

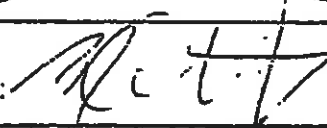


CONFIDENTIAL

FUELSAVE TECHNOLOGY Ltd.

**RENTAR FUEL CONDITIONER
EVALUATION**

OCTOBER / NOVEMBER 1997
REPORT No. MBK 970860

AUTHOR:		S.C. ROWLANDS PROJECT ENGINEER
APPROVED:		C.A. LAWSON MANAGER - VEHICLE EMISSIONS LABORATORIES
APPROVED FOR ISSUE:		R. J. CALVERT MANAGING DIRECTOR
DATE:	27 th Nov. 1997	



TEST CYCLE

The test cycle follows the Millbrook 3 phase Heavy Duty truck cycle, the three phases representing the real world working operation of a truck.

1. Urban cycle, this cycle is generally low speed operation with speeds not in excess of 50 km/hr, with additional stationary operations included.
2. Motorway cycle, typical motorway usage, steady state running at 90 km/hr with some short operations at 70 km/hr.
3. Suburban Cycle, general mixed suburban driving with speeds of 60 km/hr being achieved.

The overall length of the test was 2452 seconds and 32.76 km. First phase was 780 seconds long and 4.021 km, second phase was 778 seconds long and 17.66km and the third was 894 seconds long and 11.078 km.

TESTING METHODS

Prior to dynamometer testing coastdowns were performed on the Millbrook test track with the test vehicle and trailer at 14515 kg GVW in order to establish the road load coefficients. The times were then matched on the dynamometer to give accurate dynamometer loads.

The vehicle tested was a Volvo FL10 tractor unit (38 tonne GVW) fitted with a Volvo 10,000 c.c. diesel unit coupled to an 8 speed manual gearbox.

The tests were carried out in the Variable Temperature Emissions Chamber (VTEC) facility at Millbrook proving ground.

The VTEC enable chassis dynamometer emission testing at temperatures between -30 and + 50° C. The dynamometer enables full road load and inertia simulation allowing real world operating conditions to be accurately simulated.

The exhaust gases are sampled via a full flow CVS system. This method of testing is identical to the method of testing used for type approval of cars and LDV's.

In addition to the bag test, modal samples of exhaust gas are analysed at 10 Hz continuously to give second by second emissions throughout the driven cycle.

The particulates are measured using a weighted filter method for the final result.

RETURN TEST RESULTS DISCUSSION

The test vehicle was returned to Millbrook Proving Ground on 8th November 1997 for three further tests to be carried out as per the Millbrook Heavy Duty truck cycle.

During the period 17th October to 8th November 1997 Millbrook Proving Ground had no contact with or control over the Rentar test vehicle registration No. K639FFU and therefore cannot comment on vehicle maintenance or operation during this period

The test results are shown on the test summary sheet overleaf.

In comparing the return test data with that of the original set of tests, changes in fuel consumption and legislated pollutants can be observed.

Fuel Consumption:

The original tests gave fuel consumption averages (in l/100 Km) of:

Baseline	23.30
Rentar fitted	23.10
20 hrs cond	22.71
45 hrs cond	22.59

The return tests gave an average of 21.58, this represented a fuel consumption improvement of 7.38% over the original baseline tests from the initial test programme.

A trendline was produced showing the general reduction in fuel consumption a best fit line (following an x^2 polynomial function) was drawn through the test result points, although the curve is downward, a stabilised levelling off point would be anticipated.

Legislated Pollutants:

The legislated pollutants in the return test showed a downward trend in NO_x, CO₂ and particulates from the original baseline tests. CO and HC showed no significant changes.

