© Copyright Statement

EVALUATION OF FPC-1® FUEL PERFORMANCE CATALYST

at

HILLSBOROUGH COUNTY SCHOOL BUS

Report Prepared by

UHI CORPORATION
PROVO, UTAH,
and
ICE, INC.,
TAMPA, FLORIDA

AUGUST 11, 1994

CONTENTS

INTRODUCTION

FPC-1® is a combustion catalyst which, when added to liquid hydrocarbon fuels at a ratio of 1:5000, improves the combustion reaction resulting in increased engine efficiency and reduced fuel consumption. The products of incomplete combustion are also positively affected.

Field and laboratory tests alike indicate a potential to reduce fuel consumption in diesel fleets in the range of 5% to 10%. Smoke and carbon monoxide emissions are typically reduced 15% to 30%. This report summarizes the results of controlled back-to-back field tests conducted by UHI Corporation, ICE, Inc., and Hillsborough County School Bus, with and without FPC-1® added to the diesel fuel. The fuel consumption determination procedure applied was the Carbon Balance Exhaust Emission Test at a given engine load and speed. This same method also measures the exhaust concentrations of carbon monoxide and unburned hydrocarbons. Smoke testing was also conducted using the Bacharach Smokemeter method.

EQUIPMENT TESTED

3 x International 6.9 powered school buses
2 x International 9.0 powered school buses
4 x International DT 466 powered school buses

TEST INSTRUMENTS:

The equipment and instruments involved in the carbon balance test program were:

Sun Electric SGA-9000 non-dispersive, infrared analyzer (NDIR) for measuring the exhaust gas constituents, HC (unburned hydrocarbons as hexane gas), CO, CO_2, and O_2.

Scott Specialty BAR 90 calibration gases for SGA-9000 internal calibration of the SGA-9000.

A Fluke Model 51 type "k" thermometer and wet/dry probe for measuring exhaust, fuel, and ambient temperature.

A Dwyer magnehelic and pitot tube for exhaust pressure differential measurement and exhaust air flow determination (CFM).

A Monarch phototachometer to determine and control engine speed (rpm).

A Bacharach True-Spot smokespot meter to determine the density of exhaust smoke from diesel engines.

A hydrometer for fuel specific gravity (density) measurement.

A Snap On throttle control for setting and holding engine speed at a fixed rpm.

TEST PROCEDURE

Carbon Balance

The carbon balance technique for determining changes in fuel consumption has been recognized by the US Environment Protection Agency (EPA) since 1973 and is central to the EPA-Federal Test Procedures (FTP) and Highway Fuel Economy Test (HFET). The method relies upon the measurement of vehicle exhaust emissions to determine fuel consumption rather than direct measurement (volumetric or gravimetric) of fuel consumption.

The application of the carbon balance test method utilized in this study involves the measurement of exhaust gases of a stationary vehicle under steady-state engine conditions. The method produces a value of engine fuel consumption with FPC-1® relative to a baseline value established with the same vehicle.

Engine speed and load are duplicated from test to test, and measurements of carbon containing exhaust gases (CO_2, CO, HC), oxygen (O_2), exhaust and ambient temperature, and exhaust and ambient pressure are made. A minimum of five readings are taken for each of the above parameters after engine stabilization has taken place (rpm, and exhaust, oil, and water temperature have stabilized). The technical approach to the carbon balance method is detailed in the Appendices.

Fuel specific gravity or density is measured enabling corrections to be made to the final engine performance factors based upon the energy content of the fuel reaching the injectors.

Smoke density was determined by drawing a fixed quantity of exhaust gases through a filter medium. The particulate's were collected onto the filter surface and the density determined by comparing the discoloration of the filter paper to a color calibrated scale.

Nine school buses made up the final test fleet. Table 1 in the Appendices summarizes the percent change in fuel consumption.

DISCUSSION

1. Fuel Density

Fuel specific gravity (density) on the average was unchanged from the baseline to the treated fuel carbon balance test, therefore, there was no need to correct the fuel energy content.

2. The Effect of FPC-1 upon Smoke Density

Smoke density was determined using the Bacharach smoke spot method. The Bacharach True-Spot Smokemeter measures smoke density by drawing a specific volume of exhaust gas through a fine paper filter medium (5 micron) while the engine is operating at a fixed rpm and under steady-state engine conditions. The smoke particles are trapped on the surface of the filter paper as the exhaust gases are drawn through it forming a darkened area called a "smoke spot". The filter paper is then removed from the smoke tester and the smoke spot visually compared to a precoded smoke scale. A smoke number is then assigned to the smoke spot according to the darkness of the spot. The smoke number scale ranges from 0 to 9. Higher smoke numbers correspond to darker smoke spots, which correspond to a greater smoke density in the exhaust. The baseline and treated fuel smoke spot numbers are found on Table 2 in the Appendices.

A reduction in smoke is prime evidence of improved combustion (Germane, SAE Technical Paper # 831204). Further, reduced exhaust smoking has been shown to be one of first evidences that engine carbon residue and soot blowby into the motor oil are also being reduced (ibid). The Hillsborough test fleet saw significant reductions in exhaust smoke density on the average (20%).

3. Factors Influencing the Test Results

Engine Preconditioning Period

All laboratory tests with FPC-1 show an engine preconditioning period of several hundred hours of engine operation at high engine speeds and load before maximum fuel savings and smoke reductions are realized. In virtually every fleet like that of Hillsborough County (heavy stop and go driving, high idle time), the preconditioning period seems to be extended. Suburban driving and high idle time result in much cooler combustion temperatures and increased engine smoking. This contributes to an extended engine preconditioning period.

The extremely low mileage accumulated over the length of the FPC-1 treated fuel period indicates the buses operate much of the time at less than optimum speeds and loads, confirming the above scenario. This fleet may need to double the current mileage accumulation before more typical fuel savings are realized.

Weather Conditions

More adverse weather conditions will also have a negative impact upon the carbon mass balance test and the length of the engine preconditioning period. For example, relative humidity averaged approximately 50% during the baseline and almost 80% during the treated carbon mass balance. Greater relative humidity reduces engine efficiency by reducing the free oxygen available to the fuel inside the combustion chamber, and by slowing the flame front. The generally lower exhaust temperatures inspite of slightly higher intake air temperatures testify to the reduced flame temperatures created by the increased humidity.

Engine smoking is also impacted by greater humidity. Higher relative humidity would create more engine smoking since the air ingested by the engine contains less oxygen per unit volume, while fuel flow remains constant, affecting the fuel-air ratio so that exhaust smoking increases.

It is entirely likely, that the same test conducted under conditions more like the baseline, would have shown even greater smoke reductions.

Anomalies

Bus 2030 demonstrated a 4.6% increase in fuel consumption. This bus was not treated with FPC-1. Likewise, the exhaust from this bus was rich with raw fuel which turned the smoke spot chip brown. All the buses treated with FPC-1 had exhausts that were more odor free. This bus is indicative of what the fleet might have been like had the other buses not been treated with FPC-1. The increased humidity, and increased mileage under stop and go, and high idle conditions probably contributed to the poorer combustion of the fuel and the increase in fuel consumption in the absence of FPC-1.

Bus 2070 had a new engine installed between the baseline and treated tests. Bus 1506 was installed with a new fuel pump during the same time period. The changes made to these buses would undoubtably have an effect upon fuel consumption. Therefore, these buses have been removed from the test sample.

Bus 1781 experienced an 8.38% reduction in fuel consumption, while Bus 1605 saw only a 0.66% reduction. Both of these buses had extremely low mileages on the catalyst. Therefore, it is felt the improvement in Bus 1781 is probably created by some mechanical change, and that Bus 1635 has not had sufficient time for the engine preconditioning period to be completed. It is recommended that these buses also be removed from the test sample.

CONCLUSIONS

1) With the anomalies created by changes in the engines or the lack of FPC-1 treatment removed, the fuel consumption change determined by the carbon balance method ranged from - 0.66 to - 8.38%. The fleet averaged a 4.87% reduction in fuel consumed after FPC-1 fuel treatment and only partial engine preconditioning. Removing the buses least likely to be effected by FPC-1 due to the lack of mileage run on catalyst treated fuel, the average for the fleet is 5.05%.

2) The fact that the only untreated bus (# 2030) saw a significant increase in fuel consumption indicates the fuel economy improvement in the buses having greater mileage with FPC-1 treated fuel may be several points higher than observed.

3) Smoke density was reduced approximately 20% with FPC-1 treated fuel. Again, with greater time on the catalyst and more favorable weather conditions, the reduction in smoke density may have been greater.

APPENDICES

CARBON BALANCE METHOD TECHNICAL APPROACH:

All test instruments were calibrated and zeroed prior to both baseline and treated fuel data collection. The SGA-9000 NDIR exhaust gas analyzer was internally calibrated using Scott Calibration Gases (BAR 90 Gases), and a leak test on the sampling hose and connections was performed. The same procedure was repeated after each test segment to determine any instrument drift.

Each vehicle's engine was brought up to operating temperature at a set rpm and allowed to stabilize as indicated by the engine water and exhaust temperature, and exhaust pressure. No exhaust gas measurements were made until each engine had stabilized at the rpm selected for the test. Engine rpm was set using a phototachometer and magnetic tape, or a dash mounted tachometer, and checked periodically to prevent any change in engine speed during the data collection period. # 2 diesel was used exclusively throughout the evaluation. Fuel specific gravity (density) and temperature were also taken.

The baseline fuel consumption test consisted of a minimum of five sets of measurements of CO_2, CO, HC, O_2, and exhaust temperature and pressure made at 90 second intervals. Each engine was tested in the same manner. Engine rpm were also recorded at approximately 90 second intervals.

After the baseline test the fuel storage tanks were treated with FPC-1® at the recommended level of 1 oz. of catalyst to 40 gallons of fuel (1:5000 volume ratio). Each succeeding fuel shipment was also treated with FPC-1®. The equipment was operated on treated fuel until the final test was run.

During the two test segments, an internal self-calibration of the exhaust analyzer was performed after every two sets of measurements to correct instrument drift, if any.

From the exhaust gas concentrations of $C0_2$, CO, HC, and O_2 measured during the test, the average molecular weight of these gases, and the temperature and volumetric flow rate of the exhaust stream, the mass flow rate of the fuel to the engine (rate of fuel consumption) may be expressed as a engine "performance factor" which relates the fuel consumption of the treated fuel to the baseline. The calculations are based on the assumption that engine operating conditions are essentially the same throughout the test. Engines with known mechanical problems or having undergone repairs affecting fuel consumption are removed from the sample.

A sample calculation is found in Figure 2.

COMPUTER PRINTOUTS

Company Name:	Hillsborough County	*Location*	Tampa, FL	*Date:*	4/5/94
Test Portion:	Baseline	*Stack Diam.*	4 Inches		
Engine Type:	International 6.9	*Mile/Hrs*	172373		
Equipment Type:	School Bus	*ID #:*	1506	*Baro*	30.04
Fuel Sp. Gravity(SG	0.8500	*Temp:*	82		
				Time:	

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
3900	208.2	0.84	0.03	4	1.83	18.1	
3900	209.6	0.82	0.03	5	1.84	18	
3900	211.6	0.84	0.03	8	1.82	18	
3900	212	0.86	0.03	5	1.81	18	
3900	212.2	0.84	0.03	5	1.79	18	
3900.000	**210.720**	**.840**	**.030**	**5.400**	**1.818**	**18.020**	Mean
0	**1.746997424**	**0.01414214**	**0**	**1.51657509**	**0.01923538**	**0.04472136**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
5.40E-06	0.0003	0.01818	0.1802	29.0119932	333,059	621,003

Company Name:	Hillsborough County	*Location:*	Tampa, FL	*Test Date:*	8/9/94
Test Portion:	Treated	*Stack Diam:*	4 Inches		
Engine Type:	International 6.9	*Mile/Hrs:*	177394		
Equipment Type	School Bus	*ID #:*	1506	*Baro:*	30.08
Fuel Sp. Gravity:	0.851	*Temp:*			
SG Corr Factor:	1			*Time:*	

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
3880	206.4	0.78	0.02	5	1.83	18	
3880	206.4	0.78	0.02	6	1.91	18	
3880	207.2	0.8	0.02	6	1.91	17.9	
3880	207.2	0.8	0.02	6	1.91	17.8	
3880	209.4		0.02	6	1.9	18	
3880	209.4		0.02	8	1.92	18	
3880.000	**207.667**	**.790**	**.020**	**6.167**	**1.897**	**17.950**	Mean
0	**1.389484317**	**0.01154701**	**0**	**0.98319208**	**0.0332666**	**0.083666**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
6.17E-06	0.0002	0.01896667	0.1795	29.0218243	321,175	616,507

Performance factor adjusted for fuel density: 616,507

****% Change PF= -0.72 %**

*** A positive change in PF equates to a reduction in fuel consumption.*

Company Name:	Hillsborough County	*Location*	Tampa, FL	*Date:*	4/5/94
Test Portion:	Baseline	*Stack Diam.*	4 Inches		
Engine Type:	International DT 466	*Mile/Hrs*	120388		
Equipment Type:	School Bus	*ID #:*	2070	*Baro*	30.04
Fuel Sp. Gravity(SG	0.8480	*Temp:*			
				Time:	

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1600	247.8	0.54	0.04	14	2.02	17.3	
1600	250.2	0.54	0.04	17	2.07	17.4	
1600	253.8	0.56	0.04	17	2.07	17.4	
1600	254.2	0.56	0.04	17	2.04	17.4	
1600	254.8	0.56	0.05	17	1.99	17.4	
1600.000	**252.160**	**.552**	**.042**	**16.400**	**2.038**	**17.380**	Mean
0	**3.027870539**	**0.01095445**	**0.004472136**	**1.34164079**	**0.03420526**	**0.04472136**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
1.64E-05	0.00042	0.02038	0.1738	29.0222312	295,078	699,354

