



## Team Results for Clean Snowmobile Challenge 2014 Team 2



**2014 Clean Snowmobile Competition - Lab Emission Event Emission Data Sheet**

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Test Date       : 2014/03/06 13:08:42
Team Name      : UWP
Team Number    : 2
Model         : 7000LXR
Engine        : ArcticCat
Displacement[cc] : 1049.00
100% Speed    : 8699
100% Torque   : 89.0
No of Strokes : 4
Fuel          : gasoline           H/C: 1.99       O/C: 0.03
  
```

ModeNum	:	1	2	3	4	5	RMC
Weighting	:	0.12	0.27	0.25	0.31	0.05	1.00
Power kW	:	78.6	35.1	22.7	10.0	0.0	24.2
HC_m g/hr	:	221.90	85.54	19.55	48.82	56.75	23.75
CO_m g/hr	:	15766.07	2614.69	1057.26	2423.11	1296.77	3172.17
NOx_m g/hr	:	88.79	67.70	31.91	7.67	0.04	38.03
Soot_m mg/hr	:	52.51	2.08	2.52	6.01	16.98	10.32
N2O_m mg/hr	:	0.00	0.00	0.01	0.00	0.00	0.00
CO2_m g/hr	:	52369.49	32384.57	23466.06	14097.69	11281.46	26152.30
CH4_m g/hr	:	37.50	20.09	7.03	10.60	8.88	15.76
W_HC g/hr	:	26.63	23.09	4.89	15.13	2.84	23.75
W_CO g/hr	:	1891.93	705.97	264.32	751.16	64.84	3172.17
W_NOx g/hr	:	10.65	18.28	7.98	2.38	0.00	38.03
W_HCNOx g/hr	:	37.28	41.37	12.87	17.51	2.84	61.78
W_Soot mg/hr	:	6.30	0.56	0.63	1.86	0.85	10.32
W_N2O g/hr	:	0.00	0.00	0.00	0.00	0.00	0.00
W_CO2 g/hr	:	6284.34	8743.84	5866.52	4370.28	564.07	26152.30
W_CH4 g/hr	:	4.50	5.42	1.76	3.29	0.44	15.76

Total Weighted Power [kW] 27.683

Weighted Emissions

	HC	CO	NOx	HC+NOx
Total Mass [g/hr]	72.58	3678.22	39.29	111.87
Specific Mass [g/kW-hr]	2.62	132.87	1.42	4.04
BSFC [g/kW-hr]	394.5			

Total Soot [mg/hr] 10.20      Specific Soot [mg/kW-hr] 0.37

Not Used for Competition

Total N2O [mg/hr]	0.00	Specific N2O [mg/kW-hr]	0.00
Total CO2 [g/hr]	25829.05	Specific CO2 [g/kW-hr]	933.03
Total CH4 [g/hr]	15.41	Specific CH4 [g/kW-hr]	0.56
RMC BSFC [g/kW-hr]	410.16		

EMISSION TESTS:

	Value	Limit	Result
Power	81.11	<96.94 kW	PASS
Soot	0.37	<100 mg/kW-hr	PASS
CO	132.87	<275 g/kW-hr	PASS
HC + NOX	4.04	<90 g/kW-hr	PASS
E-Score	174.09	>100	PASS
Valid Data for All 5 Modes			PASS

LAB EMISSION TEST      PASS



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**Modal Raw Data : Engine / Environmental**

ModeNum		1	2	3	4	5	RMC
Total Points	points	600	1200	1200	1200	1200	12032
PtsInMode	points	1210	3050	2720	3470	1480	12032
Speed	rpm	8698.09	7393.51	6523.71	5656.77	1981.54	6464.91
Torque	Nm	86.29	45.30	33.26	16.88	0.00	35.79
Power	kW	78.59	35.08	22.72	10.00	0.00	24.23
BSFC	g/kw-hr	315.39	333.74	352.97	575.13	**	410.16
Fuel	g/hr	24787.48	11706.62	8021.28	5750.61	4298.15	9939.10
T_int	degC	42.10	44.07	43.63	41.31	39.11	42.60
