



Team Results for Clean Snowmobile Challenge 2015 Team 12



2015 Clean Snowmobile Competition - Lab Emission Event Emission Data Sheet

Test Date : 2015/03/05 17:44:33
 Team Name : Northern Illinois
 Team Number : 12
 Model : Polaris
 Engine : Rush
 Displacement[cc] : 599.00
 100% Speed : 8022
 100% Torque : 97.8
 No of Strokes : 2
 Fuel : GASOLINE H/C: 1.92 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	:	81.7	35.6	20.3	11.9	0.0	24.7
HC_m g/hr	:	6033.20	1164.61	1179.57	1046.74	981.37	734.51
CO_m g/hr	:	36031.96	7126.68	4097.92	2222.61	1187.84	7247.37
NOx_m g/hr	:	61.50	179.93	29.19	11.21	0.00	75.77
Soot_m mg/hr	:	5950.76	81.78	15.42	11.51	271.59	315.29
N2O_m mg/hr	:	1.34	0.23	0.14	0.08	0.05	0.25
CO2_m g/hr	:	40750.39	28550.54	15833.37	11518.54	1478.89	23423.75
CH4_m g/hr	:	266.72	70.64	13.09	5.18	3.25	39.88
W_HC g/hr	:	723.98	314.45	294.89	324.49	49.07	734.51
W_CO g/hr	:	4323.84	1924.20	1024.48	689.01	59.39	7247.37
W_NOx g/hr	:	7.38	48.58	7.30	3.48	0.00	75.77
W_HCNOx g/hr	:	731.36	363.03	302.19	327.97	49.07	810.28
W_Soot mg/hr	:	714.09	22.08	3.86	3.57	13.58	315.29
W_N2O g/hr	:	0.16	0.06	0.03	0.02	0.00	0.25
W_CO2 g/hr	:	4890.05	7708.65	3958.34	3570.75	73.94	23423.75
W_CH4 g/hr	:	32.01	19.07	3.27	1.61	0.16	39.88

Total Weighted Power [kW] 28.193

Weighted Emissions

	HC	CO	NOx	HC+NOx
Total Mass [g/hr]	1706.88	8020.92	66.73	1773.61
Specific Mass [g/kW-hr]	60.54	284.50	2.37	62.91
BSFC [g/kW-hr]	410.6			

Total Soot [mg/hr] 757.17 Specific Soot [mg/kW-hr] 26.86

Not Used for Competition

Total N2O [mg/hr]	0.28	Specific N2O [mg/kW-hr]	0.01
Total CO2 [g/hr]	20201.73	Specific CO2 [g/kW-hr]	716.55
Total CH4 [g/hr]	56.12	Specific CH4 [g/kW-hr]	1.99
RMC BSFC [g/kW-hr]	476.24		

EMISSION TESTS:

	Value	Limit	Result
Power	82.13	<96.94 kW	PASS
Soot	26.86	<100 mg/kW-hr	PASS
CO	284.50	<275 g/kW-hr	FAIL
HC + NOX	62.91	<90 g/kW-hr	PASS
E-Score	96.93	>100	FAIL
Valid Data for All 5 Modes			PASS

LAB EMISSION TEST FAIL



**Team Results for
Clean Snowmobile Challenge 2015
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	8022.19	6818.92	6016.84	5475.18	1827.60	6069.11
Torque	Nm	97.28	49.80	32.25	20.84	0.00	38.88
Power	kW	81.73	35.56	20.32	11.95	0.00	24.71
BSFC	g/kw-hr	451.46	387.06	405.46	485.81	**	476.24
Fuel	g/hr	36896.09	13764.07	8239.44	5804.89	2041.75	11768.98
T_int	degC	#####	4.74	9.61	#####	6.52	#####
RelHumid	%	14.81	14.84	13.77	15.13	13.29	14.69
Baro	in Hg	29.11	29.11	29.11	29.11	29.11	29.11
Baro	mmHg	739.45	739.43	739.42	739.48	739.37	739.45
Pvap_kPa	kPa	#####	0.12	0.15	#####	0.12	#####
Pvap_inHg	inHg	846480.03	0.04	0.04	864932.47	0.04	839652.87
AbsHumidity	grains/lb	-4347.95	5.38	6.70	-4347.95	5.37	-4347.95
SatPres	kPa	#####	98.46	98.43	#####	98.45	#####
Hum Factor		1.00	1.00	1.00	1.00	1.00	1.00
F_fac		-6.40	0.96	0.97	-4.88	0.96	-3.49
K_fac		-11.50	0.99	1.00	-9.41	0.99	-7.48
Humidity	g/kg	-621.14	0.77	0.96	-621.13	0.77	-621.14
H2		3.93	1.40	1.36	1.01	2.05	1.58
WetDry Factor		0.90	0.88	0.89	0.89	0.94	1.00