Company Name:	Hillsborough County	*Location:*	Tampa, FL	*Test Date:*	8/9/94
Test Portion:	Treated	*Stack Diam:*	4 Inches		
Engine Type:	International DT 466	*Mile/Hrs:*	127816		
Equipment Type	School Bus	*ID #:*	2070	*Baro:*	30.08
Fuel Sp. Gravity:	0.848	*Temp:*			
SG Corr Factor:	1			*Time:*	

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1600	237	0.5	0.05	22	1.88	18.2	
1600	237.4	0.5	0.05	22	1.87	18.2	
1600	237.6	0.52	0.05	21	1.99	17.6	
1600	237.6	0.52	0.05	21	1.99	17.7	
1600	239	0.52	0.05	22	1.96	17.5	
1600	239	0.52	0.05	23	1.96	17.5	
1600.000	**237.933**	**.513**	**.050**	**21.833**	**1.942**	**17.783**	Mean
0	**0.854790423**	**0.01032796**	**8.33E-10**	**0.75277265**	**0.05344779**	**0.33115958**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
2.18E-05	0.0005	0.01941667	0.177833333	29.0232663	307,573	748,833

Performance factor adjusted for fuel density: 748,833

****% Change PF = 7.07 %**

*** A positive change in PF equates to a reduction in fuel consumption.*

Company Name:	Hillsborough County	*Location*	Tampa, FL	*Date:*	4/5/94
Test Portion:	Baseline	*Stack Diam.*	4 Inches		
Engine Type:	International 9.0	*Mile/Hrs*	125352		
Equipment Type:	School Bus	*ID #:*	1635	*Baro*	30.04
Fuel Sp. Gravity(SG	0.8480	*Temp:*			
				Time:	

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1550	219.6	0.94	0.03	12	1.34	18.6	
1550	221	0.94	0.03	12	1.38	18.5	
1550	222.2	0.96	0.03	10	1.38	18.4	
1550	223	0.96	0.03	12	1.36	18.4	
1550	224.2	1	0.02	10	1.36	18.4	
1550.000	**222.000**	**.960**	**.028**	**11.200**	**1.364**	**18.460**	Mean
0	**1.777638883**	**0.0244949**	**0.004472136**	**1.09544512**	**0.0167332**	**0.08944272**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
1.12E-05	0.00028	0.01364	0.1846	28.9572896	439,890	773,644

Company Name:	Hillsborough County	*Location:*	Tampa, FL	*Test Date:*	8/9/94
Test Portion:	Treated	*Stack Diam:*	4 Inches		
Engine Type:	International 9.0	*Mile/Hrs:*	127835		
Equipment Type	School Bus	*ID #:*	1635	*Baro:*	30.08
Fuel Sp. Gravity:	0.848	*Temp:*			
SG Corr Factor:	1			*Time:*	

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1525	211.6	0.9	0.02	17	1.38	18.2	
1525	212.6	0.9	0.02	14	1.38	18.3	
1550	217.4	0.9	0.02	17	1.4	18.4	
1550	217.4	0.9	0.02	17	1.4	18.4	
1550	210	0.9	0.02	17	1.4	18.4	
1550	210	0.9	0.02	17	1.42	18.3	
1541.667	**213.167**	**.900**	**.020**	**16.500**	**1.397**	**18.333**	Mean
12.90994449	**3.425589974**	**1.3328E-08**	**0**	**1.22474487**	**0.01505545**	**0.08164966**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
1.65E-05	0.0002	0.01396667	0.183333333	28.957757	431,247	778,747

Performance factor adjusted for fuel density: 778,747

****% Change PF= 0.66 %**

*** A positive change in PF equates to a reduction in fuel consumption.*

Company Name:	Hillsborough County	*Location*	Tampa, FL	*Date:*	4/5/94
Test Portion:	Baseline	*Stack Diam.*	4 Inches		
Engine Type:	International 9.0	*Mile/Hrs*	126279		
Equipment Type:	School Bus	*ID #:*	1781	*Baro*	30.04
Fuel Sp. Gravity(SG	0.8480	*Temp:*	195		
				Time:	

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1600	204	1.5	0.03	10	1.45	18.3	
1600	219	1.4	0.04	12	1.43	18.3	
1600	225.4	1.4	0.04	12	1.43	18.3	
1600	227.6	1.4	0.03	13	1.45	18.3	
1600	229.6	1.4	0.03	13	1.41	18.4	
1600.000	**221.120**	**1.420**	**.034**	**12.000**	**1.434**	**18.320**	Mean
0	**10.36590565**	**0.04472136**	**0.005477226**	**1.22474487**	**0.0167332**	**0.04472136**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
1.20E-05	0.00034	0.01434	0.1832	28.962936	417,163	602,857

Company Name:	Hillsborough County	*Location:*	Tampa, FL	*Test Date:*	8/9/94
Test Portion:	Treated	*Stack Diam:*	4 Inches		
Engine Type:	International 9.0	*Mile/Hrs:*	127876		
Equipment Type	School Bus	*ID #:*	1781	*Baro:*	30.08
Fuel Sp. Gravity:	0.848	*Temp:*	79		
SG Corr Factor:	1			*Time:*	

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1600	223	1.4	0.03	10	1.31	18.6	
1600	223	1.4	0.03	12	1.33	18.6	
1600	223	1.5	0.03	13	1.32	18.9	
1600	223.8	1.5	0.03	13	1.32	18.8	
1600	224	1.5	0.03	13	1.26	18.9	
1600.000	**223.360**	**1.460**	**.030**	**12.200**	**1.308**	**18.760**	Mean
0	**0.497995984**	**0.05477226**	**0**	**1.30384048**	**0.02774887**	**0.15165751**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
1.22E-05	0.0003	0.01308	0.1876	28.9603876	457,379	653,363

Performance factor adjusted for fuel density: 653,363

****% Change PF= 8.38 %**

*** A positive change in PF equates to a reduction in fuel consumption.*

Company Name:	Hillsborough County	*Location*	Tampa, FL	*Date:*	4/5/94
Test Portion:	Baseline	*Stack Diam.*	4 Inches		
Engine Type:	International DT 466	*Mile/Hrs*	65735		
Equipment Type:	School Bus	*ID #:*	2435	*Baro*	30.04
Fuel Sp. Gravity(SG	0.8480	*Temp:*	88.9 & 170		
				Time:	

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1500	232.2	0.48	0.04	15	1.89	17.6	
1500	241	0.48	0.03	17	1.85	17.7	
1500	247.2	0.5	0.03	17	1.84	17.7	
1500	253.4	0.52	0.03	17	1.89	17.6	
1500	253.6	0.52	0.03	18	1.88	17.6	
1500	256.8	0.52	0.03	18	1.9	17.5	
1500.000	**247.367**	**.503**	**.032**	**17.000**	**1.875**	**17.617**	Mean
0	**9.325592028**	**0.01966384**	**0.004082483**	**1.09544512**	**0.02428992**	**0.07527727**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
1.70E-05	0.000316667	0.01875	0.176166667	29.0056527	321,508	795,294

Company Name:	Hillsborough County	*Location:*	Tampa, FL	*Test Date:*	8/9/94
Test Portion:	Treated	*Stack Diam:*	4 Inches		
Engine Type:	International DT 466	*Mile/Hrs:*	71529		
Equipment Type	School Bus	*ID #:*	2435	*Baro:*	30.08
Fuel Sp. Gravity:	0.848	*Temp:*			
SG Corr Factor:	1			*Time:*	

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1500	230.6	0.52	0.02	17	1.73	18.6	
1500	230.2	0.52	0.02	15	1.74	18.8	
1500	228	0.5	0.02	13	1.72	18.3	
1500	227.8	0.5	0.02	14	1.72	18.2	
	226	0.5	0.02	14	1.76	18.3	
	226	0.5	0.02	14	1.76	18.3	
1500.000	**228.100**	**.507**	**.020**	**14.500**	**1.738**	**18.417**	Mean
0	**1.978888577**	**0.01032796**	**0**	**1.37840488**	**0.01834848**	**0.23166067**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
1.45E-05	0.0002	0.01738333	0.184166667	29.015641	348,900	848,975

Performance factor adjusted for fuel density: 848,975

****% Change PF= 6.75 %**

*** A positive change in PF equates to a reduction in fuel consumption.*

Company Name:	Hillsborough County	*Location*	Tampa, FL	*Date:*	4/5/94
Test Portion:	Baseline	*Stack Diam.*	4 Inches		
Engine Type:	International 6.9	*Mile/Hrs*	149120		
Equipment Type:	School Bus	*ID #:*	1519	*Baro*	30.04
Fuel Sp. Gravity(SG	0.8500	*Temp:*	195		
				Time:	

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
4125	212.6	0.82	0.02	5	1.93	17.3	
4125	215.4	0.84	0.02	5	1.89	17.3	
4125	213.4	0.84	0.02	5	1.91	17.2	
4125	214.8	0.82	0.02	6	1.91	17.3	
4125	214	0.84	0.02	5	1.91	17.2	
4125.000	**214.040**	**.832**	**.020**	**5.200**	**1.910**	**17.260**	Mean
0	**1.108151614**	**0.01095445**	**0**	**0.4472136**	**0.01414214**	**0.05477226**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
5.20E-06	0.0002	0.0191	0.1726	28.9963016	318,782	598,710

Company Name:	Hillsborough County	*Location:*	Tampa, FL	*Test Date:*	8/9/94
Test Portion:	Treated	*Stack Diam:*	4 Inches		
Engine Type:	International 6.9	*Mile/Hrs:*	154539		
Equipment Type	School Bus	*ID #:*	1519	*Baro:*	30.08
Fuel Sp. Gravity:	0.849	*Temp:*			
SG Corr Factor:	1			*Time:*	

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
4115	197.8	0.78	0.02	5	1.93	17.4	
4115	197.8	0.78	0.02	5	1.92	17.1	
4100	200.2	0.78	0.02	5	1.97	17.7	
4100	200.2	0.78	0.02	3	1.97	17.2	
4120	200.6	0.78	0.02	5	1.9	17.9	
4120	200.6	0.78	0.02	5	1.9	18	
4111.667	**199.533**	**.780**	**.020**	**4.667**	**1.932**	**17.550**	Mean
9.309493362	**1.354498677**	**0**	**0**	**0.81649658**	**0.03188521**	**0.37282704**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
4.67E-06	0.0002	0.01931667	0.1755	29.0113373	315,468	605,698

Performance factor adjusted for fuel density: 605,698

****% Change PF= 1.17 %**

*** A positive change in PF equates to a reduction in fuel consumption.*

Company Name:	Hillsborough County	*Location*	Tampa, FL	*Date:*	4/5/94
Test Portion:	Baseline	*Stack Diam.*	4 Inches		
Engine Type:	International 6.9	*Mile/Hrs*	144540		
Equipment Type:	School Bus	*ID #:*	1527	*Baro*	30.04
Fuel Sp. Gravity(SG	0.8480	*Temp:*			
				Time:	

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
3850	210.4	0.85	0.03	6	1.86	17.7	
3850	211.2	0.85	0.03	5	1.86	17.7	
3850	210.6	0.84	0.03	5	1.86	17.7	
3850	212	0.86	0.03	5	1.86	17.7	
3850	214	0.84	0.02	5	1.86	17.7	
3850.000	**211.640**	**.848**	**.028**	**5.200**	**1.860**	**17.700**	Mean
0	**1.458766602**	**0.0083666**	**0.004472136**	**0.4472136**	**0**	**0**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
5.20E-06	0.00028	0.0186	0.177	29.0059016	325,969	605,324

Company Name:	Hillsborough County	*Location:*	Tampa, FL	*Test Date:*	8/9/94
Test Portion:	Treated	*Stack Diam:*	4 Inches		
Engine Type:	International 6.9	*Mile/Hrs:*	149888		
Equipment Type	School Bus	*ID #:*	1527	*Baro:*	30.08
Fuel Sp. Gravity:	0.848	*Temp:*			
SG Corr Factor:	1			*Time:*	

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
3863	195.6	0.84	0.03	6	1.78	17.2	
3830	197.6	0.84	0.02	5	1.78	17.3	
3830	198	0.84	0.02	5	1.79	17.4	
3830	198	0.84	0.02	5	1.78	17.4	
3830	198	0.78	0.02	5	1.73	18.1	
3830	198	0.78	0.02	4	1.72	18.1	
3835.500	**197.533**	**.820**	**.022**	**5.000**	**1.763**	**17.583**	Mean
13.47219359	**0.960555395**	**0.03098387**	**0.004082483**	**0.63245553**	**0.03011091**	**0.4070217**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
5.00E-06	0.000216667	0.01763333	0.175833333	28.9857567	344,529	644,181

Performance factor adjusted for fuel density: 644,181

****% Change PF= 6.42 %**

*** A positive change in PF equates to a reduction in fuel consumption.*

Company Name:	Hillsborough County	*Location*	Tampa, FL	*Date:*	4/5/94
Test Portion:	Baseline	*Stack Diam.*	4 Inches		
Engine Type:	International DT 466	*Mile/Hrs*	75161		
Equipment Type:	School Bus	*ID #:*	2318	*Baro*	30.04
Fuel Sp. Gravity(SG	0.8480	*Temp:*	170		
				Time:	

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1600	268	0.52	0.05	14	1.99	17.5	
1600	263	0.52	0.05	15	1.99	17.5	
1600	264	0.52	0.05	17	2.01	17.5	
1600	261.4	0.52	0.05	17	2.03	17.5	
1600	262.2	0.52	0.05	17	2	17.5	
1600.000	**263.720**	**.520**	**.050**	**16.000**	**2.004**	**17.500**	Mean
0	**2.579147146**	**0**	**6.58545E-10**	**1.41421356**	**0.0167332**	**0**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
1.60E-05	0.0005	0.02004	0.175	29.021568	298,825	735,599

