_fac		1.04	1.02	1.02	1.01	1.02
K_fac		1.05	1.04	1.04	1.04	1.04
Humidity	g/kg	4.90	2.61	2.71	2.39	2.70
H2		0.00	0.00	0.00	0.00	0.00
WetDry Factor		0.90	0.94	0.94	0.95	0.96



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Modal Emissions Concentrations

ModeNum		1	2	3	4	5
THC	ppmC1	3.26	0.00	0.00	0.00	6.70
CO	%	0.00	0.00	0.00	0.00	0.00
N2O	ppm	2.82	1.58	1.61	2.76	6.05
CH4	ppm	2.86	1.08	2.28	5.35	10.77
CO2	%	10.57	5.99	5.60	5.14	3.77
O2	%	4.39	11.35	11.95	12.61	14.52
CNOx	ppm	800.31	385.57	268.60	143.58	66.46
AHC	ppm	0.69	0.51	0.77	0.91	1.43
C2H2	ppm	0.65	0.28	0.21	0.17	0.24
C2H4	ppm	0.38	0.30	0.30	0.29	0.26
C3H6	ppm	0.91	0.81	0.71	0.82	0.73
C4H6	ppm	0.66	0.92	0.79	0.69	0.70
ETOH	ppm	0.00	0.00	0.00	0.00	0.00
H2O	%	10.27	5.91	5.56	5.11	3.95
HCHO	ppm	0.56	0.78	0.33	0.27	0.21
HCN	ppm	0.98	0.45	0.39	0.57	0.28
HNCO	ppm	2.96	2.05	2.02	1.90	1.08
MECHO	ppm	0.19	0.04	0.07	0.06	0.30
NC5	ppm	0.00	0.00	0.00	0.00	0.00
NH3	ppm	0.16	0.02	0.02	0.04	0.04
NO	ppm	903.14	253.21	169.17	34.58	20.54
NO2	ppm	50.12	235.29	170.21	148.42	63.46
Soot	mg/m3	99.87	15.67	12.08	9.60	2.68
AFR	:1	17.91	32.23	34.52	37.61	51.06



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Measurement Accuracy (SAE paper 961804)

ModeNum	H2_XLS %	ModalHC_Dry %	ModalFTIR_H2O %	N2 %	Ar %	AFR :1	Tr_Eff -
1	0.000	0.000	10.273	81.311	0.940	18.645	0.780
2	0.000	0.000	5.905	79.637	0.921	33.428	0.443
3	0.000	0.000	5.555	79.532	0.919	35.796	0.415
4	0.000	0.000	5.114	79.121	0.915	38.978	0.384
5	0.000	0.001	3.948	78.221	0.904	52.883	0.295

ModeNum	ModalWHC %	ModalC1 %	ModalC8 %	ModalSUM_HC %	ModalT_Emiss %	ModalError %
1	0.249	-2.592	-0.324	-2.916	96.110	3.890
2	0.000	**	**	**	**	**
3	0.000	**	**	**	**	**
4	0.000	**	**	**	**	**
5	0.115	-2.768	-0.346	-3.114	95.069	4.931

Power Run

Team 102

TeamNumber	102
TeamName	Buffalo
Model	Mercedes
Engine	Mercedes

Displacement cc	799.00
RatedSpeed	3652
RatedTorque	82.1