**Team Results for
Clean Snowmobile Challenge 2015
Team 12**



Modal Emissions Concentrations

ModeNum		1	2	3	4	5	RMC
THC	ppmC1	25199.30	11595.49	19756.41	25220.37	66743.49	7859.26
CO	%	7.50	3.53	3.42	2.67	4.02	3.86
N2O	ppm	17.76	7.24	7.39	5.81	11.62	8.50
CH4	ppm	971.32	613.25	191.14	108.78	192.65	372.06
CO2	%	5.40	9.01	8.41	8.80	3.19	7.94
O2	%	3.76	2.35	3.06	3.75	10.53	4.01
CNOx	ppm	77.89	543.24	148.26	81.91	0.00	245.84
AHC	ppm	1071.19	320.00	834.37	972.97	1811.60	849.59
C2H2	ppm	138.21	70.73	26.05	49.35	228.15	85.36
C2H4	ppm	751.05	1338.33	458.09	256.04	632.10	674.49
C3H6	ppm	609.69	431.11	486.79	259.41	281.57	450.99
C4H6	ppm	0.20	5.04	0.00	0.00	36.18	2.54
ETOH	ppm	273.80	17.54	231.56	554.06	865.26	287.33
H2O	%	10.45	11.93	11.14	10.90	6.09	0.03
HCHO	ppm	477.62	579.13	453.84	229.57	270.80	439.80
HCN	ppm	5.22	11.01	2.08	1.64	0.00	5.28
HNCO	ppm	0.00	28.88	0.00	0.04	0.00	7.71
MECHO	ppm	317.95	160.23	233.42	290.69	493.09	287.43
NC5	ppm	1545.29	194.80	1287.17	1792.90	10832.66	1435.21
NH3	ppm	27.66	11.22	10.88	8.07	14.69	12.92
NO	ppm	59.10	500.52	117.66	64.79	0.01	217.36
NO2	ppm	18.79	42.72	30.60	17.12	0.00	28.69
Soot	mg/m3	15.97	0.50	0.16	0.17	11.40	2.03
AFR	:1	7.99	10.94	9.70	9.37	6.27	12.61



**Team Results for
Clean Snowmobile Challenge 2015
Team 12**



Measurement Accuracy (SAE paper 961804)

ModeNum	H2_XLS %	ModalHC_Dry %	ModalFTIR_H2O %	N2 %	Ar %	AFR :1	Tr_Eff -
1	4.383	2.814	10.448	73.058	0.844	11.131	0.805
2	1.584	1.317	11.927	77.760	0.899	13.408	0.880
3	1.528	2.223	11.145	75.904	0.877	13.094	0.843
4	1.136	2.831	10.904	78.256	0.905	13.404	0.808
5	2.187	7.107	6.088	73.639	0.851	13.017	0.460

ModeNum	ModalWHC %	ModalC1 %	ModalC8 %	ModalSUM_HC %	ModalT_Emiss %	ModalError %
1	6033.201	-0.546	-0.068	-0.614	96.276	3.724
2	1164.614	-0.557	-0.070	-0.626	96.593	3.407
3	1179.572	-0.210	-0.026	-0.236	94.837	5.163
4	1046.743	-0.182	-0.023	-0.205	97.178	2.822
5	981.367	-0.878	-0.110	-0.988	94.583	5.417

Power Run

Team 12

TeamNumber	12
TeamName	Northern Illinois
Model	Polaris
Engine	Rush

Displacement cc	599.00
RatedSpeed	8022
RatedTorque	97.8

