



Team Results for Clean Snowmobile Challenge 2019 Team 4



2019 Clean Snowmobile Competition - Lab Emission Event Emission Data Sheet

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Test Date       : 2019/03/07 12:53:32
Team Name      : ETS
Team Number    : 4
Model         : 600 ACE
Engine        : 600 ACE
Displacement[cc] : 600.00
100% Speed    : 7217
100% Torque   : 59.2
No of Strokes : 4
Fuel          : Gas
                H/C: 1.95      O/C: 0.00
  
```

ModeNum	:	1	2	3	4	5
Weighting	:	0.12	0.27	0.25	0.31	0.05
Power kW	:	28.8	0.0	0.0	0.0	0.0
HC_m g/hr	:	24.73	**	**	**	**
CO_m g/hr	:	5817.86	**	**	**	**
NOx_m g/hr	:	10.56	**	**	**	**
Soot_m mg/hr	:	215.21	**	**	**	**
N2O_m mg/hr	:	0.19	**	**	**	**
CO2_m g/hr	:	41624.98	**	**	**	**
CH4_m g/hr	:	6.74	**	**	**	**
W_HC g/hr	:	2.97	**	**	**	**
W_CO g/hr	:	698.14	**	**	**	**
W_NOx g/hr	:	1.27	**	**	**	**
W_HCNOx g/hr	:	4.24	**	**	**	**
W_Soot mg/hr	:	25.83	**	**	**	**
W_N2O g/hr	:	0.02	**	**	**	**
W_CO2 g/hr	:	4995.00	**	**	**	**
W_CH4 g/hr	:	0.81	**	**	**	**

Total Weighted Power [kW] 3.454

Weighted Emissions

	HC	CO	NOx	HC+NOx
Total Mass [g/hr]	2.97	698.14	1.27	4.24
Specific Mass [g/kW-hr]	0.86	202.11	0.37	1.23
BSFC [g/kW-hr]	****			

Total Soot [mg/hr] 25.83 Specific Soot [mg/kW-hr] 7.48

Not Used for Competition

Total N2O [mg/hr]	0.02	Specific N2O [mg/kW-hr]	0.01
Total CO2 [g/hr]	4995.00	Specific CO2 [g/kW-hr]	1446.01
Total CH4 [g/hr]	0.81	Specific CH4 [g/kW-hr]	0.23
RMC BSFC [g/kW-hr]	0		

EMISSION TESTS:

	Value	Limit	Result
Power	44.74	<96.94 kW	PASS
Soot	7.48	<50 mg/kW-hr	PASS
CO	202.11	<275 g/kW-hr	FAIL
HC + NOX	1.23	<90 g/kW-hr	FAIL
E-Score	158.66	>175	FAIL
Valid Data for All 5 Modes			FAIL
RMC			FAIL (-50 Points)
LAB EMISSION TEST			FAIL



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Modal Raw Data : Engine / Environmental

ModeNum		1	2	3	4	5
Total Points	points	373	1	1	1	1
PtsInMode	points	983	1	1	1	1
Speed	rpm	7082.31	0.00	0.00	0.00	0.00
Torque	Nm	38.81	0.00	0.00	0.00	0.00
Power	kW	28.79	0.00	0.00	0.00	0.00
BSFC	g/kw-hr	560.89	**	**	**	**
Fuel	g/hr	16145.77	#####	#####	#####	#####
T_int	degC	19.17	0.00	0.00	0.00	0.00
RelHumid	%	17.57	0.00	0.00	0.00	0.00
Baro	in Hg	29.16	0.00	0.00	0.00	0.00
Baro	mmHg	740.54	0.00	0.00	0.00	0.00
Pvap_kPa	kPa	0.33	0.00	0.00	0.00	0.00
Pvap_inHg	inHg	0.10	0.00	0.00	0.00	0.00
