



Team Results for Clean Snowmobile Challenge 2018 Team 102



2018 Clean Snowmobile Competition - Lab Emission Event Emission Data Sheet

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Test Date       : 2018/03/05 21:23:56
Team Name      : SUNY Buffalo
Team Number    : 102
Model         : Mercedes
Engine        :
Displacement[cc] : 799.00
100% Speed    : 3873
100% Torque   : 71.2
No of Strokes : 4
Fuel          : Diesel
                H/C: 1.74      O/C: 0.01
  
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ModeNum	:	1	2	3	4	5	RMC
Weighting	:	0.12	0.27	0.25	0.31	0.05	1.00
Power	kW :	29.8	12.5	7.1	3.6	0.0	9.5
HC_m	g/hr :	0.05	0.00	0.00	0.00	0.09	-0.25
CO_m	g/hr :	0.51	0.00	0.00	0.02	0.00	0.06
NOx_m	g/hr :	215.23	78.08	50.52	18.19	4.54	66.99
Soot_m	mg/hr:	19452.64	3620.22	1402.80	737.51	89.81	3446.41
N2O_m	mg/hr:	0.07	0.03	0.02	0.02	0.11	0.05
CO2_m	g/hr :	27474.54	12735.88	8062.23	5233.58	1598.24	10999.73
CH4_m	g/hr :	0.05	0.08	0.10	0.13	0.13	0.13
W_HC	g/hr :	0.01	0.00	0.00	0.00	0.00	-0.25
W_CO	g/hr :	0.06	0.00	0.00	0.01	0.00	0.06
W_NOx	g/hr :	25.83	21.08	12.63	5.64	0.23	66.99
W_HCNOx	g/hr :	25.83	21.08	12.63	5.64	0.23	66.74
W_Soot	mg/hr:	2334.32	977.46	350.70	228.63	4.49	3446.41
W_N2O	g/hr :	0.01	0.01	0.01	0.01	0.01	0.05
W_CO2	g/hr :	3296.95	3438.69	2015.56	1622.41	79.91	10999.73
W_CH4	g/hr :	0.01	0.02	0.03	0.04	0.01	0.13

Total Weighted Power [kW] 9.845

Weighted Emissions

	HC	CO	NOx	HC+NOx
Total Mass [g/hr]	0.01	0.07	65.40	65.41
Specific Mass [g/kW-hr]	0.00	0.01	6.64	6.64
BSFC [g/kW-hr]	351.0			

Total Soot [mg/hr] 3895.60 Specific Soot [mg/kW-hr] 395.67

Not Used for Competition

Total N2O [mg/hr]	0.04	Specific N2O [mg/kW-hr]	0.00
Total CO2 [g/hr]	10453.51	Specific CO2 [g/kW-hr]	1061.76
Total CH4 [g/hr]	0.10	Specific CH4 [g/kW-hr]	0.01
RMC BSFC [g/kW-hr]	360.59		

EMISSION TESTS:

	Value	Limit	Result
Power	28.88	<96.94 kW	PASS
Soot	395.67	<50 mg/kW-hr	FAIL
CO	0.01	<275 g/kW-hr	PASS
HC + NOX	6.64	<90 g/kW-hr	PASS
E-Score	205.57	>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	RMC
Total Points	points	600	1520	1200	1200	1200	11432
PtsInMode	points	1210	3370	3470	1800	1480	11432
Speed	rpm	3873.30	3292.52	2903.41	2518.19	876.74	2978.96
Torque	Nm	73.48	36.31	23.44	13.54	0.00	30.57
Power	kW	29.81	12.52	7.13	3.57	0.00	9.54
BSFC	g/kw-hr	288.23	318.06	353.77	458.32	**	360.59
Fuel	g/hr	8590.94	3982.21	2520.87	1636.43	499.82	3439.14
T_int	degC	18.92	19.08	24.17	20.44	21.95	20.92
RelHumid	%	20.47	25.19	23.43	20.81	22.68	22.72
Baro	in Hg	28.93	28.93	28.93	28.93	28.93	28.93
Baro	mmHg	734.85	734.90	734.94	734.86	734.89	734.89
Pvap_kPa	kPa	0.38	0.47	0.58	0.42	0.50	0.47
Pvap_inHg	inHg	0.11	0.14	0.17	0.13	0.15	0.14
AbsHumidity	grains/lb	17.09	21.24	26.06	18.90	22.37	21.19
SatPres	kPa	97.59	97.50	97.40	97.55	97.47	97.50
Hum Factor		0.79	0.80	0.81	0.79	0.80	0.80
F_fac		1.00	1.00	1.01	1.00	1.01	1.01
K_fac		1.02	1.02	1.03	1.02	1.02	1.02
Humidity	g/kg	2.44	3.03	3.72	2.70	3.20	3.03
H2		0.00	0.00	0.00	0.00	0.00	0.00
WetDry Factor		0.90	0.94	0.95	0.95	0.96	1.00