Company Name:	Hillsborough County	*Location:*	Tampa, FL	*Test Date:*	8/9/94
Test Portion:	Treated	*Stack Diam:*	4 Inches		
Engine Type:	International DT 466	*Mile/Hrs:*	78784		
Equipment Type	School Bus	*ID #:*	2318	*Baro:*	30.08
Fuel Sp. Gravity:	0.848	*Temp:*			
SG Corr Factor:	1			*Time:*	

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
1600	253	0.5	0.05	18	1.94	18	
1600	251	0.5	0.05	19	1.92	18	
1600	251	0.5	0.05	17	1.91	18	
1600	249	0.5	0.05	17	1.91	18.1	
1600	245	0.48	0.05	17	1.92	18.2	
1600	242	0.48	0.05	17	1.93	18.2	
1600.000	**248.500**	**.493**	**.050**	**17.500**	**1.922**	**18.083**	Mean
0	**4.183300133**	**0.01032796**	**8.33E-10**	**0.83666003**	**0.01169045**	**0.09831921**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
1.75E-05	0.0005	0.01921667	0.180833333	29.031815	311,197	778,692

Performance factor adjusted for fuel density: 778,692

****% Change PF= 5.86 %**

*** A positive change in PF equates to a reduction in fuel consumption.*

Company Name:	Hillsborough County	*Location*	Tampa, FL	*Date:*	4/5/94
Test Portion:	Baseline	*Stack Diam.*	4 Inches		
Engine Type:	International DT 466	*Mile/Hrs*	89284		
Equipment Type:	School Bus	*ID #:*	2303	*Baro*	30.04
Fuel Sp. Gravity(SG	0.8480	*Temp:*	120		
				Time:	

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
3780	246.4	0.4	0.08	22	2.06	17.3	
3780	246.6	0.42	0.08	26	2.06	17.2	
3780	250.2	0.42	0.08	27	2.04	17.3	
3780	250	0.42	0.08	27	2.05	17.2	
3780	251.6	0.42	0.08	27	2.05	17.2	
3780.000	**248.960**	**.416**	**.080**	**25.800**	**2.052**	**17.240**	Mean
0	**2.329806859**	**0.00894427**	**0**	**2.16794834**	**0.0083666**	**0.05477226**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw1	pf1	PF1
2.58E-05	0.0008	0.02052	0.1724	29.0194164	287,082	782,007

Company Name:	Hillsborough County	*Location:*	Tampa, FL	*Test Date:*	8/9/94
Test Portion:	Treated	*Stack Diam:*	4 Inches		
Engine Type:	International DT 466	*Mile/Hrs:*	95097		
Equipment Type	School Bus	*ID #:*	2303	*Baro:*	30.08
Fuel Sp. Gravity:	0.848	*Temp:*			
SG Corr Factor:	1			*Time:*	

RPM	Exh Temp	Pv Inch	CO	HC	CO2	O2	
3780	235.8	0.44	0.06	25	2.06	17.4	
3780	235.8	0.44	0.06	26	2.07	17.4	
3780	236	0.44	0.06	26	2.1	17.4	
3780	236	0.44	0.06	26	2.12	17.4	
3780	236.4	0.44	0.06	26	2.12	17.3	
3780	236.8	0.44	0.06	26	2.11	17.3	
3780.000	**236.133**	**.440**	**.060**	**25.833**	**2.097**	**17.367**	Mean
0	**0.393276832**	**0**	**0**	**0.40824829**	**0.02581989**	**0.05163978**	Std Dev

VFHC	VFCO	VFCO2	VFO2	Mtw2	pf2	PF2
2.58E-05	0.0006	0.02096667	0.173666667	29.0316317	283,940	745,720

Performance factor adjusted for fuel density: 745,720

****% Change PF= -4.64 %**

*** A positive change in PF equates to a reduction in fuel consumption.*

Table 1. Change in Fuel Consumption with FPC-1

Unit #	Baseline PF	FPC-1 PF	Percent Change
1519	598,710	605,698	- 1.17
1781	602,857	653,363	- 8.38
2435	795,294	848,975	- 6.75
1527	605,324	644,181	- 6.42
**2070	699,354	748,833	- 7.07
2318	735,599	778,692	- 5.86
*2303	782,007	745,720	+ 4.64
**1506	621,003	616,507	+ 0.72
1635	773,644	778,747	- 0.66
Fleet Average:			- 4.45

* Bus 2303 was not treated with FPC-1 for several weeks before and during the carbon mass balance test, and therefore is removed from the fleet average.

** The engine in Bus 2070 was replaced between the baseline and treated carbon mass balance tests. A new fuel pump was installed on Bus 1506 between the baseline and treated tests.

Table 2. Change in Smoke Density with FPC-1

Unit #	Baseline SS#	FPC-1 SS#	Percent Change
1519	8.5	7.5	- 11.8
1781	7.0	3.0	- 57.1
2435	4.0	n/a	
1527	9.0	7.0	- 22.2
**2070	4.0	3.5	- 12.5
2318	3.0	3.0	00.0
*2303	3.0	3.0	00.0
**1506	7.0	7.0	00.0
1635	4.0	3.0	- 25.0
Fleet Average:	5.9	4.7	- 20.3

* Bus 2303 was not treated with FPC-1 for several weeks before and during the carbon mass balance test, and therefore is removed from the fleet average. The exhaust was rich with unburned fuel that produced a strong diesel odor and that stung the eyes. The smoke spot number was nearly the same as the baseline, but he spot was brown rather than grey.

** The engine in Bus 2070 was replaced between the baseline and treated tests. A new fue lpump was installed on Bus 1506 between the two tests.

Table 3. Comparison of Miles Run with FPC-1

Unit #	Baseline	FPC-1	Difference
1519	149,120	154,539	5,419
1781	126,279	127,876	1,597
2435	65,735	71,529	5,794
1527	144,540	149,881	5,348
**2070	120,388	127,816	7,428
2318	75,161	78,784	3,623
*2303	89,284	95,097	5,813
**1506	172,373	177,394	5,021
1635	125,352	127,835	2,483
Fleet Average:			4,589

* Bus 2303 was not treated with FPC-1 for several weeks before and during the carbon mass balance test, and therefore is removed from the fleet average.

** The engine was replaced in Bus 2070. The fuel pump was replaced in Bus 1506.

Figure 1
CARBON MASS BALANCE FORMULAE

ASSUMPTIONS: $C_{12}H_{26}$ and SG = 0.82
Time is constant
Load is constant

DATA:

Mwt = Molecular Weight
pf1 = Calculated Performance Factor (Baseline)
pf2 = Calculated Performance Factor (Treated)
PF1 = Performance Factor (adjusted for Baseline exhaust mass)
PF2 = Performance Factor (adjusted for Treated exhaust mass)
CFM = Volumetric Flow Rate of the Exhaust
SG = Specific Gravity of the Fuel
VF = Volume Fraction
d = Exhaust stack diameter in inches
Pv = Velocity pressure in inches of H_20
P_B = Barometric pressure in inches of mercury
Te = Exhaust temperature ^OF

VFHC = "reading" ÷ 1,000,000
VFCO = "reading" ÷ 100
$VFCO_2$ = "reading" ÷ 100
VFO_2 = "reading" ÷ 100

EQUATIONS:

$$Mwt = (VFHC)(86)+(VFCO)(28)+(VFCO_2)(44)+(VFO_2)(32)+[(1-VFHC-VFCO-VFCO_2-VFO_2)(28)]$$

$$pf1 \text{ or } pf2 = \frac{3099.6 \times Mwt}{86(VFHC)+13.89(VFCO)+13.89(VFCO_2)}$$

$$CFM = \frac{(d/2)^2\pi}{144}\left(1096.2\sqrt{\frac{Pv}{1.325(PB/ET+460)}}\right)$$

$$PF1 \text{ or } PF2 = \frac{pf \times (Te+460)}{CFM}$$

FUEL ECONOMY:
PERCENT INCREASE (OR DECREASE)

$$\frac{PF2 - PF1}{PF1} \times 100$$

Figure 2.

SAMPLE CALCULATION FOR THE CARBON MASS BALANCE

BASELINE:

Equation 1 (Volume Fractions)

VFHC = 13.20/1,000,000
= 0.0000132

VFCO = 0.017/100
= 0.00017

$VFCO_2$ = 1.937/100
= 0.01937

VFO_2 = 17.10/100
= 0.171

Equation 2 (Molecular Weight)

Mwt1 = (0.0000132)(86) + (0.00017)(28) + (0.01937)(44) + (0.171)(32)
+ [(1-0.0000132-0.00017-0.01937-0.171)(28)]

Mwt1 = 28.995

Equation 3 (Calculated Performance Factor)

$$pf1 = \frac{3099.6 \times 28.995}{86(0.0000132) + 13.89(0.00017) + 13.89(0.01937)}$$

pf1 = 329,809

Equation 4 (CFM Calculations)

$$CFM = \frac{(d/2)^2\pi}{144}\left(1096.2\sqrt{\frac{Pv}{1.325(PB/ET+460)}}\right)$$

d = Exhaust stack diameter in inches
Pv = Velocity pressure in inches of H_20
P_B = Barometric pressure in inches of mercury
Te = Exhaust temperature ^OF

$$CFM = \frac{(10/2)^2\pi}{144}\left(1096.2\sqrt{\frac{.80}{1.325(30.00/313.100+460)}}\right)$$

CFM = 2358.37

Equation 5 (Corrected Performance Factor)

PF1 = $\frac{329,809(313.1 \text{ deg F} + 460)}{2358.37 \text{ CFM}}$

PF1 = 108,115

TREATED:

Equation 1 (Volume Fractions)

VFHC = 14.6/1,000,000
= 0.0000146

VFCO = .013/100
= 0.00013

$VFCO_2$ = 1.826/100
= 0.01826

VFO_2 = 17.17/100
= 0.1717

Fuel Specific Gravity Correction Factor

Baseline Fuel Specific Gravity - Treated Fuel Specific Gravity/Baseline Fuel Specific Gravity +1

.840-.837/.840+1=1.0036

PF2 = 115,966 x Specific Gravity Correction

PF2 = 115,966 x 1.0036

PF2 = 116,384

Equation 6 (Percent Change in Engine Performance Factor:)

$$\% \text{ Change PF} = \frac{PF2 - PF1}{PF1} \times 100$$

% Change PF = [(116,384 - 108,115)/108,115](100)

= +7.65

Note: A positive change in PF equates to a reduction in fuel consumption.

Equation 2 (Molecular Weight)

Mwt2 = (0.0000146)(86)+(0.00013)(28)+(0.01826)(44)+(0.1717)(32)
+ [(1-0.0000146-0.00013-0.01826-0.1717)(28)]

Mwt2 = 28.980

Equation 3 (Calculated Performance Factor)

$$pf2 = \frac{3099.6 \times 28.980}{86(0.0000146)+13.89(0.00013)+13.89(0.01826)}$$

pf2 = 349,927

Equation 4 (CFM Calculations)

$$CFM = \frac{(d/2)^2\pi}{144}\left(1096.2\sqrt{\frac{Pv}{1.325(PB/ET+460)}}\right)$$

d = Exhaust stack diameter in inches
Pv = Velocity pressure in inches of H_20
P_B = Barometric pressure in inches of mercury
Te = Exhaust temperature ^OF

$$CFM = \frac{(10/2)^2\pi}{144}\left(1096.2\sqrt{\frac{.775}{1.325(29.86/309.02+460)}}\right)$$

CFM = 2320.51

Equation 5 (Corrected Performance Factor)

$$PF2 = \frac{349,927(309.02 \text{ deg F} + 460)}{2320.51 \text{ CFM}}$$

= 115,966

RAW DATA WORK SHEETS

Carbon Mass Balance Field Data Form

Test #1

Company:_____ Location:_____ Test Date:_____

Test Portion: Baseline:_____ Treated:_____ Exhaust Stack Diameter: ___Inches

Engine Make/Model: ~~Ford~~ International 6.9 Miles/Hours: 172373 I.D.#: 1506

Type of Equipment: School Bus International

Fuel Specfic Gravity: .850 @: 87° (°F) 180°

Barometric Pressure: _____ inches of Mercury Start Time:_____

RPM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	~~NO_x~~ Smoke
~~Alt~~ 3900 ~~3900~~ ~~HSAS~~	208.2	.84	.03	4	1.83	18.1	
3900	209.6	.82	.03	5	1.84	18.0	
3900	211.6	.84	.03	8	1.82	18.0	
3900	212.0	.86	.03	5	1.81	18.0	
3900	212.2	.84	.03	5	1.79	18.0	7.0

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

Test #2

Company:_____ Location:_____ Test Date:_____

Test Portion: Baseline:_____ Treated:_____ Exhaust Stack Diameter: ___Inches

Engine Make/Model: International 6.9 Miles/Hours: 149,120 I.D.#: 1519

Type of Equipment: International School Bus

195°F

Fuel Specfic Gravity: .850 @:_____ (°F)

Barometric Pressure: _____ inches of Mercury Start Time:_____

RPM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	Smoke
Alt 4125	212.6	.82	.02	5	1.93	17.3	
4125	215.4	.84	.02	5	1.89	17.3	
4125	213.4	.84	.02	5	1.91	17.2	
4125	214.8	.82	.02	6	1.91	17.3	
4125	214.0	.84	.02	5	1.91	17.2	8.5

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

Test #3

Company:_____ Location:_____ Test Date:_____
Test Portion: Baseline:_____ Treated:_____ Exhaust Stack Diameter: ___Inches

Engine Make/Model: International 9.0 liter Miles/Hours: 116,804 I.D.#: 1846
Type of Equipment: International School Bus

Fuel Specfic Gravity: _____ @: 170° F (°F)

Barometric Pressure: _____ inches of Mercury Start Time:_____

RPM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	~~NO~~ Smoke #
Air Comp 1300	200.6	.9	.05	10	1.34	18.2	
1300	201.0	.88	.05	12	1.34	18.1	
1300	203.0	.9	.05	12	1.33	18.2	
1300	203.0	.84	.05	13	1.36	18.1	
1300	203.0	.9	.05	12	1.35	18.1	3