AbsHumidity	grains/lb	14.75	**	**	**	**
SatPres	kPa	98.40	0.00	0.00	0.00	0.00
Hum Factor		0.78	**	**	**	**
F_fac		0.99	**	**	**	**
K_fac		1.01	**	**	**	**
Humidity	g/kg	2.11	**	**	**	**
H2		0.92	**	**	**	**
WetDry Factor		0.87	1.00	1.00	1.00	1.00



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Modal Emissions Concentrations

ModeNum		1	2	3	4	5
THC	ppmC1	213.11	0.00	0.00	0.00	0.00
CO	%	2.50	0.00	0.00	0.00	0.00
N2O	ppm	5.16	0.00	0.00	0.00	0.00
CH4	ppm	50.73	0.00	0.00	0.00	0.00
CO2	%	11.39	0.00	0.00	0.00	0.00
O2	%	0.01	0.00	0.00	0.00	0.00
CNOx	ppm	27.65	**	**	**	**
AHC	ppm	2.00	0.00	0.00	0.00	0.00
C2H2	ppm	1.56	0.00	0.00	0.00	0.00
C2H4	ppm	0.71	0.00	0.00	0.00	0.00
C3H6	ppm	0.07	0.00	0.00	0.00	0.00
C4H6	ppm	8.29	0.00	0.00	0.00	0.00
ETOH	ppm	5.27	0.00	0.00	0.00	0.00
H2O	%	12.65	0.00	0.00	0.00	0.00
HCHO	ppm	0.15	0.00	0.00	0.00	0.00
HCN	ppm	1.19	0.00	0.00	0.00	0.00
HNCO	ppm	4.22	0.00	0.00	0.00	0.00
MECHO	ppm	0.16	0.00	0.00	0.00	0.00
NC5	ppm	2.10	0.00	0.00	0.00	0.00
NH3	ppm	223.04	0.00	0.00	0.00	0.00
NO	ppm	35.67	0.00	0.00	0.00	0.00
NO2	ppm	0.18	0.00	0.00	0.00	0.00
Soot	mg/m3	1.10	0.00	0.00	0.00	0.00
AFR	:1	13.50	**	**	**	**



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Measurement Accuracy (SAE paper 961804)

ModeNum	H2_XLS %	ModalHC_Dry %	ModalFTIR_H2O %	N2 %	Ar %	AFR :1	Tr_Eff -
1	1.057	0.024	12.648	77.398	0.895	13.492	1.000
2	**	0.000	0.000	0.000	0.000	**	**
3	**	0.000	0.000	0.000	0.000	**	**
4	**	0.000	0.000	0.000	0.000	**	**
5	**	0.000	0.000	0.000	0.000	**	**

ModeNum	ModalWHC %	ModalC1 %	ModalC8 %	ModalSUM_HC %	ModalT_Emiss %	ModalError %
1	24.730	0.019	0.002	0.021	95.287	4.713
2	**	**	**	**	**	**
3	**	**	**	**	**	**
4	**	**	**	**	**	**
5	**	**	**	**	**	**

Carbon Balance Verification

		1	2	3	4	5
Power	kW	28.786	0.000	0.000	0.000	0.000
BSFC	g/kw-hr	560.89	**	**	**	**
Fuel_MassFlow	g/hr	16146	9999999	9999999	9999999	9999999
HC_m	g/hr	24.730	**	**	**	**
CO_m	g/hr	5817.9	**	**	**	**
CO2_m	g/hr	41625	**	**	**	**
TW_Power	kW	3.4543				
TW_BSFC	g/kw-hr	**				
Fuel_MassFlow	g/hr	16146	9999999	9999999	9999999	9999999
FuelCalc	g/hr	16149	**	**	**	**
FuelCalcDev	%	-0.022939	**	**	**	**

\$HCR_ENG	1.949
\$OCR_ENG	0
MassFracCFuel H/C ratio	0.85943

Power Run

Team 4

TeamNumber	4
TeamName	ETS
Model	600 ACE
Engine	600 ACE

Displacement cc	600.00
RatedSpeed	7217
RatedTorque	59.2

