



Team Results for Clean Snowmobile Challenge 2013 Team 10 ECO



2012 Clean Snowmobile Competition - Lab Emission Event Emission Data Sheet

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Test Date       : 2013/03/08 16:08:57
Team Name      : Waterloo
Team Number    : 10
Model         : Arctic Cat
Engine        : T660
Displacement[cc] : 660.00
100% Speed    : 6219
100% Torque   : 120.7
No of Strokes : 4
Fuel          : GASOLINE           H/C: 2.50       O/C: 0.28
  
```

ModeNum	:	1	2	3	4	5
Weighting	:	0.12	0.27	0.25	0.31	0.05
Power kW	:	54.1	0.0	0.0	0.0	0.0
HC_m g/hr	:	285.38	**	**	**	**
CO_m g/hr	:	16686.61	**	**	**	**
NOx_m g/hr	:	17.70	**	**	**	**
Soot_m mg/hr	:	464.66	**	**	**	**
N2O_m mg/hr	:	0.00	**	**	**	**
CO2_m g/hr	:	50304.32	**	**	**	**
CH4_m g/hr	:	87.23	**	**	**	**
W_HC g/hr	:	34.25	**	**	**	**
W_CO g/hr	:	2002.39	**	**	**	**
W_NOx g/hr	:	2.12	**	**	**	**
W_HCNOx g/hr	:	36.37	**	**	**	**
W_Soot mg/hr	:	55.76	**	**	**	**
W_N2O g/hr	:	0.00	**	**	**	**
W_CO2 g/hr	:	6036.52	**	**	**	**
W_CH4 g/hr	:	10.47	**	**	**	**

Total Weighted Power [kW] 6.497

Weighted Emissions

	HC	CO	NOx	HC+NOx
Total Mass [g/hr]	34.25	2002.39	2.12	36.37
Specific Mass [g/kW-hr]	5.27	308.19	0.33	5.60
BSFC [g/kW-hr]	56.6			

Total Soot [mg/hr] 55.76 Specific Soot [mg/kW-hr] 8.58

Not Used for Competition

Total N2O [mg/hr]	0.00	Specific N2O [mg/kW-hr]	0.00
Total CO2 [g/hr]	6036.52	Specific CO2 [g/kW-hr]	929.09
Total CH4 [g/hr]	10.47	Specific CH4 [g/kW-hr]	1.61

EMISSION TESTS:

	Value	Limit	Result
Power	78.59	<96.94 kW	PASS
Soot	8.58	<100 mg/kW-hr	PASS
CO	308.19	<275 g/kW-hr	FAIL
HC + NOX	5.60	<90 g/kW-hr	FAIL
E-Score	129.22	>100	PASS
Valid Data for All 5 Modes			FAIL

LAB EMISSION TEST FAIL



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Modal Raw Data : Engine / Environmental

ModeNum		1	2	3	4	5
Total Points	points	599	1	1	1	1
PtsInMode	points	771	1	1	1	1
Speed	rpm	6198.36	0.00	0.00	0.00	0.00
Torque	Nm	83.41	0.00	0.00	0.00	0.00
Power	kW	54.14	0.00	0.00	0.00	0.00
BSFC	g/kw-hr	472.08	**	**	**	**
Fuel	g/hr	25560.03	0.00	0.00	0.00	0.00
T_int	degC	13.66	0.00	0.00	0.00	0.00
RelHumid	%	21.73	0.00	0.00	0.00	0.00
Baro	in Hg	29.12	0.00	0.00	0.00	0.00
Baro	mmHg	739.73	0.00	0.00	0.00	0.00
Pvap_kPa	kPa	0.30	0.00	0.00	0.00	0.00
Pvap_inHg	inHg	0.09	0.00	0.00	0.00	0.00
AbsHumidity	grains/lb	13.39	**	**	**	**
SatPres	kPa	98.32	0.00	0.00	0.00	0.00
Hum Factor		0.78	**	**	**	**
F_fac		0.98	**	**	**	**
K_fac		1.00	**	**	**	**
Humidity	g/kg	1.91	**	**	**	**
H2		2.60	**	**	**	**
WetDry Factor		0.84	1.00	1.00	1.00	1.00



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Modal Emissions Concentrations

ModeNum		1	2	3	4	5
THC	ppmC1	1582.85	0.00	0.00	0.00	0.00
CO	%	4.80	0.00	0.00	0.00	0.00
N2O	ppm	0.00	0.00	0.00	0.00	0.00
CH4	ppm	439.57	0.00	0.00	0.00	0.00
CO2	%	9.22	0.00	0.00	0.00	0.00
O2	%	0.02	0.00	0.00	0.00	0.00
CNOx	ppm	31.01	**	**	**	**
AHC	ppm	45.46	0.00	0.00	0.00	0.00
C2H2	ppm	6.09	0.00	0.00	0.00	0.00
C2H4	ppm	173.18	0.00	0.00	0.00	0.00
C3H6	ppm	12.98	0.00	0.00	0.00	0.00
C4H6	ppm	20.31	0.00	0.00	0.00	0.00
ETOH	ppm	29.26	0.00	0.00	0.00	0.00
H2O	%	15.58	0.00	0.00	0.00	0.00
HCHO	ppm	1.70	0.00	0.00	0.00	0.00
HCN	ppm	10.28	0.00	0.00	0.00	0.00
HNCO	ppm	8.54	0.00	0.00	0.00	0.00
MECHO	ppm	33.72	0.00	0.00	0.00	0.00
NC5	ppm	22.52	0.00	0.00	0.00	0.00
NH3	ppm	455.27	0.00	0.00	0.00	0.00
NO	ppm	40.01	0.00	0.00	0.00	0.00
NO2	ppm	0.08	0.00	0.00	0.00	0.00
Soot	mg/m3	1.57	0.00	0.00	0.00	0.00
AFR	:1	8.73	**	**	**	**



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Measurement Accuracy (SAE paper 961804)

	H2_XLS %	ModalHC_Dry %	ModalFTIR_H2O %	N2 %	Ar %	AFR :1	Tr_Eff -
1	3.079	0.187	15.579	80.256	0.928	12.904	0.999
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	**	**

ModalWHC %	ModalC1 %	ModalC8 %	ModalSUM_HC %	ModalT_Emiss %	ModalError %
285.378	0.172	0.021	0.193	101.087	1.087
**	**	**	**	**	**
**	**	**	**	**	**
**	**	**	**	**	**
**	**	**	**	**	**

Power Run

Team 10 ECO

TeamNumber	10
TeamName	Waterloo
Model	Arctic Cat
Engine	T660

Displacement cc	660.00
RatedSpeed	6219
RatedTorque	120.7