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

Test #4

Company:_____ Location:_____ Test Date:_____
Test Portion: Baseline:_____ Treated:_____ Exhaust Stack Diameter: ___Inches

Engine Make/Model: DT 466 International Miles/Hours: 89,284 I.D.#: 2303
Type of Equipment: International School Bus

Fuel Specfic Gravity: _____ @: 3120°F (°F)

Barometric Pressure: 30.04 inches of Mercury Start Time:_____

RPM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NOx Smoke #
Alt 3780	246.4	.4	.08	22	2.06	17.3	
3780	246.6	.42	.08	26	2.06	17.2	
3780	250.2	.42	.08	27	2.04	17.3	
3780	250.0	.42	.08	27	2.05	17.2	
3780	251.6	.42	.08	27	2.05	17.2	4.5

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

Test #5

Company:_____ Location:_____ Test Date:_____

Test Portion: Baseline:_____ Treated:_____ Exhaust Stack Diameter: ___Inches

Engine Make/Model: International 6.9 Miles/Hours: 168,435 I.D.#: 1520

Type of Equipment: International School Bus

Fuel Specfic Gravity: _____ @: 195°F (°F)

Barometric Pressure: _____ inches of Mercury Start Time:_____

RPM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	~~NO_x~~ Smoke #
Alt 4370	214.0	.9	.02	6	1.78	17.8	
4380	216.0	.88	.02	5	1.81	17.8	
4380	216.8	.9	.03	5	1.73	17.9	
4380	215.2	.9	.02	4	1.75	17.8	
4390	221.2	.9	.03	5	1.79	17.8	8

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

Test #6

Company:_____ Location:_____ Test Date:_____
Test Portion: Baseline:_____ Treated:_____ Exhaust Stack Diameter: ___Inches

Engine Make/Model: International 9.0 Miles/Hours: 126,279 I.D.#: 1781
Type of Equipment: International School Bus

Fuel Specfic Gravity: _____ @: 195 °F (°F)

Barometric Pressure: _____ inches of Mercury Start Time:_____

	RPM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	~~NO~~ Smoke
1600	~~Amb Temp~~ TAC ~~1900~~	204.0	1.5	~~.03~~ .03	10	1.45	18.3	
1600	~~1900~~	219.0	1.4	.04	12	1.43	18.3	
1600	~~1900~~	225.4	1.4	.04	12	1.43	18.3	
1600	~~1900~~	227.6	1.4	.03	13	1.45	18.3	
1600	~~1900~~	229.6	1.4	.03	13	1.41	18.4	7

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

Test #7

Company:_____ Location:_____ Test Date:_____

Test Portion: Baseline:_____ Treated:_____ Exhaust Stack Diameter: ___Inches

Engine Make/Model: International DT466 Miles/Hours: 65,735 I.D.#: 2435

Type of Equipment: _____

Fuel Specfic Gravity: .845 88.6° @: 170° (°F)

Barometric Pressure: _____ inches of Mercury Start Time:_____

RPM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	~~NO_x~~ Smoke
TAC 1500	232.2	.48	.04	15	1.89	17.6	
1500	241.0	.48	.03	17	1.85	17.7	
1500	247.2	.50	.03	17	1.84	17.7	
1500	253.4	.52	.03 ~~.03~~	17	1.89	17.6	
1500	253.6	.52	.03	18	1.88	17.6	
1500	256.8	.52	.03	18	1.90	17.5	4

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

Test #8

Company:_____ Location:_____ Test Date:_____

Test Portion: Baseline:_____ Treated:_____ Exhaust Stack Diameter: ___Inches

Engine Make/Model: International 9.0 Miles/Hours: 125,352 I.D.#: 1635

Type of Equipment: International School Bus

Fuel Specfic Gravity: _____ @:_____ (°F)

Barometric Pressure: _____ inches of Mercury Start Time:_____

RPM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NO_x
TAC 1550	219.6	.94	.03	12	1.34	18.6	
1550	221.0	.94	.03	12	1.38	18.5	
1550	222.2	.96	.03	10	1.38	18.4	
1550	223.0	.96	.03	12	1.36	18.4	
1550	224.2	1.0	.02	10	1.36	18.4	4

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Test #9

Carbon Mass Balance Field Data Form

Company:_____ Location:_____ Test Date:_____
Test Portion: Baseline:_____ Treated:_____ Exhaust Stack Diameter: ___Inches
Engine Make/Model: International 6.9 Miles/Hours: 144,540 I.D.#: 1527
Type of Equipment: International School Bus

Fuel Specfic Gravity: _____ @:_____ (°F)

Barometric Pressure: _____ inches of Mercury Start Time:_____

RPM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NO_x
Alt 3850	210.4	.85	.03	6	1.86	17.7	
3850	211.2	.85	.03	5	1.86	17.7	
3850	210.6	.84	.03	5	1.86	17.7	
3850	212.0	.86	.03	5	1.86	17.7	
3850	214.0	.84	.02	5	1.86	17.7	9

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

Test # 10

Company:_____ Location:_____ Test Date:_____

Test Portion: Baseline:_____ Treated:_____ Exhaust Stack Diameter: ___Inches

Engine Make/Model: International DT466 Miles/Hours: 120,388 I.D.#: 2070

Type of Equipment: International School Bus

Fuel Specfic Gravity: _____ @:_____ (°F)

Barometric Pressure: _____ inches of Mercury Start Time:_____

RPM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	~~NO~~ Smoke
TAC 1600	247.8	.54	.04	14	2.02	17.3	
1600	~~288~~ 250.2	.54	.04	17	2.07	17.4	
1600	253.8	.56	.04	17	2.07	17.4	
1600	254.2	.56	.04	17	2.04	17.4	
1600	254.8	.56	.05	17	1.99	17.4	4

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Test #11

Carbon Mass Balance Field Data Form

Company:_____ Location:_____ Test Date:_____ 7

Test Portion: Baseline:_____ Treated:_____ Exhaust Stack Diameter: ___Inches

Engine Make/Model: International DT 466 Miles/Hours: 75161 I.D.#: 2318

Type of Equipment: _____

Fuel Specfic Gravity: _____ @: 170 (°F)

Barometric Pressure: _____ inches of Mercury Start Time:_____

RPM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NO_x
TAC 1600	268.0	.52	.05	14	1.99	17.5	
1600	263.0	.52	.05	15	1.99	17.5	
1600	264.0	.52	.05	17	2.01	17.5	
1600	261.4	.52	.05	17	2.03	17.5	
1600	262.2	.52	.05	17	2.00	17.5	3
							WARMED UP AT IDLE

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

#1

Company: Hills. County Location: Tampa Test Date: 8/9/94
Test Portion: Baseline:_____ Treated: X Exhaust Stack Diameter: __Inches
Engine Make/Model: International 6.9 Miles/Hours: 177,394 I.D.#: 1506
Type of Equipment: School Bus

Fuel Specific Gravity: .851 @:_____(°F)

Barometric Pressure: 30.08 inches of Mercury Start Time:_____

RPM Alt	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NO_x
[illegible]			.03	[illegible]	[illegible]	[illegible]	
[illegible]			.03	[illegible]	1.84	[illegible]	
3880	206.4	.78	.02	5	1.83	18.0	
3880	206.4	.78	.02	6	1.91	18.0	
3880	207.2	.80	.02	6	1.91	17.9	
3880	207.2	.80	.02	6	1.91	17.8	
3880	209.4		.02	6	1.90	18.0	
3880	209.4		.02	8	1.92	18.0	7

Names of Customer Personnel Participating in Test:

_____ _____

.8478
.843

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

#2

Company: Hills County Location: Tampa Test Date: 8/9/94
Test Portion: Baseline:_____ Treated: X Exhaust Stack Diameter: ___Inches

Engine Make/Model: Intl Navistar 6.9 Miles/Hours: 154,539 I.D.#: 1519
Type of Equipment: _____

Fuel Specific Gravity: .849 @:_____ (°F)

Barometric Pressure: 30.05 inches of Mercury Start Time:_____

RPM A/F	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NO_x
~~4115~~ 4115	197.8	.78	.02	5	1.93	17.4	
4115	197.8	.78	.02	5	1.92	17.1	
4100	200.2	.78	.02	5	1.97	17.7	
4100	200.2	.78	.02	3	1.97	17.2	
4120	200.6	.78	.02	5	1.90	17.9	
4120	200.6	.78	.02	5	1.90	18.0	7 1/2

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

#4

Company: Hills County Location: Tampa Test Date: 8/9/94

Test Portion: Baseline:_____ Treated: X Exhaust Stack Diameter: ___Inches

Engine Make/Model: DT 466 International Miles/Hours: 95097 I.D.#: 2303

Type of Equipment: School Bus

Fuel Specfic Gravity: _____ @:_____ (°F)

Barometric Pressure: 30.08 inches of Mercury Start Time:_____

RPM Alt	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NO_x
3780	235.8	.44	.06	25	2.06	17.4	
3780	235.8	.44	.06	26	2.07	17.4	
3780	236.0	.44	.06	26	2.10	17.4	
3780	236.0	.44	.06	26	2.12	17.4	
3780	236.4	.44	.06	26	2.12	17.3	
3780	236.8	.44	.06	26	2.11	17.3	

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

#5

Carbon Mass Balance Field Data Form

Company: Hills. County Location: Tampa Test Date: 8/9/94
Test Portion: Baseline:____ Treated: X Exhaust Stack Diameter: ___Inches
Engine Make/Model: International 6.9 Miles/Hours: 173,903 I.D.#: 1520
Type of Equipment: International School Bus

Fuel Specific Gravity: _____ @:_____ (°F)

Barometric Pressure: 30.08 inches of Mercury Start Time:_____

RPM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NO_x
4400							
Could not reproduce Exhaust Temp. at approx SAME RPMs. Exhaust Temp approx 202.- Cannot use in sample due to 10% reduction in exhaust temp.							

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

#7

Carbon Mass Balance Field Data Form

Company: Hills County Location: Tampa Test Date: 8/9/94
Test Portion: Baseline: Treated: X Exhaust Stack Diameter: ___Inches
Engine Make/Model: International DT 466 Miles/Hours: 71,529 I.D.#: 2435
Type of Equipment: School Bus

Fuel Specfic Gravity: .840 1.01 @:_____ (°F)

Barometric Pressure: 30.08 inches of Mercury Start Time:_____

RPM TAC	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NO_x
1500	230.6	.52	.02	17	1.73	18.6	
1500	230.2	.52	.02	15	1.74	18.8	
1500	228.0	.50	.02	13	1.72	18.3	
1500	227.8	.50	.02	14	1.72	18.2	
	226.0	.50	.02	14	1.76	18.3	
	226.0	.50	.02	14	1.76	18.3	

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

#6

Company: Hillsborough Co. Location: _____ Test Date: 8/9/94

Test Portion: Baseline: _____ Treated: X Exhaust Stack Diameter: ___ Inches

Engine Make/Model: International 9.0 Miles/Hours: 127,576 I.D.#: 1781

Type of Equipment: International School Bus

Fuel Specfic Gravity: .842 1.01 @: 79 (°F) 180°

Barometric Pressure: 30.08 inches of Mercury Start Time: _____

RPM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NO_x Smoke
TAC 1600	223	1.4	.03	10	1.31	18.6	
1600	223	1.4	.03	12	1.33	18.6	
1600	223	1.5	.03	13	1.32	18.9	
1600	223.8	1.5	.03	13	1.32	18.8	
1600	224	1.5	.03	13	1.26	18.9	3

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

#8

Company: Hills County Location: Tampa Test Date: 8/9/94
Test Portion: Baseline:_____ Treated: X Exhaust Stack Diameter: __Inches

Engine Make/Model: International 9.0 Miles/Hours: 127,835 I.D.#: 1635
Type of Equipment: School Bus

Fuel Specfic Gravity: _____ @:_____ (°F)

Barometric Pressure: 30.08 inches of Mercury Start Time:_____

RPM TAC	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NO_x
1525	211.6	.90	.02	17	~~1.38~~	18.2	
1525	212.6	.90	.02	14	1.38	18.3	
1550	217.4	.90	.02	17	1.40	18.4	
1550	217.4	.90	.02	17	1.40	18.4	
1550	210.0	.90	.02	17	1.40	18.4	
1550	210.0	.90	.02	17	1.42	18.3	3

Bus is cycling between 1.38 and 1.5 % CO_2

X

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

#9

Company: Hills County Location: Tampa Test Date: 8/9/93
Test Portion: Baseline:_____ Treated: X Exhaust Stack Diameter: __Inches
Engine Make/Model: International 6.9 Miles/Hours: 149,388 I.D.#: 1527
Type of Equipment: School Bus

Fuel Specific Gravity: _____ @:_____ (°F)

Barometric Pressure: 30.08 inches of Mercury Start Time:_____

RPM ACT	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NO_x
3863	195.6	.84	.03	6	1.78	17.2	
3830	197.6	.84	.02	5	1.78	17.3	
3830	198.0	.84	.02	5	1.79	17.4	
3830	198.0	.84	.02	5	1.78	17.4	
3830	198.0	.78	.02	5	1.73	18.1	
3830	198.0	.78	.02	4	17.2	18.1	7

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

#10

Company: Hillsborough Co. Location: _____ Test Date: 8/9/94

Test Portion: Baseline: _____ Treated: X Exhaust Stack Diameter: ___ Inches

Engine Make/Model: International DT 466 / 1278/C Miles/Hours: _____ I.D.#: 2070

Type of Equipment: International School Bus

Fuel Specific Gravity: _____ @: _____ (°F)

Barometric Pressure: 30.08 inches of Mercury Start Time: _____

RPM TAC	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NO_x
1600	237.0	.50	.05	22	1.88	18.2	
1600	237.4	.50	.05	22	1.87	18.2	
1600	237.6	.52	.05	21	1.99	17.6	
1600	237.6	.52	.05	21	1.99	17.7	
1600	239.0	.52	.05	22	1.96	17.5	
1600	239	.52	.05	23	1.96	17.5	3½