MILLBROOK VEHICLE EMISSIONS LABORATORY

3 PHASE TRUCK CYCLE DIESEL EMISSIONS TEST SUMMARY SHEET

TEST PURPOSE:		FUEL CONDITIONER EVALUATION, BASELINE TESTS			
DATE	10-Oct-97	Site No.	2	DYNAMOMETER SETTINGS	
VEHICLE NO	K639 FFU	Detonation Factors		INERTIA	14515 kg
VEHICLE TYPE	VOVLO FL10	HC	1.0	F ²	909.10 N
ENGINE	10000 C.C.	CO	1.0	F ¹	-4.985 N/kmh
TRANS TYPE	MT8	NOx	1.0	F ²	0.34343 N/kmh ²
FUEL TYPE	PLUMP	PM	1.0	F ²	-3.001547 N/kmh ³

Test No. ML02001086		09-Oct-97							Fuel Cons
Odo	181542	LNITS	HC	CO	NOx	CO ₂	PM	(Carb Bal)	
Phase 1	Urban	grammes	3.509	34.480	57.645	3829.0	3.574	36.72	
Phase 2	Motorway	grammes	6.600	20.752	129.286	9758.8	5.412	20.86	
Phase 3	Suburban	grammes	5.729	31.093	91.827	6536.2	3.341	22.37	
Combined result		g/km	0.485	2.641	8.529	615.8	0.577	litres/100km	
								23.30	

Test No. ML02001087		09-Oct-97							Fuel Cons
Odo	181542	LNITS	HC	CO	NOx	CO ₂	PM	(Carb Bal)	
Phase 1	Urban	grammes	3.259	45.288	55.253	3852.2	3.770	37.02	
Phase 2	Motorway	grammes	6.805	24.235	121.518	9825.0	4.461	20.99	
Phase 3	Suburban	grammes	5.703	39.727	83.947	6566.4	4.052	22.53	
Combined result		g/km	0.482	3.341	7.972	619.1	0.576	litres/100km	
								23.47	

Test No. ML02001088		09-Oct-97							Fuel Cons
Odo	181542	LNITS	HC	CO	NOx	CO ₂	PM	(Carb Bal)	
Phase 1	Urban	grammes	3.411	35.773	59.949	3799.0	3.100	36.25	
Phase 2	Motorway	grammes	6.939	20.800	132.341	9760.1	4.360	20.81	
Phase 3	Suburban	grammes	5.907	24.770	92.108	6483.7	3.159	22.26	
Combined result		g/km	0.497	2.439	8.709	612.7	0.525	litres/100km	
								23.19	

Average of 3 Combined Tests (g/km)	0.488	2.874	8.404	615.0	0.559		23.340
Standard Deviation (Mean x100)	1.33	11.40	3.73	0.45	0.50		0.34

