



Team Results for Clean Snowmobile Challenge 2016 Team 12



2016 Clean Snowmobile Competition - Lab Emission Event Emission Data Sheet

```

Test Date       : 2016/03/10 10:20:29
Team Name      : RIT
Team Number    : 12
Model         : Weber
Engine        : Weber
Displacement[cc] : 750.00
100% Speed    : 5423
100% Torque   : 31.1
No of Strokes : 4
Fuel          : GASOLINE           H/C: 2.00       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	:	17.5	7.7	4.4	1.7	0.0	4.8
HC_m g/hr	:	2.89	2.11	2.51	4.30	4.07	1.70
CO_m g/hr	:	49.86	19.90	17.85	15.15	10.66	29.26
NOx_m g/hr	:	117.20	28.14	12.50	3.43	0.10	17.90
Soot_m mg/hr	:	0.00	0.92	3.23	0.11	0.31	1.83
N2O_m mg/hr	:	0.07	0.02	0.01	0.00	0.00	0.01
CO2_m g/hr	:	22473.97	13073.78	9873.88	6609.28	2879.18	10576.39
CH4_m g/hr	:	1.52	1.77	1.74	2.42	1.48	2.51
W_HC g/hr	:	0.35	0.57	0.63	1.33	0.20	1.70
W_CO g/hr	:	5.98	5.37	4.46	4.70	0.53	29.26
W_NOx g/hr	:	14.06	7.60	3.13	1.06	0.00	17.90
W_HCNOx g/hr	:	14.41	8.17	3.75	2.40	0.21	19.60
W_Soot mg/hr	:	0.00	0.25	0.81	0.03	0.02	1.83
W_N2O g/hr	:	0.01	0.01	0.00	0.00	0.00	0.01
W_CO2 g/hr	:	2696.88	3529.92	2468.47	2048.88	143.96	10576.39
W_CH4 g/hr	:	0.18	0.48	0.43	0.75	0.07	2.51

Total Weighted Power [kW] 5.809

Weighted Emissions

	HC	CO	NOx	HC+NOx
Total Mass [g/hr]	3.08	21.05	25.86	28.94
Specific Mass [g/kW-hr]	0.53	3.62	4.45	4.98
BSFC [g/kW-hr]	754.6			

Total Soot [mg/hr] 1.10 Specific Soot [mg/kW-hr] 0.19

Not Used for Competition

Total N2O [mg/hr]	0.02	Specific N2O [mg/kW-hr]	0.00
Total CO2 [g/hr]	10888.10	Specific CO2 [g/kW-hr]	1874.44
Total CH4 [g/hr]	1.92	Specific CH4 [g/kW-hr]	0.33
RMC BSFC [g/kW-hr]	701.24		

EMISSION TESTS:

	Value	Limit	Result
Power	17.68	<96.94 kW	PASS
Soot	0.19	<50 mg/kW-hr	PASS
CO	3.62	<275 g/kW-hr	PASS
HC + NOX	4.98	<90 g/kW-hr	PASS
E-Score	205.77	>175	PASS
Valid Data for All 5 Modes			PASS
RMC			PASS
LAB EMISSION TEST			PASS



**Team Results for
Clean Snowmobile Challenge 2016
Team 12**



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	5422.80	4608.99	4067.30	2778.72	1546.78	3759.63
Torque	Nm	30.83	15.95	10.24	5.97	0.00	12.27
Power	kW	17.51	7.70	4.36	1.74	0.00	4.83
BSFC	g/kw-hr	410.64	542.88	723.80	1218.63	**	701.24
Fuel	g/hr	7189.79	4178.39	3158.02	2118.11	926.94	3386.80
T_int	degC	18.19	19.38	19.72	19.44	18.40	19.32
RelHumid	%	39.56	34.41	34.32	36.20	34.15	36.31
Baro	in Hg	28.97	28.97	28.96	28.97	28.97	28.97