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

#11

Company: Hillsborough Co. Location: _____ Test Date: 8/9/94

Test Portion: Baseline: _____ Treated: X Exhaust Stack Diameter: ___Inches

Engine Make/Model: International DT 466 Miles/Hours: 78784 I.D.#: 2318

Type of Equipment: International School Bus

Fuel Specific Gravity: .857 @: _____ (°F)

Barometric Pressure: 30.08 inches of Mercury Start Time: _____

RPM TAC	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NO_x Smoke
1600	253	.5	.05	18	1.94	18.0	
1600	251	.5	.05	19	1.92	18.0	
1600	251	.5	.05	17	1.91	18.0	
1600	249	.5	.05	17	1.91	18.1	
1600	245	.48	.05	17	1.92	18.2	
1600	242	.48	.05	17	1.93	18.2	3

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

#1

Company: Hills. County Location: Tampa Test Date: 8/9/94
Test Portion: Baseline:_____ Treated: X Exhaust Stack Diameter: ___Inches
Engine Make/Model: International 6.9 Miles/Hours: 177,394 I.D.#: 1506
Type of Equipment: School Bus

Fuel Specific Gravity: .851 @:_____(°F)

Barometric Pressure: 30.08 inches of Mercury Start Time:_____

RPM All	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NO_x
~~[illegible]~~			~~0.03~~	~~5~~	~~1.83~~	~~18.0~~	
~~[illegible]~~	~~206.4~~		~~.02~~	~~5~~	~~1.84~~	~~17.9~~	
3880	206.4	.78	.02	5	1.83	18.0	
3880	206.4	.78	.02	6	1.91	18.0	
3880	207.2	.80	.02	6	1.91	17.9	
3880	207.2	.80	.02	6	1.91	17.8	
3880	209.4		.02	6	1.90	18.0	
3880	209.4		.02	8	1.92	18.0	7

Names of Customer Personnel Participating in Test:

.8478
.843

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

#2

Company: Hills County Location: Tampa Test Date: 8/9/94
Test Portion: Baseline:_____ Treated: X Exhaust Stack Diameter: ___Inches

Engine Make/Model: International 4.9 Miles/Hours: 154,539 I.D.#: 1519
Type of Equipment: _____

Fuel Specific Gravity: .849 @:_____ (°F)

Barometric Pressure: 30.08 inches of Mercury Start Time:_____

RPM A/F	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NO_x
~~4115~~ 4115	197.8	.78	.02	5	1.93	17.4	
4115	197.8	.78	.02	5	1.92	17.1	
4100	200.2	.78	.02	5	1.97	17.7	
4100	200.2	.78	.02	3	1.97	17.2	
4120	200.6	.78	.02	5	1.90	17.9	
4120	200.6	.78	.02	5	1.90	18.0	7 1/2

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

#4

Carbon Mass Balance Field Data Form

Company: Hills County Location: Tampa Test Date: 8/9/94
Test Portion: Baseline: ____ Treated: X Exhaust Stack Diameter: ___Inches
Engine Make/Model: DT 466 International Miles/Hours: 95097 I.D.#: 2303
Type of Equipment: School Bus

Fuel Specfic Gravity: _____ @: _____ (°F)

Barometric Pressure: 30.08 inches of Mercury Start Time: _____

RPM A-LT	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NO_x
3780	235.8	.44	.06	25	2.06	17.4	
3780	235.8	.44	.06	26	2.07	17.4	
3780	236.0	.44	.06	26	2.10	17.4	
3780	236.0	.44	.06	26	2.12	17.4	
3780	236.4	.44	.06	26	2.12	17.3	
3780	236.8	.44	.06	26	2.11	17.3	

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

#5

Carbon Mass Balance Field Data Form

Company: Hills. County Location: Tampa Test Date: 8/9/94
Test Portion: Baseline:____ Treated: X Exhaust Stack Diameter: ___Inches
Engine Make/Model: International 6.9 Miles/Hours: 173,903 I.D.#: 1520
Type of Equipment: International School Bus

Fuel Specific Gravity: _____ @:_____(°F)

Barometric Pressure: 30.08 inches of Mercury Start Time:_____

RPM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NO_x
1400							
Could not reproduce Exhaust Temp. at approx same RPMs. Exhaust Temp approx 200°. Cannot use in sample due to 10% reduction in exhaust temp.							

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

#7

Carbon Mass Balance Field Data Form

Company: Hills. County Location: Tampa Test Date: 8/9/94

Test Portion: Baseline: ____ Treated: X Exhaust Stack Diameter: ___ Inches

Engine Make/Model: International DT 466 Miles/Hours: 71,529 I.D.#: 2435

Type of Equipment: School Bus

Fuel Specfic Gravity: .840 1.01 @: _____ (°F)

Barometric Pressure: 30.08 inches of Mercury Start Time: _____

RPM TAC	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NO_x
1500	230.6	.52	.02	17	1.73	18.6	
1500	230.2	.52	.02	15	1.74	18.8	
1500	228.0	.50	.02	13	1.72	18.3	
1500	227.8	.50	.02	14	1.72	18.2	
	226.0	.50	.02	14	1.76	18.3	
	226.0	.50	.02	14	1.76	18.3	

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

#6

Company: Hillsborough Co. Location: _____ Test Date: 8/9/94

Test Portion: Baseline: _____ Treated: X Exhaust Stack Diameter: ___ Inches

Engine Make/Model: International 9.0 Miles/Hours: 127,576 I.D.#: 1781

Type of Equipment: International School Bus

Fuel Specfic Gravity: .842 1.01 @: 79 (°F) 180°

Barometric Pressure: 30.08 inches of Mercury Start Time: _____

RPM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NO$_x$ Smoke
THC 1600	223	1.4	.03	10	1.31	18.6	
1600	223	1.4	.03	12	1.33	18.6	
1600	223	1.5	.03	13	1.32	18.9	
1600	223.8	1.5	.03	13	1.32	18.8	
1600	224	1.5	.03	13	1.26	18.9	3

✓

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

#8

Company: Hills County Location: Tampa Test Date: 8/9/94
Test Portion: Baseline:_____ Treated: X Exhaust Stack Diameter: ___Inches

Engine Make/Model: International 9.0 Miles/Hours: 127,835 I.D.#: 1635
Type of Equipment: School Bus

Fuel Specfic Gravity: _____ @:_____(°F)

Barometric Pressure: 30.08 inches of Mercury Start Time:_____

RPM FAC	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NO_x
1525	211.6	.90	.02	17	1.38 ~~1.38~~	18.7	
1525	212.6	.90	.02	14	1.38	18.3	
1550	217.4	.90	.02	17	1.40	18.4	
1550	217.4	.90	.02	17	1.40	18.4	
1550	210.0	.90	.02	17	1.40	18.4	
1550	210.0	.90	.02	17	1.42	18.3	3

Bus is Cycling between 1.38 and 1.5 % CO_2

X

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

#9

Company: Hills County Location: Tampa Test Date: 8/9/93
Test Portion: Baseline:_____ Treated: X Exhaust Stack Diameter: ___Inches
Engine Make/Model: International 6.9 Miles/Hours: 149,388 I.D.#: 1527
Type of Equipment: School Bus

Fuel Specfic Gravity: _____ @:_____ (°F)

Barometric Pressure: 30.08 inches of Mercury Start Time:_____

RPM ACT	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NO_x
3863	195.6	.84	.03	6	1.78	17.2	
3830	197.6	.84	.02	5	1.78	17.3	
3830	198.0	.84	.02	5	1.79	17.4	
3830	198.0	.84	.02	5	1.78	17.4	
3830	198.0	.78	.02	5	1.73	18.1	
3830	198.0	.78	.02	4	17.2	18.1	7

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

#10

Company: Hillsborough Co Location: _____ Test Date: 8/9/94

Test Portion: Baseline: _____ Treated: X Exhaust Stack Diameter: ___Inches

Engine Make/Model: International DT 466 / 275 HP Miles/Hours: _____ I.D.#: 2070

Type of Equipment: International School Bus

Fuel Specfic Gravity: _____ @: _____ (°F)

Barometric Pressure: 30.08 inches of Mercury Start Time: _____

RPM TAC	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NO_x
1600	237.0	.50	.05	22	1.88	18.2	
1600	237.4	.50	.05	22	1.87	18.2	
1600	237.6	.52	.05	21	1.99	17.6	
1600	237.6	.52	.05	21	1.99	17.7	
1600	239.0	.52	.05	22	1.96	17.5	
1600	239	.52	.05	23	1.96	17.5	3½

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

#11

Company: Hillsborough Co. Location: _____ Test Date: 8/9/94

Test Portion: Baseline: _____ Treated: X Exhaust Stack Diameter: ___ Inches

Engine Make/Model: International DT 466 Miles/Hours: 78784 I.D.#: 2318

Type of Equipment: International School Bus

Fuel Specific Gravity: .857 .99 @: _____ (°F)

Barometric Pressure: 30.08 inches of Mercury Start Time: _____

RPM TM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NO_x Smoke
1600	253	.5	.05	18	1.94	18.0	
1600	251	.5	.05	19	1.92	18.0	
1600	251	.5	.05	17	1.91	18.0	
1600	249	.5	.05	17	1.91	18.1	
1600	245	.48	.05	17	1.92	18.2	
1600	242	.48	.05	17	1.93	18.2	3

X

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

Test #1

Company:_____ Location:_____ Test Date:_____

Test Portion: Baseline:_____ Treated:_____ Exhaust Stack Diameter: ___Inches

Engine Make/Model: ~~Detroit~~ International 6.9 Miles/Hours: 172373 I.D.#: 1506

Type of Equipment: School Bus International

Fuel Specfic Gravity: .850 @: 87° (°F) 180°

Barometric Pressure: _____ inches of Mercury Start Time:_____

RPM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	~~NO_x~~ Smoke
~~Alt~~ 3900 ~~1355~~	208.2	.84	.03	4	1.83	18.1	
3900	209.6	.82	.03	5	1.84	18.0	
3900	211.6	.84	.03	8	1.82	18.0	
3900	212.0	.86	.03	5	1.81	18.0	
3900	212.2	.84	.03	5	1.79	18.0	7.0

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

Test #2

Company:_____ Location:_____ Test Date:_____

Test Portion: Baseline:_____ Treated:_____ Exhaust Stack Diameter: ___Inches

Engine Make/Model: International 6.9 Miles/Hours: 149,120 I.D.#: 1519

Type of Equipment: International School Bus

195°F

Fuel Specfic Gravity: .850 @:_____ (°F)

Barometric Pressure: _____ inches of Mercury Start Time:_____

RPM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NOx Smoke *
Alt 4125	212.6	.82	.02	5	1.93	17.3	
4125	215.4	.84	.02	5	1.89	17.3	
4125	213.4	.84	.02	5	1.91	17.2	
4125	214.8	.82	.02	6	1.91	17.3	
4125	214.0	.84	.02	5	1.91	17.2	8.5

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

Test #3

Company:_____ Location:_____ Test Date:_____

Test Portion: Baseline:_____ Treated:_____ Exhaust Stack Diameter: ___Inches

Engine Make/Model: International 9.0 Liter Miles/Hours: 116,804 I.D.#: 1846

Type of Equipment: International School Bus

Fuel Specfic Gravity: _____ @: 170° F (°F)

Barometric Pressure: _____ inches of Mercury Start Time:_____

RPM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	~~NO~~ Smoke #
Air Comp 1300	200.6	.9	.05	10	1.34	18.2	
1300	201.0	.88	.05	12	1.34	18.1	
1300	203.0	.9	.05	12	1.33	18.2	
1300	203.0	.84	.05	13	1.36	18.1	
1300	203.0	.9	.05	12	1.35	18.1	3

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

Test #4

Company:_____ Location:_____ Test Date:_____

Test Portion: Baseline:_____ Treated:_____ Exhaust Stack Diameter: ___Inches

Engine Make/Model: DT 466 International Miles/Hours: 89,284 I.D.#: 2303

Type of Equipment: International School Bus

Fuel Specfic Gravity: _____ @: 3120°F (°F)

Barometric Pressure: 30.04 inches of Mercury Start Time:_____

RPM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	~~NOx~~ Smoke #
Alt 3780	246.4	.4	.08	22	2.06	17.3	
3780	246.6	.42	.08	26	2.06	17.2	
3780	250.2	.42	.08	27	2.04	17.3	
3780	250.0	.42	.08	27	2.05	17.2	
3780	251.6	.42	.08	27	2.05	17.2	4.5

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

Test #5

Company:_____ Location:_____ Test Date:_____

Test Portion: Baseline:_____ Treated:_____ Exhaust Stack Diameter: ___Inches

Engine Make/Model: International 6.9 Miles/Hours: 168,435 I.D.#: 1520

Type of Equipment: International School Bus

Fuel Specfic Gravity: _____ @: 195°F (°F)

Barometric Pressure: _____ inches of Mercury Start Time:_____

RPM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	~~NOx~~ Smoke #
Alt 4370	214.0	.9	.02	6	1.78	17.8	
4380	216.0	.88	.02	5	1.81	17.8	
4380	216.8	.9	.03	5	1.73	17.9	
4380	215.2	.9	.02	4	1.75	17.8	
4390	221.2	.9	.03	5	1.79	17.8	8

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

Test #6

Company:_____ Location:_____ Test Date:_____

Test Portion: Baseline:_____ Treated:_____ Exhaust Stack Diameter: ___Inches

Engine Make/Model: International 9.0 Miles/Hours: 126,279 I.D.#: 1781

Type of Equipment: International School Bus

Fuel Specfic Gravity: _____ @: 195 °F (°F)