REMARKS

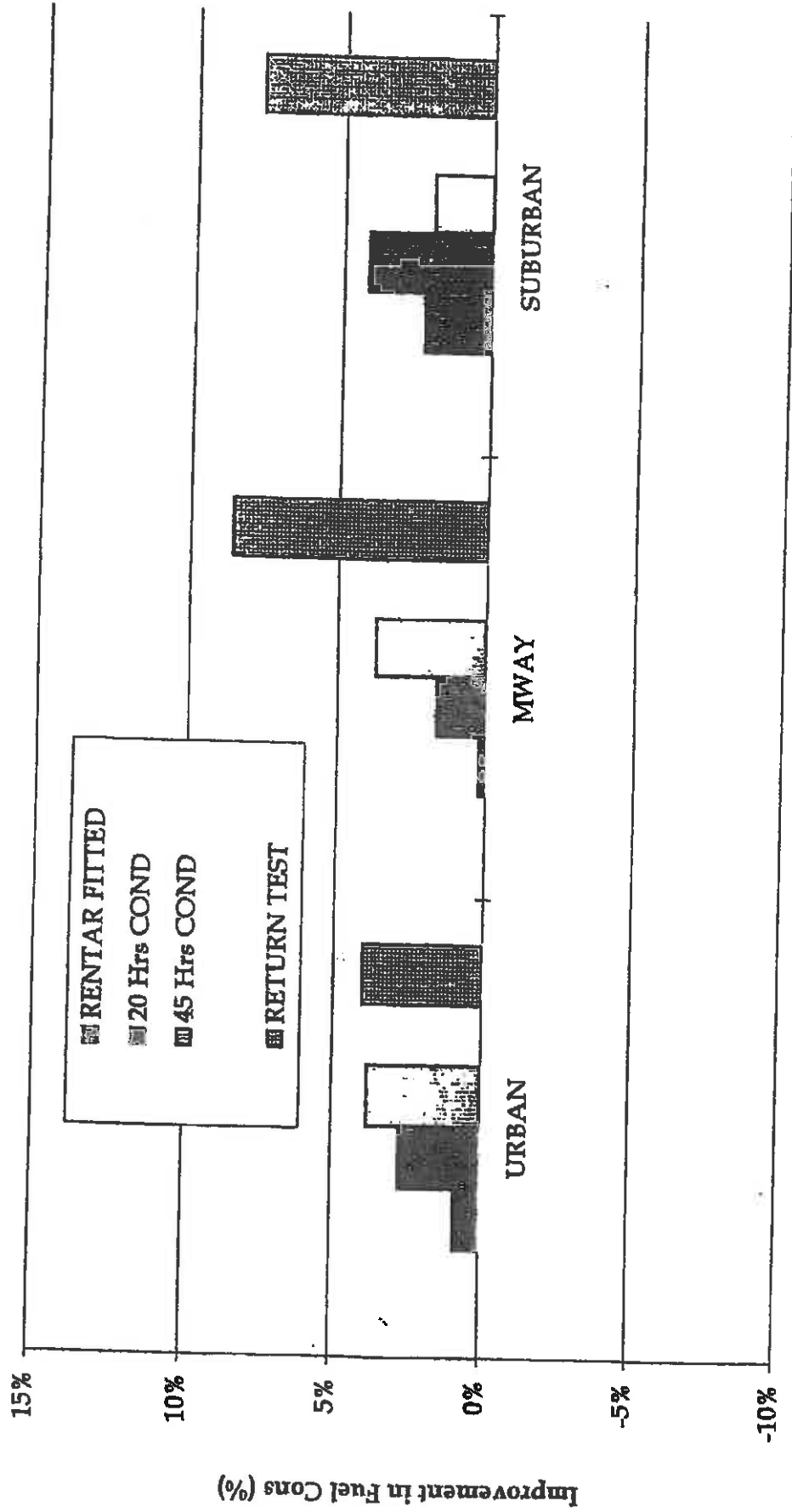
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DATE: 10/10/97