Baro	mmHg	735.84	735.74	735.57	735.80	735.78	735.76
Pvap_kPa	kPa	0.71	0.66	0.67	0.70	0.62	0.69
Pvap_inHg	inHg	0.21	0.20	0.20	0.21	0.18	0.21
AbsHumidity	grains/lb	31.78	29.51	30.00	31.17	27.74	31.05
SatPres	kPa	97.39	97.43	97.40	97.40	97.47	97.40
Hum Factor		0.83	0.82	0.83	0.83	0.82	0.83
F_fac		1.00	1.00	1.00	1.00	1.00	1.00
K_fac		1.02	1.02	1.02	1.02	1.02	1.02
Humidity	g/kg	4.54	4.22	4.29	4.45	3.96	4.44
H2		0.02	0.01	0.01	0.02	0.03	0.02
WetDry Factor		0.86	0.86	0.87	0.87	0.87	1.00



**Team Results for
Clean Snowmobile Challenge 2016
Team 12**



Modal Emissions Concentrations

ModeNum		1	2	3	4	5	RMC
THC	ppmC1	53.04	66.36	102.27	259.98	571.94	64.78
CO	%	0.05	0.03	0.04	0.05	0.08	0.06
N2O	ppm	4.10	1.92	0.83	0.28	0.15	1.22
CH4	ppm	24.42	48.67	62.09	128.31	182.52	83.87
CO2	%	13.16	13.09	12.84	12.74	12.90	12.87
O2	%	0.24	0.45	0.79	0.96	0.68	0.84
CNOx	ppm	656.61	269.55	155.56	63.34	4.23	208.31
AHC	ppm	1.60	0.13	0.11	0.55	14.10	2.91
C2H2	ppm	1.23	1.04	0.95	0.87	1.05	1.07
C2H4	ppm	2.38	3.91	12.89	41.93	36.90	23.96
C3H6	ppm	0.79	0.56	0.57	1.71	13.28	2.66
C4H6	ppm	0.42	0.27	0.36	0.31	3.50	0.81
ETOH	ppm	0.22	0.42	0.52	0.57	0.44	0.44
H2O	%	13.83	13.67	13.38	13.26	13.35	0.00
HCHO	ppm	1.14	2.02	3.61	7.90	0.97	4.55
HCN	ppm	1.30	0.87	0.65	0.73	0.75	0.83
HNCO	ppm	0.80	0.77	0.80	0.21	0.30	0.58
MECHO	ppm	0.01	0.08	0.04	0.10	0.00	0.07
NC5	ppm	2.18	0.62	0.47	1.43	30.19	4.44
NH3	ppm	0.62	0.07	0.05	0.09	4.15	0.72
NO	ppm	788.41	324.76	183.51	71.60	3.82	247.29
NO2	ppm	1.58	2.55	4.96	4.79	1.37	4.02
Soot	mg/m3	0.00	0.02	0.08	0.00	0.03	0.04
AFR	:1	14.24	14.39	14.63	14.69	14.36	14.66



**Team Results for
Clean Snowmobile Challenge 2016
Team 12**



Measurement Accuracy (SAE paper 961804)

ModeNum	H2_XLS %	ModalHC_Dry %	ModalFTIR_H2O %	N2 %	Ar %	AFR :1	Tr_Eff -
1	0.018	0.006	13.832	83.840	0.969	14.926	0.988
2	0.012	0.008	13.670	83.929	0.970	15.078	0.977
3	0.014	0.012	13.375	83.546	0.966	15.331	0.960
4	0.018	0.030	13.260	83.561	0.966	15.438	0.951
5	0.029	0.066	13.350	83.289	0.963	15.160	0.965

ModeNum	ModalWHC %	ModalC1 %	ModalC8 %	ModalSUM_HC %	ModalT_Emiss %	ModalError %
1	2.886	-0.178	-0.022	-0.200	100.320	0.320
2	2.112	-0.343	-0.043	-0.386	100.290	0.290
3	2.506	-0.587	-0.073	-0.660	99.669	0.331
4	4.297	-0.692	-0.086	-0.778	99.630	0.370
5	4.068	-0.453	-0.057	-0.510	99.529	0.471

Power Run

Team 12

TeamNumber	12
TeamName	RIT
Model	Weber
Engine	Weber

Displacement cc	750.00
RatedSpeed	5423
RatedTorque	31.1