Barometric Pressure: _____ inches of Mercury Start Time:_____

	RPM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	~~NO~~ Smoke
1600	~~Amb Temp~~ TAC ~~1920~~	204.0	1.5	~~.03~~ .03	10	1.45	18.3	
1600	~~1920~~	219.0	1.4	.04	12	1.43	18.3	
1600	~~1920~~	225.4	1.4	.04	12	1.43	18.3	
1600	~~1920~~	227.6	1.4	.03	13	1.45	18.3	
1600	~~1920~~	229.6	1.4	.03	13	1.41	18.4	7

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

Test #7

Company:_____ Location:_____ Test Date:_____

Test Portion: Baseline:_____ Treated:_____ Exhaust Stack Diameter: __Inches

Engine Make/Model: International DT466 Miles/Hours: 65,735 I.D.#: 2435

Type of Equipment: _____

Fuel Specfic Gravity: .845 88.6° @: 170° (°F)

Barometric Pressure: _____ inches of Mercury Start Time:_____

RPM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	~~NO$_x$~~ Smoke
TAC 1500	232.2	.48	.04	15	1.89	17.6	
1500	241.0	.48	.03	17	1.85	17.7	
1500	247.2	.50	.03	17	1.84	17.7	
1500	253.4	.52	.03 ~~.03~~	17	1.89	17.6	
1500	253.6	.52	.03	18	1.88	17.6	
1500	256.8	.52	.03	18	1.90	17.5	4

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

Test #8

Company:_____ Location:_____ Test Date:_____

Test Portion: Baseline:_____ Treated:_____ Exhaust Stack Diameter: ___Inches

Engine Make/Model: International 9.0 Miles/Hours: 125,352 I.D.#: 1635

Type of Equipment: International School Bus

Fuel Specfic Gravity: _____ @:_____ (°F)

Barometric Pressure: _____ inches of Mercury Start Time:_____

RPM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NO_x
TAC 1550	219.6	.94	.03	12	1.34	18.6	
1550	221.0	.94	.03	12	1.38	18.5	
1550	222.2	.96	.03	10	1.38	18.4	
1550	223.0	.96	.02	12	1.36	18.4	
1550	224.2	1.0	.02	10	1.36	18.4	4

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Test #9

Carbon Mass Balance Field Data Form

Company:_____ Location:_____ Test Date:_____

Test Portion: Baseline:_____ Treated:_____ Exhaust Stack Diameter: ___Inches

Engine Make/Model: International 6.9 Miles/Hours: 144,540 I.D.#: 1527

Type of Equipment: International School Bus

Fuel Specfic Gravity: _____ @:_____ (°F)

Barometric Pressure: _____ inches of Mercury Start Time:_____

RPM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NO_x
Alt 3850	210.4	.85	.03	6	1.86	17.7	
3850	211.2	.85	.03	5	1.86	17.7	
3850	210.6	.84	.03	5	1.86	17.7	
3850	212.0	.86	.03	5	1.86	17.7	
3850	214.0	.84	.02	5	1.86	17.7	9

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Carbon Mass Balance Field Data Form

Test # 10

Company:_____ Location:_____ Test Date:_____

Test Portion: Baseline:_____ Treated:_____ Exhaust Stack Diameter: ___Inches

Engine Make/Model: International DT466 Miles/Hours: 120,388 I.D.#: 2070

Type of Equipment: International School Bus

Fuel Specfic Gravity: _____ @:_____ (°F)

Barometric Pressure: _____ inches of Mercury Start Time:_____

RPM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	~~Bkg~~ Smoke
TAC 1600	247.8	.54	.04	14	2.02	17.3	
1600	~~253~~ 250.2	.54	.04	17	2.07	17.4	
1600	253.8	.56	.04	17	2.07	17.4	
1600	254.2	.56	.04	17	2.04	17.4	
1600	254.8	.56	.05	17	1.99	17.4	4

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

Test #11

Carbon Mass Balance Field Data Form

Company:_____ Location:_____ Test Date:_____ 7

Test Portion: Baseline:_____ Treated:_____ Exhaust Stack Diameter: ___Inches

Engine Make/Model: International DT 466 Miles/Hours: 75161 I.D.#: 2318

Type of Equipment: _____

Fuel Specfic Gravity: _____ @: 170 (°F)

Barometric Pressure: _____ inches of Mercury Start Time:_____

RPM	Exhaust Temp °F	P Inches of H_2O	% CO	HC ppm	% CO_2	% O_2	NO_x
TAC 1600	268.0	.52	.05	14	1.99	17.5	
1600	263.0	.52	.05	15	1.99	17.5	
1600	264.0	.52	.05	17	2.01	17.5	
1600	261.4	.52	.05	17	2.03	17.5	
1600	262.2	.52	.05	17	2.00	17.5	3
							WARMED UP
							DONE

Names of Customer Personnel Participating in Test:

_____ _____

Signature of Technicians:

_____ _____

****

Item: 2 Code: CFL

10/8AM Tue 9 August — FLORIDA this hour — TODAY'S DATA

TOWN	WEATHER	TEMP	WIND	FLSLK	VIS	HUM	BRMTR	HI	LOW	PCPN
Pensacola NAS	mstly cldy	78	NE 6	90	7	67%	30.11r	78	71	
Pensacola AP	cloudy	79	NE 5	92	7	67%	30.14r	79	72	
Milton	.....									
Mary Esther	ptly cldy	77	N 7	91	7	74%	30.14r	77	68	
Eglin AFB	cloudy	78	N 5	90	7	64%	30.14r	78	69	
Valparaiso AP	.....									
Crestview	haze	78	NW 5	91	5	69%	30.14r	78	64	
Panama Cty AP	ptly cldy	80	E 6	94	7	67%	30.12r	80	70	
Tyndall AFB	ptly cldy	78	NE 8	92	7	71%	30.12r	78	70	
Apalachicola	.....									
Tallahassee	ptly cldy	80	NE 8	94	7	67%	30.13r	80	64	
Cross City	dry	78	NE 10G13	94		77%		78	69	
Jacksonvl Int	ptly cldy	81	NE 11	100	7	79%	30.11r	81	70	
Cecil NAS JAX	haze	81	NE 10	97	6	72%	30.07r	81	71	
Jacksnvle Twr	haze	83	N 5	102	6	74%	30.08r	83	72	
Jacksonvl Mun	light fog	76	NE 9	94	4	90%	30.06f	76	72	
Mayport	.....									
Gainesville	light fog	78	E 9	96	4	85%	30.10r	78	68	
Ocala	no report	78	CALM	96		85%	30.07s	78	70	
Astor	.....									
Daytona Beach	cloudy	76	CALM	93	10	87%	30.07r	76	73	
Sanford	no report	80	N 6	99	10	82%	30.07s	80	73	
Orlando Intl	ptly cldy	81	N 9	102	10	85%	30.08r	81	74	
Orlando Exec	ptly cldy	81	NE 7	103	7	88%	30.08s	81	74	
Titusvlle	.....									
Titusville AP	mstly cldy	81	N 5		7		30.08s	81	70	
Cocoa	mstly cldy	79	NW 2	100	7	91%	30.08r	79	76	
Melbourne	ptly cldy	78	W 5	97	10	88%	30.06r	78	71	0.93
StPtrsbrg Int	haze	75	E 8	94	5	97%	30.08r	76	75	
StPtrsbrg	light fog	80	NE 10	101	5	88%	30.08s	80	79	
Tampa Intl	haze	78	NE 6	98	6	91%	30.07s	78	73	
MacDill AFB	haze	79	E 6	98	3	85%	30.07r			0.98
Sarasota	ptly cldy	83	SE 3	105	10	82%	30.05r	83	74	
Lakeland	light fog	80	CALM	101	2	88%	30.07s	80	75	
Bartow	mstly cldy	77	CALM	93	7	79%	30.07s			
Avon Park	.....									
Vero Beach	ptly cldy	85	CALM	105	12	72%	30.06r	85	72	
Ft Myers AP	ptly cldy	84	CALM	102	15	70%	30.07r	84	73	
Ft Myers Page	mstly cldy	84	E 7	102	10	70%	30.06r	84	75	
Naples	mstly cldy	83	E 6	100	10	70%	30.07r	83	74	
W Palm Beach	no report	84	CALM	105	10	77%	30.06r	84	74	
Ft Ldrdle Exc	ptly cldy		CALM		15		30.02s			
Ft Ldrdle Int	ptly cldy	88	CALM	110	15	70%	30.03r	88	79	
Miami Opalaka	ptly cldy		N 6		12		30.03s			
Miami Intl	ptly cldy	87	NW 2	107	7	68%	30.04r	87	77	
Miami Beach	no report	86	CALM					86	82	
TaMiami AP	mstly cldy	86	NW 7	106	15	70%	30.04r	86	75	
Homestead AFB	mstly cldy	87	CALM	108	7	70%	30.04s	87	76	
Key West Intl	.....									
Key West NAS	.....									
Fort Pierce	ptly cldy		CALM		7		30.06r			
Naples Beach	no report	84	CALM					84	75	
West Kindall	clear	83	N 5	103		77%		83	75	
Flamingo	no report		CALM							
Marathon	.....									

****

Item: 2 Code: CFL

9AM Tue 9 August FLORIDA this hour TODAY'S DATA

TOWN	WEATHER	TEMP	WIND	FLSLK	VIS	HUM	BRMTR	HI	LOW	PCPN
Pensacola NAS	mstly cldy	80	E 8	92	7	60%	30.11s	80	71	
Pensacola AP	cloudy	81	NE 5	93	7	60%	30.15r	81	72	
Milton	cloudy	85	E 2	98	7	55%	30.15s	85	70	
Mary Esther	ptly cldy	82	E 9	92	7	53%	30.14s	82	68	
Eglin AFB	mstly cldy	81	E 9	91	7	54%	30.15r	81	69	
Valparaiso AP	mstly cldy	82	NE 9	93	7	55%	30.16rr			
Crestview	haze	82	NE 8	93	5	55%	30.14s	82	64	
Panama Cty AP	ptly cldy	82	E 6	96	7	63%	30.13r	82	70	
Tyndall AFB	ptly cldy	79	NE 8	94	7	72%	30.14r	79	70	
Apalachicola	.....									
Tallahassee	ptly cldy	83	NE 11	95	7	57%	30.14r	83	64	
Cross City	dry	81	NE 6G9	97		72%		81	69	
Jacksonvl Int	mstly cldy	83	NE 10	102	7	74%	30.12r	83	70	
Cecil NAS JAX	haze	81	NE 6	97	6	69%	30.08r	81	71	
Jacksnvle Twr	mstly cldy	83	N 5	103	7	77%	30.09r	83	72	
Jacksonvl Mun	mstly cldy	79	N 8	98	7	85%	30.09r	79	72	
Mayport	haze	79	N 6	97	6	82%	30.09r	80	77	
Gainesville	haze	80	E 11	98	5	79%	30.10s	80	68	
Ocala	no report	82	CALM	100		74%	30.08s	82	70	
Astor	.....									
Daytona Beach	ptly cldy	82	NE 6	101	10	77%	30.08r	82	73	
Sanford	ptly cldy	84	NE 3	102	10	70%	30.07s	84	73	
Orlando Intl	mstly cldy	82	N 6	102	10	79%	30.08s	82	74	
Orlando Exec	ptly cldy	84	E 5	107	10	82%	30.06s	84	74	
Titusvlle	.....									
Titusville AP	mstly cldy	80	N 5		7		30.07f	81	70	
Cocoa	mstly cldy	81	NW 6	102	10	85%	30.07f	81	76	
Melbourne	ptly cldy	80	NW 7	98	10	79%	30.07r	80	71	0.93
StPtrsbrg Int	haze	78	NE 8	97	6	88%	30.08s	78	75	
StPtrsbrg	light fog	86	NE 9	106	5	70%	30.08s	86	79	
Tampa Intl	cloudy	82	NE 3	103	7	82%	30.09r	82	73	
MacDill AFB	haze	81	NE 6	100	3	79%	30.08r			0.98
Sarasota	ptly cldy	85	CALM	107	15	77%	30.05s	85	74	
Lakeland	haze	83	CALM	104	5	80%	30.08r	83	75	
Bartow	mstly cldy	81	CALM	99	10	77%	30.08r	81	75	
Avon Park	.....									
Vero Beach	ptly cldy	86	SW 8	106	12	70%	30.06s	86	72	
Ft Myers AP	ptly cldy	87	CALM	105	15	63%	30.07s	87	73	
Ft Myers Page	mstly cldy	89	E 6	107	10	59%	30.06s	89	75	
Naples	mstly cldy	84	CALM	101	10	67%	30.08r	84	74	
W Palm Beach	mstly cldy	89	CALM	108	10	61%	30.07s	89	74	
Ft Ldrdle Exc	mstly cldy		CALM		15		30.03r			
Ft Ldrdle Int	ptly cldy	86	CALM	106	15	70%	30.04r	88	79	
Miami Opalaka	ptly cldy		N 5		12		30.04r			
Miami Intl	mstly cldy	89	SW 2	108	7	61%	30.05s	89	77	
Miami Beach	no report	87	E 3					87	82	
TaMiami AP	ptly cldy	87	S 6	105	15	63%	30.05r	87	75	
Homestead AFB	mstly cldy	84	N 3	105	7	77%	30.05r	87	76	
Key West Intl	ptly cldy	89	SE 7	109	10	63%	30.05r	89	83	
Key West NAS	ptly cldy	91	SE 3	113	7	64%	30.03r	91	83	
Fort Pierce	ptly cldy		CALM		7		30.06s			
Naples Beach	no report	83	CALM					84	75	
West Kindall	clear	87	S 6	105		63%		87	75	
Flamingo	no report		S 8							
Marathon	ptly cldy	87	SE 6	109	10	72%	30.05r			