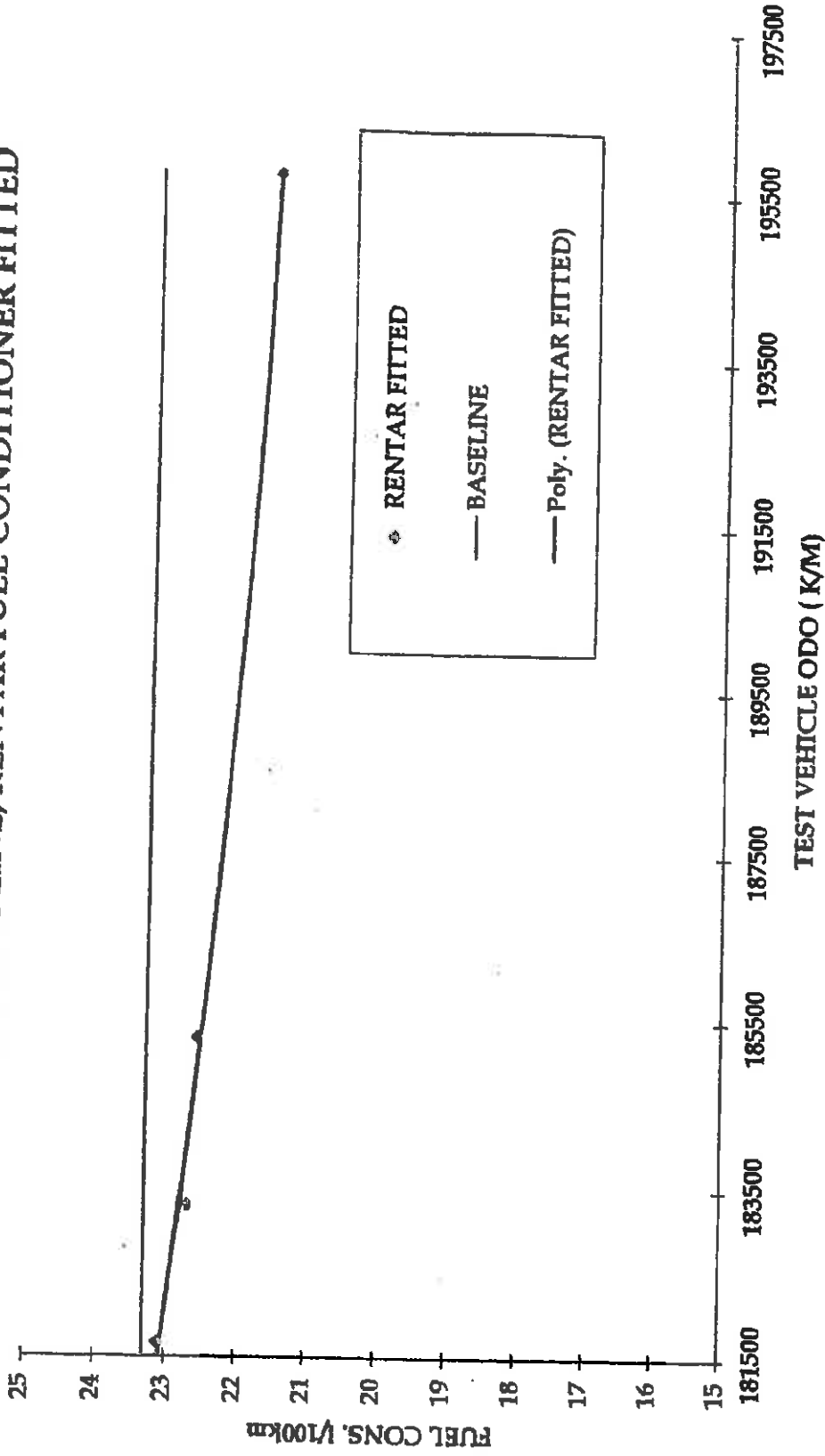
APPROVED BY:

DATE:

Fuel Consumption relative to Baseline Percent Improvement by Phase



POLYNOMIAL TRENDLINE, RENTAR FUEL CONDITIONER FITTED



APPENDIX 2

GASEOUS SUMMARY SHEETS

MILLBROOK VEHICLE EMISSIONS LABORATORY

3 PHASE TRUCK CYCLE DIESEL EMISSIONS TEST SUMMARY SHEET

TEST PURPOSE-		FUEL CONDITIONER EVALUATION, BASELINE TESTS			
DATE	10-Oct-97	Site No.	2	DYNAMOMETER SETTINGS	
VEHICLE NO	K639 FFU	Detenoration Factors		INERTIA	14515 kg
VEHICLE TYPE	VOVLO FL10	HC	: 1.0	F ²	909.10 N
ENGINE	18000 C.C.	CO	: 1.0	F ¹	-1.985 N/kmh
TRANS TYPE	MT8	NOx	1.0	F ²	0.34343 N/kmh ²
FUEL TYPE	PLDMP	PM	1.0	F ²	-0.001547 N/kmh ²

Test No. ML02001086		09-Oct-97							Fuel Cons
Odo	181542	UNITS	HC	CO	NOx	CO ₂	PM	(Carb Bal)	
Phase 1	Urban	grammes	3.509	34.480	57.645	3829.0	3.574	36.72	
Phase 2	Motorway	grammes	6.600	20.752	129.286	9758.8	5.412	20.86	
Phase 3	Suburban	grammes	5.729	31.093	91.827	6336.2	3.341	22.37	
Combined result		g/km	0.485	2.641	8.529	615.8	0.377	litres/100km	
								23.30	