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Modal Emissions Concentrations

ModeNum		1	2	3	4	5	RMC
THC	ppmC1	0.59	0.00	0.00	0.00	6.72	-4.31
CO	%	0.00	0.00	0.00	0.00	0.00	0.00
N2O	ppm	2.83	1.50	1.50	1.75	27.83	2.48
CH4	ppm	0.55	1.10	1.80	3.14	8.64	1.89
CO2	%	10.72	6.06	5.04	4.64	3.89	5.91
O2	%	4.52	11.53	13.08	13.71	14.80	12.44
CNOx	ppm	803.15	355.19	302.02	154.29	105.50	344.12
AHC	ppm	0.00	0.00	0.00	0.01	0.01	0.00
C2H2	ppm	0.10	0.01	0.02	0.05	0.01	0.04
C2H4	ppm	0.31	0.24	0.21	0.21	0.16	0.24
C3H6	ppm	0.23	0.48	0.41	0.37	0.37	0.42
C4H6	ppm	0.84	0.66	0.48	0.30	0.26	0.55
ETOH	ppm	0.88	0.97	0.43	0.58	0.41	0.65
H2O	%	10.17	5.88	4.93	4.58	3.92	0.00
HCHO	ppm	0.32	0.27	0.19	0.13	0.04	0.23
HCN	ppm	0.54	0.23	0.26	0.20	0.20	0.30
HNCO	ppm	3.30	2.20	1.73	1.73	1.36	2.03
MECHO	ppm	0.02	0.00	0.00	0.00	0.00	0.00
NC5	ppm	0.10	0.10	0.09	0.09	0.13	0.12
NH3	ppm	0.48	0.02	0.02	0.07	0.02	0.08
NO	ppm	924.74	164.23	129.70	64.66	17.73	217.59
NO2	ppm	97.01	280.66	241.67	130.32	113.89	213.60
Soot	mg/m3	138.70	31.69	16.14	12.03	4.03	32.98
AFR	:1	18.45	33.17	40.06	43.62	52.08	35.19



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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	10.170	82.236	0.951	18.651	0.773
2	0.000	0.000	5.881	80.530	0.931	33.491	0.435
3	0.000	0.000	4.931	80.156	0.927	40.441	0.362
4	0.000	0.000	4.583	80.114	0.926	44.023	0.332
5	0.000	0.001	3.922	79.675	0.921	52.570	0.282

ModeNum	ModalWHC %	ModalC1 %	ModalC8 %	ModalSUM_HC %	ModalT_Emiss %	ModalError %
1	0.047	-2.707	-0.338	-3.045	97.220	2.780
2	0.000	**	**	**	**	**
3	0.000	**	**	**	**	**
4	0.000	**	**	**	**	**
5	0.086	-2.904	-0.363	-3.267	96.792	3.208

Carbon Balance Verification

		1	2	3	4	5	6
Power	kW	29.806	12.520	7.126	3.571	0.000	9.537
BSFC	g/kw-hr	288.23	318.06	353.77	458.32	**	360.59
Fuel_MassFlow	g/hr	8590.9	3982.2	2520.9	1636.4	499.8	3439.1
HC_m	g/hr	0.04725	0.00000	0.00000	0.00000	0.08649	-0.25104
CO_m	g/hr	0.51162	0.00000	0.00000	0.01873	0.00000	0.06204
CO2_m	g/hr	27475	12736	8062	5234	1598	11000
TW_Power	kW	9.8455					
TW_BSFC	g/kw-hr	350.98					
Fuel_MassFlow	g/hr	8590.9	3982.2	2520.9	1636.4	499.8	3439.1
FuelCalc	g/hr	8680.7	4023.8	2547.2	1653.5	505.1	3475.0
FuelCalcDev	%	-1.0447	-1.0446	-1.0446	-1.0446	-1.0472	-1.0435

\$HCR_ENG	1.736
\$OCR_ENG	0.009
MassFracCFuel H/C ratio	0.86380

Power Run

Team 102

TeamNumber	102
TeamName	SUNY Buffalo
Model	Mercedes
Engine	

Displacement cc	799.00
RatedSpeed	3873
RatedTorque	71.2