****

Item: 2 Code: CFL

10AM Tue 9 August FLORIDA this hour TODAY'S DATA

TOWN	WEATHER	TEMP	WIND	FLSLK	VIS	HUM	BRMTR	HI	LOW	PCPN
Pensacola NAS	mstly cldy	80	E 8	92	7	60%	30.11s	80	71	
Pensacola AP	ptly cldy	84	E 11	96	7	55%	30.15s	84	72	
Milton	cloudy	87	E 2	99	7	50%	30.15s	87	70	
Mary Esther	ptly cldy	84	E 10	93	7	46%	30.15r	84	68	
Eglin AFB	mstly cldy	84	NE 10	95	7	51%	30.15s	84	69	
Valparaiso AP	ptly cldy	85	NE 9	95	7	48%	30.16s			
Crestview	haze	83	E 8	93	6	51%	30.15r	83	64	
Panama Cty AP	ptly cldy	86	NE 8	97	7	48%	30.13s	86	70	
Tyndall AFB	ptly cldy	84	E 9	97	7	57%	30.13f	84	70	
Apalachicola	.....									
Tallahassee	ptly cldy	83	NE 8	95	7	55%	30.14s	83	64	
Cross City	dry	84	NE 7G11	100		63%		84	69	
Jacksonvl Int	mstly cldy	82	NE 10	100	7	74%	30.12s	83	70	
Cecil NAS JAX	haze	81	NE 6	97	6	69%	30.08r	81	71	
Jacksnvle Twr	mstly cldy	85	NE 2	102	7	65%	30.09s	85	72	
Jacksonvl Mun	mstly cldy	81	NE 11	99	7	77%	30.10r	81	72	
Mayport	haze	79	N 6	97	6	82%	30.09r	80	77	
Gainesville	haze	81	N 6	97	6	72%	30.10s	81	68	
Ocala	no report	82	CALM	99		72%	30.08s	82	70	
Astor	mstly cldy	85	N 6	106	7	75%	30.08fr			
Daytona Beach	mstly cldy	84	N 11	105	10	77%	30.08s	84	73	
Sanford	ptly cldy	84	CALM	101	10	67%	30.07s	85	73	
Orlando Intl	mstly cldy	86	E 6	106	10	70%	30.08s	86	74	
Orlando Exec	mstly cldy	86	E 5	109	7	77%	30.08r	86	74	
Titusvlle	.....									
Titusville AP	mstly cldy	82	NE 7		7		30.09r	82	70	
Cocoa	mstly cldy	81	NW 6	102	10	85%	30.07f	81	76	
Melbourne	ptly cldy	83	NW 5	101	15	72%	30.07s	83	71	0.93
StPtrsbrg Int	haze	80	NE 6	100	6	85%	30.09r	80	75	
StPtrsbrg	light fog	83	E 7	103	5	77%	30.10r	86	79	
Tampa Intl	mstly cldy	84	E 6	105	8	77%	30.09s	84	73	
MacDill AFB	haze	83	NE 6	102	3	74%	30.08s			0.98
Sarasota	ptly cldy	86	SW 8	107	15	72%	30.06r	86	74	
Lakeland	mstly cldy	85	CALM	106	9	75%	30.08s	85	75	
Bartow	mstly cldy	85	CALM	102	12	65%	30.08s	85	75	
Avon Park	.....									
Vero Beach	mstly cldy	89	SW 6	109	12	63%	30.07r	89	72	
Ft Myers AP	ptly cldy	89	CALM	108	15	61%	30.07s	89	73	
Ft Myers Page	mstly cldy	88	NW 6	106	10	61%	30.06s	89	75	
Naples	mstly cldy	86	CALM	103	10	63%	30.07f	86	74	
W Palm Beach	cloudy	88	NE 7	107	10	63%	30.06s	89	74	
Ft Ldrdle Exc	mstly cldy		CALM		15		30.03r			
Ft Ldrdle Int	ptly cldy	86	CALM	105	15	68%	30.04s	88	79	
Miami Opalaka	mstly cldy		N 7		12		30.04s			
Miami Intl	mstly cldy	88	N 3	107	7	63%	30.05s	89	77	
Miami Beach	no report	89	E 6					89	82	
TaMiami AP	ptly cldy	87	E 6	104	15	61%	30.05s	87	75	
Homestead AFB	ptly cldy	87	NW 3	106	7	65%	30.04f	87	76	
Key West Intl	ptly cldy	90	SE 7	108	10	57%	30.06r	90	83	
Key West NAS	ptly cldy	91	SE 3	113	7	64%	30.03r	91	83	
Fort Pierce	mstly cldy		W 5		7		30.07r			
Naples Beach	no report	83	CALM					84	75	
West Kindall	clear	87	E 6	104		61%		87	75	
Flamingo	no report		S 7							
Marathon	ptly cldy	87	SE 6	109	10	72%	30.05r			

****

Item: 2 Code: CFL

1200

11AM Tue 9 August FLORIDA this hour TODAY'S DATA

TOWN	WEATHER	TEMP	WIND	FLSLK	VIS	HUM	BRMTR	HI	LOW	PCPN
Pensacola NAS	mstly cldy	84	E 8G14	94	7	49%	30.12r	84	71	
Pensacola AP	ptly cldy	86	N 8	98	7	51%	30.14f	86	72	
Milton	haze	89	NE 2	102	6	48%	30.13f	89	70	
Mary Esther	ptly cldy	86	NE 7	98	7	50%	30.13f	86	68	
Eglin AFB	mstly cldy	86	NE 9	95	7	45%	30.14f	86	69	
Valparaiso AP	ptly cldy	85	N 11	96	7	49%	30.15f			
Crestview	haze	86	E 8	98	6	50%	30.13f	86	64	
Panama Cty AP	ptly cldy	87	NE 11	96	7	42%	30.12f	87	70	
Tyndall AFB	ptly cldy	84	E 9	97	7	57%	30.13f	84	70	
Apalachicola	.....									
Tallahassee	ptly cldy	83	NE 8	95	7	55%	30.14s	83	64	
Cross City	dry	86	E 6G7	102		59%		86	69	
Jacksonvl Int	mstly cldy	82	NE 10	100	7	74%	30.12s	83	70	
Cecil NAS JAX	haze	81	NE 6	97	6	69%	30.08r	81	71	
Jacksnvle Twr	mstly cldy	87	NE 5	104	7	61%	30.11r	87	72	
Jacksonvl Mun	mstly cldy	83	N 14	101	7	72%	30.11r	83	72	
Mayport	haze	79	N 6	97	6	82%	30.09r	80	77	
Gainesville	mstly cldy	83	NE 9	101	7	72%	30.11r	83	68	
Ocala	no report	82	CALM	99		72%	30.08s	82	70	
Astor	mstly cldy	85	N 6	106	7	75%	30.08fr			
Daytona Beach	mstly cldy	84	N 11	104	10	74%	30.09r	84	73	
Sanford	ptly cldy	87	N 5	103	10	59%	30.07s	87	73	
Orlando Intl	mstly cldy	88	NW 8	107	10	63%	30.08s	88	74	
Orlando Exec	mstly cldy	85	NW 5	107	7	77%	30.08s	86	74	
Titusvlle	.....									
Titusville AP	mstly cldy	82	NE 6		7		30.09s	82	70	
Cocoa	mstly cldy	83	NE 8	105	10	82%	30.07s	84	76	
Melbourne	ptly cldy	85	NW 7	101	15	63%	30.07s	85	71	0.93
StPtrsbrg Int	haze	81	E 6	100	6	79%	30.09s	81	75	
StPtrsbrg	light fog	83	E 7	103	5	77%	30.10r	86	79	
Tampa Intl	mstly cldy	84	E 6	105	8	77%	30.09s	84	73	
MacDill AFB	haze	83	NE 6	102	3	74%	30.08s			0.98
Sarasota	ptly cldy	87	W 8	108	15	70%	30.06s	87	74	
Lakeland	mstly cldy	85	CALM	106	9	75%	30.08s	85	75	
Bartow	mstly cldy	84	W 8	100	12	63%	30.07f	85	75	
Avon Park	.....									
Vero Beach	mstly cldy	87	E 10	109	12	72%	30.06f	89	72	
Ft Myers AP	mstly cldy	90	CALM	108	15	57%	30.07s	90	73	
Ft Myers Page	mstly cldy	90	W 3	107	10	56%	30.06s	90	75	
Naples	mstly cldy	88	NW 7	106	10	61%	30.07s	88	74	
W Palm Beach	lgt rain	86	E 10	106	10	70%	30.06s	89	74	
Ft Ldrdle Exc	thunder		NE 8		10		30.03s			
Ft Ldrdle Int	ptly cldy	86	CALM	105	15	68%	30.04s	88	79	
Miami Opalaka	mod t-shwr		SE 15		10		30.06r			
Miami Intl	hvy t-shwr	78	NW 16	97	1	88%	30.08s	89	77	
Miami Beach	no report	87	E 3					89	82	
TaMiami AP	ptly cldy	92	S 8	108	10	50%	30.04f	92	75	
Homestead AFB	ptly cldy	87	NW 3	106	7	65%	30.04f	87	76	
Key West Intl	mstly cldy	90	SE 8	109	10	59%	30.05f	90	83	
Key West NAS	ptly cldy	91	SE 3	113	7	64%	30.03r	91	83	
Fort Pierce	mstly cldy		E 6		10		30.06s			
Naples Beach	no report	82	W 5					84	75	
West Kindall	clear	87	E 6	104		61%		87	75	
Flamingo	no report		S 8							
Marathon	ptly cldy	87	SE 6	109	10	72%	30.05r			

****

Item: 2 Code: CFL

8AM Tue 5 April — FLORIDA this hour — TODAY'S DATA

TOWN	WEATHER	TEMP	WIND	FLSLK	VIS	HUM	BRMTR	HI	LOW	PCPN
Pensacola NAS	mstly cldy	65	S 7	70	7	84%	29.95r	65	58	
Pensacola AP	mstly cldy	65	S 9	69	7	87%	29.97r	65	53	
Milton	light fog	63	E 1	71	5	87%	29.97s	63	49	
Mary Esther	mstly cldy	67	S 11	68	7	76%	29.98s	67	48	
Eglin AFB	light fog	63	SE 7	67	6	87%	29.98r	63	49	
Valparaiso AP	mstly cldy	63	SE 8	66	7	90%	29.98f			
Crestview	light fog	57	CALM	63	3	96%	29.97s	57	46	
Panama Cty AP	light fog	62	SE 5	69	2	93%	30.00r	62	52	
Tyndall AFB	light fog	62	E 6	69	3	100%	30.02r	62	52	
Apalachicola	.....									
Tallahassee	fog	58	W 3	64	3/4	97%	30.04r	58	51	
Cross City	dry	64	S 3G5	72		87%		64	52	
Jacksonvl Int	ptly cldy	69	W 5	78	7	81%	30.05r	69	53	
Cecil NAS JAX	light fog	60	S 3	67	1	93%	30.02s	60	55	
Jacksnvle Twr	haze	70	CALM	79	6	73%	30.03r	70	55	
Jacksonvl Mun	haze	67	SE 5	77	4	90%	30.03r	67	56	
Mayport	haze	75	SE 2	83	6	60%	30.03r	75	60	
Gainesville	fog	62	CALM	71	1/4	97%	30.04r	62	57	
Ocala	cloudy	61	CALM	69	1/2	93%	30.06r	61	56	0.04
Astor	fog	61	CALM	70	1/8	100%	30.01r			
Daytona Beach	clear	74	CALM	85	8	71%	30.05r	74	56	
Sanford	mstly cldy	67	SE 3	77	7	87%	30.04s	67	58	
Orlando Intl	fog	66	N 5	76	1/2	97%	30.05s	66	59	
Orlando Exec	light fog	68	CALM	79	2	87%	30.05r	68	62	
Titusvlle	.....									
Titusville AP	haze	70	W 7	67	4		30.06r	70	56	
Cocoa	ptly cldy	72	NW 6	81	7	68%	30.04r	72	64	
Melbourne	ptly cldy	74	NW 6	84	7	69%	30.04r	74	59	
StPtrsbrg Int	haze	65	E 7	72	5	93%	30.02r	65	58	
StPtrsbrg	light fog	70	E 6	78	5	79%	30.06r	70	65	
Tampa Intl	mstly clr	72	NE 3	79	8	62%	30.04r	72	53	
MacDill AFB	cloudy	65	NE 5	74	7	93%	30.05r			
Sarasota	ptly cldy	66	CALM	77	10	93%	30.02r	66	56	
Lakeland	mstly clr	69	CALM	80	7	84%	30.04s	69	57	
Bartow	light fog	67	E 2	76	2	84%	30.05r			
Avon Park	.....									
Vero Beach	mstly cldy	76	N 5	87	12	67%	30.04r	76	61	
Ft Myers AP	clear	70	NE 6	77	10	76%	30.05r	70	59	
Ft Myers Page	ptly cldy	72	E 6	81	7	68%	30.02r	72	60	
Naples	no report	71	E 6	80	10	71%	30.04r	71	61	
W Palm Beach	ptly cldy	77	N 6	89	10	67%	30.03r	77	65	
Ft Ldrdle Exc	clear		N 7		7		30.00r			
Ft Ldrdle Int	clear	78	N 6	89	15	62%	30.00r	78	68	
Miami Opalaka	ptly cldy		N 6		8		30.01r			
Miami Intl	mstly clr	78	N 7	88	7	60%	30.04r	78	68	
Miami Beach	no report	75	CALM					75	70	
TaMiami AP	ptly cldy	75	N 8	85	7	66%	30.02r	75	64	
Homestead AFB	ptly cldy	79	NE 5	92	7	67%	30.02r	79	65	
Key West Intl	mstly clr	77	NE 9	89	10	67%	30.01r	77	71	
Key West NAS	mstly clr	78	NE 6	90	7	64%	30.00r	78	71	
Fort Pierce	ptly cldy		CALM		7		30.03r			
Naples Beach	no report	65	NE 3	65				66	62	
West Kindall	clear	71	N 8	83		81%		71	64	
Flamingo	no report		NE 9							
Marathon	.....									