Test No. ML02001087		09-Oct-97							Fuel Cons
Odo	181542	UNITS	HC	CO	NOx	CO ₂	PM	(Carb Bal)	
Phase 1	Urban	grammes	3.259	45.288	55.253	3852.2	3.770	37.02	
Phase 2	Motorway	grammes	6.805	24.235	121.518	9828.0	4.461	20.99	
Phase 3	Suburban	grammes	5.703	32.727	83.947	6566.4	4.052	22.53	
Combined result		g/km	0.482	2.341	7.972	619.1	0.376	litres/100km	
								23.47	

Test No. ML02001088		09-Oct-97							Fuel Cons
Odo	181542	UNITS	HC	CO	NOx	CO ₂	PM	(Carb Bal)	
Phase 1	Urban	grammes	3.411	35.773	59.949	3799.0	3.160	36.25	
Phase 2	Motorway	grammes	6.939	20.800	132.341	9760.1	4.360	20.81	
Phase 3	Suburban	grammes	5.907	26.770	92.108	6483.7	3.159	22.26	
Combined result		g/km	0.497	2.639	8.709	612.7	0.325	litres/100km	
								23.19	

Average of 3 Combined Tests g/km 0.488 2.674 8.404 615.4 0.359 23.30

Standard Deviation (Mean x100) 1.35 11.20 3.73 0.45 0.50 0.40

COMMENTS

ED/B1

DATE: 10/1/97

APPROVED BY:

DATE:

MILLIKOOL VEHICLE EMISSIONS LABORATORY

3 PHASE TRUCK CYCLE DIESEL EMISSIONS TEST SUMMARY SHEET

TEST PURPOSE-		FUEL CONDITIONER EVALUATION, FUEL CONDITIONER FITTED			
DATE	10/10/97	Site No.	2	DYNAMOMETER SETTINGS	
VEHICLE NO	K639 FFU	Deterioration Factors		INERTIA	14515 kg
VEHICLE TYPE	VOLVO FL10	HC	1.0	F	809.10 N
ENGINE	10000 C.C.	CO	1.0	F	-1.895 N/kmh
TRANS TYPE	MTS	NOx	1.0	F	0.34343 N/kmh ²
FUEL TYPE	PUMP	PM	1.0	F	-0.001547 N/kmh ³

Test No. ML02001090 09-Oct-97								Fuel Cons
Odo	181674	UNITS	HC	CO	NOx	CO ₂	PM	(Carb Ball)
Phase 1	Urban	grammes	3.441	41.129	39.665	3879.0	3.608	36.79
Phase 2	Motorway	grammes	6.803	21.470	132.767	9780.3	4.109	20.91
Phase 3	Suburban	grammes	5.838	35.571	91.572	6543.9	3.539	22.54
Combined result		g. km	0.492	3.004	8.691	618.3	0.344	litres/100km 23.42

Test No. ML02001091 10-OCT-97								Fuel Cons
Odo	181674	UNITS	HC	CO	NOx	CO ₂	PM	(Carb Ball)
Phase 1	Urban	grammes	3.987	25.077	62.210	3785.3	2.722	36.15
Phase 2	Motorway	grammes	7.122	19.258	129.050	9756.7	4.075	20.54
Phase 3	Suburban	grammes	5.383	28.755	95.423	6157.3	3.258	21.16
Combined result		g. km	0.505	2.241	3.873	603.4	0.307	litres/100km 22.92

Test No. ML02001092 10-Oct-97								Fuel Cons
Odo	181674	UNITS	HC	CO	NOx	CO ₂	PM	(Carb Ball)
Phase 1	Urban	grammes	3.596	22.629	60.414	3792.2	2.772	36.15
Phase 2	Motorway	grammes	7.047	20.658	131.730	9732.9	4.482	20.50
Phase 3	Suburban	grammes	5.718	28.555	93.617	6426.3	3.576	21.96
Combined result		g. km	0.500	2.196	3.737	610.0	0.325	litres/100km 23.06