RelHumid	%	17.78	14.99	13.89	15.81	13.17	15.69
Baro	in Hg	28.89	28.88	28.87	28.89	28.87	28.88
Baro	mmHg	733.86	733.62	733.30	733.76	733.23	733.66
Pvap_kPa	kPa	1.09	1.01	0.91	0.93	0.70	0.98
Pvap_inHg	inHg	0.32	0.30	0.27	0.28	0.21	0.29
AbsHumidity	grains/lb	49.09	45.40	41.19	42.00	31.42	44.34
SatPres	kPa	96.75	96.80	96.85	96.89	97.05	96.82
Hum Factor		0.89	0.88	0.86	0.87	0.83	0.87
F_fac		1.06	1.07	1.07	1.06	1.05	1.06
K_fac		1.06	1.06	1.06	1.06	1.05	1.06
Humidity	g/kg	7.01	6.49	5.88	6.00	4.49	6.33
H2		2.00	0.55	0.31	1.16	0.79	0.83
WetDry Factor		0.88	0.87	0.87	0.87	0.87	1.00



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**Modal Emissions Concentrations**

ModeNum		1	2	3	4	5	RMC
THC	ppmC1	1335.52	1011.10	331.21	1210.21	1862.85	334.22
CO	%	4.75	1.55	0.90	3.01	2.13	2.23
N2O	ppm	0.00	0.00	0.27	0.00	0.00	0.21
CH4	ppm	197.71	207.98	104.33	230.20	255.23	194.34
CO2	%	10.04	12.19	12.66	11.13	11.79	11.72
O2	%	0.00	0.00	0.00	0.00	0.02	-0.04
CNOx	ppm	162.79	243.80	164.68	57.89	0.35	163.05
AHC	ppm	70.84	40.11	7.61	62.70	105.39	46.71
C2H2	ppm	6.36	3.11	2.82	6.17	2.63	3.91
C2H4	ppm	102.51	108.12	34.16	106.58	133.15	90.18
C3H6	ppm	37.74	21.37	5.47	20.54	38.82	20.08
C4H6	ppm	26.79	21.90	7.15	7.61	7.25	13.76
ETOH	ppm	7.90	6.94	7.75	5.51	2.59	5.92
H2O	%	12.36	12.82	12.93	12.75	12.61	0.00
HCHO	ppm	1.20	0.60	0.22	0.60	0.41	0.65
HCN	ppm	17.26	8.10	2.71	21.91	2.25	10.77
HNCO	ppm	8.05	9.36	3.00	2.20	0.00	5.28
MECHO	ppm	2.73	0.81	0.20	0.61	0.82	0.90
NC5	ppm	9.39	1.14	0.19	0.24	16.69	3.26
NH3	ppm	711.43	527.25	201.66	168.03	116.63	329.34
NO	ppm	182.32	277.91	191.17	67.03	0.50	186.71
NO2	ppm	0.31	0.06	0.00	0.03	0.02	0.06
Soot	mg/m3	0.19	0.01	0.02	0.09	0.33	0.09
AFR	:1	11.71	13.10	13.58	12.43	12.63	12.97



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Measurement Accuracy (SAE paper 961804)

ModeNum	H2_XLS %	ModalHC_Dry %	ModalFTIR_H2O %	N2 %	Ar %	AFR :1	Tr_Eff -
1	2.284	0.152	12.365	75.720	0.875	12.465	1.000
2	0.635	0.116	12.823	79.230	0.916	13.916	1.000
3	0.357	0.038	12.933	80.095	0.926	14.284	1.000
4	1.330	0.139	12.753	77.596	0.897	13.226	1.000
5	0.899	0.213	12.609	78.276	0.905	13.574	0.999

ModeNum	ModalWHC %	ModalC1 %	ModalC8 %	ModalSUM_HC %	ModalT_Emiss %	ModalError %
1	221.900	0.152	0.019	0.171	95.943	4.057
2	85.535	0.116	0.014	0.130	96.701	3.299
3	19.552	0.038	0.005	0.043	97.011	2.989
4	48.817	0.139	0.017	0.156	96.188	3.812
5	56.748	0.196	0.024	0.220	96.256	3.744

# Power Run

## Team 2

TeamNumber	2
TeamName	UWP
Model	7000LXR
Engine	ArcticCat

Displacement cc	1049.00
RatedSpeed	8699
RatedTorque	89.0