****

Item: 2 Code: CFL

9AM Tue 5 April — FLORIDA this hour — TODAY'S DATA

TOWN	WEATHER	TEMP	WIND	FLSLK	VIS	HUM	BRMTR	HI	LOW	PCPN
Pensacola NAS	ptly cldy	69	SE 6	74	7	71%	29.99r	69	58	
Pensacola AP	mstly cldy	69	SE 7	74	7	73%	30.90fr	69	53	
Milton	ptly cldy	69	E 6	73	7	66%	30.00r	69	49	
Mary Esther	mstly cldy	69	SE 8	73	7	71%	30.01r	69	48	
Eglin AFB	mstly cldy	68	S 10	70	7	71%	30.02r	68	49	
Valparaiso AP	mstly cldy	69	S 10	71	7	68%	30.02r			
Crestview	ptly cldy	68	S 8	71	7	71%	30.00r	68	46	
Panama Cty AP	haze	67	SE 6	74	4	81%	30.01r	67	52	
Tyndall AFB	mstly cldy	68	SE 10	72	7	81%	30.02s	68	52	
Apalachicola	.....									
Tallahassee	ptly cldy	67	S 8	70	7	73%	30.03f	67	51	
Cross City	dry	70	SE 3G10	78		68%		70	52	
Jacksonvl Int	mstly cldy	73	S 13	82	7	69%	30.04f	73	53	
Cecil NAS JAX	haze		S 11		6		30.02s	60	55	
Jacksnvle Twr	ptly cldy	72	S 8	81	7	68%	30.03s	72	55	
Jacksonvl Mun	ptly cldy	74	S 9	86	7	76%	30.03s	74	56	
Mayport	haze	75	SE 7	83	6	60%	30.03s	75	60	
Gainesville	haze	71	S 7	80	6	73%	30.04s	71	57	
Ocala	mstly cldy	66	CALM	75	10	84%	30.05s	66	56	0.04
Astor	light fog	65	CALM	75	2	93%	30.04r			
Daytona Beach	ptly cldy	76	S 6	85	10	62%	30.05s	76	56	
Sanford	no report	72	S 3	83	10	76%	30.06s	72	58	
Orlando Intl	ptly cldy	73	NW 5	85	7	76%	30.07r	73	59	
Orlando Exec	haze	74	S 5	83	6	66%	30.06r	74	62	
Titusvlle	.....									
Titusville AP	haze	74	E 7		6		30.08r	74	56	
Cocoa	ptly cldy	75	E 7	84	7	62%	30.06r	75	64	
Melbourne	ptly cldy	78	SE 6	87	7	58%	30.05r	78	59	
StPtrsbrg Int	ptly cldy	72	E 8	79	7	62%	30.06r	72	58	
StPtrsbrg	mstly clr	72	E 6	81	9	71%	30.07r	72	65	
Tampa Intl	mstly clr	75	N 5	80	15	48%	30.05r	75	53	
MacDill AFB	ptly cldy	72	E 1	78	7	57%	30.06r	72	63	
Sarasota	ptly cldy	73	CALM	79	20	55%	30.05r	73	56	
Lakeland	mstly clr	71	CALM	79	9	66%	30.06r	71	57	
Bartow	mstly clr	72	NW 3	80	8	66%	30.06r			
Avon Park	.....									
Vero Beach	mstly cldy	79	CALM	88	15	54%	30.04s	79	61	
Ft Myers AP	clear	76	NE 6	85	15	62%	30.05s	76	59	
Ft Myers Page	clear	76	E 7	85	10	60%	30.03r	76	60	
Naples	no report	76	SE 3	85	10	60%	30.04s	76	61	
W Palm Beach	mstly cldy	79	E 5	88	10	54%	30.04r	79	65	
Ft Ldrdle Exc	ptly cldy		E 6		7		30.01r			
Ft Ldrdle Int	clear	80	NE 8	89	15	54%	30.01r	80	68	
Miami Opalaka	ptly cldy		N 6		8		30.01r			
Miami Intl	ptly cldy	81	N 8	90	7	51%	30.05r	81	68	
Miami Beach	no report	77	N 7					77	70	
TaMiami AP	ptly cldy	78	NW 6	87	8	58%	30.03r	78	64	
Homestead AFB	ptly cldy	83	E 5	95	7	55%	30.04r	83	65	
Key West Intl	ptly cldy	79	E 7	90	10	60%	30.03r	79	71	
Key West NAS	ptly cldy	81	NE 7	93	7	60%	30.01r	81	71	
Fort Pierce	ptly cldy		E 6		10		30.04r			
Naples Beach	no report	73	E 3					73	62	
West Kindall	clear	78	NW 6	87		58%		78	64	
Flamingo	no report		E 7							
Marathon	ptly cldy	78	N 9	94	10	79%	29.92f			

****

Item: 2 Code: CFL

10AM Tue 5 April — FLORIDA this hour — TODAY'S DATA

TOWN	WEATHER	TEMP	WIND	FLSLK	VIS	HUM	BRMTR	HI	LOW	PCPN
Pensacola NAS	ptly cldy	71	S 9	79	7	68%	29.99f	71	58	
Pensacola AP	ptly cldy	71	S 13	80	7	73%	30.00f	71	53	
Milton	ptly cldy	72	S 11	78	7	57%	29.98f	72	49	
Mary Esther	ptly cldy	71	S 13	80	7	71%	30.01f	71	48	
Eglin AFB	ptly cldy	71	S 14	79	7	68%	30.02f	71	49	
Valparaiso AP	ptly cldy	73	S 16	77	7	50%	30.01f			
Crestview	ptly cldy	76	S 8	81	7	47%	29.98f	76	46	
Panama Cty AP	ptly cldy	71	S 9	80	8	71%	30.04s	71	52	
Tyndall AFB	ptly cldy	70	S 9	74	7	71%	30.05s	70	52	
Apalachicola	.....									
Tallahassee	clear	75	S 8	80	7	50%	30.03r	75	51	
Cross City	dry	77	SW 8G11	84		52%		77	52	
Jacksonvl Int	ptly cldy	78	S 10	85	7	50%	30.03f	78	53	
Cecil NAS JAX	ptly cldy	80	S 9	87	7	47%	30.00f	80	55	
Jacksnvle Twr	ptly cldy	80	S 5	89	7	52%	30.01f	80	55	
Jacksonvl Mun	ptly cldy	76	E 8	87	7	67%	30.01f	77	56	
Mayport	haze	76	E 8	84	6	56%	30.02f	76	60	
Gainesville	ptly cldy	76	SW 13	85	7	60%	30.03f	76	57	
Ocala	no report	78	S 7G16	81	10	38%	30.01s	78	56	0.04
Astor	mstly cldy	80	S 8	91	7	58%	30.02f	80	58	
Daytona Beach	ptly cldy	78	E 13	89	10	62%	30.02f	78	56	
Sanford	ptly cldy	81	SW 9	86	10	41%	30.02s	81	58	
Orlando Intl	ptly cldy	81	SE 9	89	10	47%	30.03f	81	59	
Orlando Exec	ptly cldy	82	S 18	87	7	38%	30.03f	82	62	
Titusvlle	.....									
Titusville AP	haze	76	E 9		6		30.05f	76	56	
Cocoa	ptly cldy	76	SE 9	85	7	62%	30.04f	76	64	
Melbourne	ptly cldy	77	E 10	88	10	64%	30.04f	78	59	
StPtrsbrg Int	ptly cldy	74	N 9	82	7	60%	30.05s	82	58	
StPtrsbrg	clear	76	SE 7	82	14	52%	30.06f	76	65	
Tampa Intl	clear	78	W 10	83	15	45%	30.04s	78	53	
MacDill AFB	ptly cldy	78	S 7	83	7	45%	30.04f	78	63	
Sarasota	clear	77	SW 6	83	20	50%	30.03f	77	56	
Lakeland	ptly cldy	81	S 8	88	12	46%	30.02f	81	57	
Bartow	ptly cldy	78	SW 5	85	10	50%	30.04f	78	63	
Avon Park	.....									
Vero Beach	mstly cldy	79	E 8	88	15	54%	30.03f	79	61	
Ft Myers AP	mstly cldy	83	CALM	90	10	43%	30.05s	83	59	
Ft Myers Page	ptly cldy	82	SE 11	88	10	43%	30.03f	82	60	
Naples	ptly cldy	80	W 11	88	10	49%	30.03f	80	61	
W Palm Beach	cloudy	80	E 14	85	10	42%	30.03f	80	65	
Ft Ldrdle Exc	ptly cldy		E 6		7		30.01r			
Ft Ldrdle Int	ptly cldy	81	E 9	89	15	49%	30.00f	81	68	
Miami Opalaka	ptly cldy		E 7		15		30.00f			
Miami Intl	mstly cldy	80	E 11	87	7	47%	30.04f	81	68	
Miami Beach	no report	79	NE 5					79	70	
TaMiami AP	ptly cldy	83	SE 13	91	15	44%	30.03s	83	64	
Homestead AFB	ptly cldy	83	E 9	95	7	55%	30.02f	83	65	
Key West Intl	ptly cldy	80	NE 8	93	10	65%	30.03f	80	71	
Key West NAS	ptly cldy	81	NE 7	90	7	53%	30.01f	81	71	
Fort Pierce	ptly cldy		E 7		10		30.04f			
Naples Beach	no report	74	W 6					74	62	
West Kindall	clear	83	SE 13	91		44%		83	64	
Flamingo	no report		S 11							
Marathon	ptly cldy	78	N 9	94	10	79%	29.92f			

****

Item: 2 Code: CFL

11AM Tue 5 April — FLORIDA this hour — TODAY'S DATA

TOWN	WEATHER	TEMP	WIND	FLSLK	VIS	HUM	BRMTR	HI	LOW	PCPN
Pensacola NAS	ptly cldy	71	S 9	79	7	68%	29.99f	71	58	
Pensacola AP	ptly cldy	71	S 13	80	7	73%	30.00f	71	53	
Milton	ptly cldy	72	S 11	78	7	57%	29.98f	72	49	
Mary Esther	ptly cldy	71	S 13	80	7	71%	30.01f	71	48	
Eglin AFB	ptly cldy	71	S 14	79	7	68%	30.02f	71	49	
Valparaiso AP	ptly cldy	73	S 16	77	7	50%	30.01f			
Crestview	ptly cldy	76	S 8	81	7	47%	29.98f	76	46	
Panama Cty AP	ptly cldy	71	S 9	80	8	71%	30.04s	71	52	
Tyndall AFB	ptly cldy	70	S 9	74	7	71%	30.05s	70	52	
Apalachicola	.....									
Tallahassee	clear	75	S 8	80	7	50%	30.03r	75	51	
Cross City	dry	77	SW 3G16	83		48%		77	52	
Jacksonvl Int	ptly cldy	78	S 10	85	7	50%	30.03f	78	53	
Cecil NAS JAX	ptly cldy	80	S 9	87	7	47%	30.00f	80	55	
Jacksnvle Twr	ptly cldy	80	S 5	89	7	52%	30.01f	80	55	
Jacksonvl Mun	ptly cldy	76	E 8	87	7	67%	30.01f	77	56	
Mayport	haze	76	E 8	84	6	56%	30.02f	76	60	
Gainesville	ptly cldy	76	SW 13	85	7	60%	30.03f	76	57	
Ocala	no report	78	S 7G16	81	10	38%	30.01s	78	56	0.04
Astor	mstly cldy	80	S 8	91	7	58%	30.02f	80	58	
Daytona Beach	ptly cldy	77	E 11	88	10	64%	30.01f	78	56	
Sanford	ptly cldy	81	SW 11G16	85	10	38%	30.01f	81	58	
Orlando Intl	ptly cldy	81	S 14	89	10	49%	30.03s	81	59	
Orlando Exec	ptly cldy	82	S 18	87	7	38%	30.03f	82	62	
Titusvlle	.....									
Titusville AP	haze	76	E 9		6		30.05f	76	56	
Cocoa	ptly cldy	76	SE 9	85	7	62%	30.04f	76	64	
Melbourne	ptly cldy	77	E 10	88	10	64%	30.04f	78	59	
StPtrsbrg Int	ptly cldy	74	N 9	82	7	60%	30.05s	82	58	
StPtrsbrg	clear	76	SE 7	82	14	52%	30.06f	76	65	
Tampa Intl	clear	78	W 10	83	15	45%	30.04s	78	53	
MacDill AFB	ptly cldy	78	S 7	83	7	45%	30.04f	78	63	
Sarasota	clear	77	SW 6	83	20	50%	30.03f	77	56	
Lakeland	ptly cldy	81	S 8	88	12	46%	30.02f	81	57	
Bartow	ptly cldy	78	SW 5	85	10	50%	30.04f	78	63	
Avon Park	.....									
Vero Beach	mstly cldy	79	E 8	88	15	54%	30.03f	79	61	
Ft Myers AP	mstly cldy	83	CALM	90	10	43%	30.05s	83	59	
Ft Myers Page	ptly cldy	82	SE 11	88	10	43%	30.03f	82	60	
Naples	ptly cldy	80	W 11	88	10	49%	30.03f	80	61	
W Palm Beach	cloudy	80	E 14	85	10	42%	30.03f	80	65	
Ft Ldrdle Exc	.....									
Ft Ldrdle Int	ptly cldy	81	E 9	89	15	49%	30.00f	81	68	
Miami Opalaka	ptly cldy		E 7		15		30.00f			
Miami Intl	mstly cldy	80	E 11	87	7	47%	30.04f	81	68	
Miami Beach	no report	79	NE 5					79	70	
TaMiami AP	ptly cldy	83	SE 13	91	15	44%	30.03s	83	64	
Homestead AFB	ptly cldy	83	E 9	95	7	55%	30.02f	83	65	
Key West Intl	ptly cldy	80	NE 8	93	10	65%	30.03f	80	71	
Key West NAS	ptly cldy	81	NE 7	90	7	53%	30.01f	81	71	
Fort Pierce	ptly cldy		E 7		10		30.04f			
Naples Beach	no report	74	W 6					74	62	
West Kindall	clear	83	SE 13	91		44%		83	64	
Flamingo	no report		S 11							
Marathon	.....									