Average of Combined Tests (g/km)	0.499	2.480	8.787	610.0	0.325	23.00
Standard Deviation Mean x100	1.06	14.36	3.88	1.00	4.00	1.07

COMMENTS

LED BY

DATE

APPROVED BY:

DATE

MILBROOK VEHICLE EMISSIONS LABORATORY

3 PHASE TRUCK CYCLE DIESEL EMISSIONS TEST SUMMARY SHEET

TEST PURPOSE:- **FUEL CONDITIONER EVALUATION, TEST FOLLOWING 20 HRS COND**

DATE	: 13/10/1997	Site No.	2	DYNAMOMETER SETTINGS	
VEHICLE NO	: K639 FFU	Deterioration Factors		INERTIA	: 14515 kg
VEHICLE TYPE	: VOVLO FL10	HC	: 1.0	F ¹	: 0 809.1N
ENGINE	: 10000 C.C.	CO	: 1.0	F ²	: -4.985 N/kmh
TRANS TYPE	: MT8	NOx	: 1.0	F ³	: 0.34343 N/kmh ²
FUEL TYPE	: PLMP	PM	: 1.0	F ⁴	: -0.001547 N/kmh ³

Test No. ML02001098		13/10/1997								
Odo	183314	UNITS		HC	CO	NOx	CO ₂	PM	Fuel Cons (Carb Bal)	
Phase 1	Urban	grammes		3.740	30.633	62.727	3770.1	3.145	36.01	
Phase 2	Motorway	grammes		6.473	17.689	136.290	9715.8	4.251	20.77	
Phase 3	Suburban	grammes		5.913	30.939	94.039	6481.5	3.301	22.20	
Combined result		g/km		0.494	2.426	8.968	611.0	0.327	litres/100km	
									23.11	

Test No. ML02001099		13/10/1997								
Odo	183314	UNITS		HC	CO	NOx	CO ₂	PM	Fuel Cons (Carb Bal)	
Phase 1	Urban	grammes		3.496	31.167	58.045	3741.2	2.952	35.61	
Phase 2	Motorway	grammes		6.595	19.077	126.220	9586.3	4.180	20.46	
Phase 3	Suburban	grammes		5.899	28.337	88.202	6391.6	3.246	21.90	
Combined result		g/km		0.488	2.402	8.329	602.8	0.317	litres/100km	
									22.80	

Test No. ML02001100		13/10/97								
Odo	183314	UNITS		HC	CO	NOx	CO ₂	PM	Fuel Cons (Carb Bal)	
Phase 1	Urban	grammes		3.699	32.842	57.192	3725.2	3.169	35.43	
Phase 2	Motorway	grammes		6.460	18.911	123.660	9554.2	3.892	20.41	
Phase 3	Suburban	grammes		6.060	25.641	91.079	5949.2	2.560	20.29	
Combined result		g/km		0.495	2.363	7.997	587.1	0.294	litres/100km	
									22.21	

Average of Combined Tests (g/km)	0.492	2.397	8.431	600.307	0.313	22.707
Standard Deviation/Mean x100	0.61	1.09	4.78	1.66	4.50	1.63

COMMENTS

TESTED BY: DATE: 20/10/97

APPROVED BY: _____ DATE: _____

MILBROOK VEHICLE EMISSIONS LABORATORY

3 PHASE TRUCK CYCLE DIESEL EMISSIONS TEST SUMMARY SHEET

TEST PURPOSE-		FUEL CONDITIONER EVALUATION, TEST FOLLOWING 45 HRS COND					
DATE	15/10/1997	Site No.	2		DYNAMOMETER SETTINGS		
VEHICLE NO	K639 FFU	Deterioration Factors		INERTIA			
VEHICLE TYPE	VOVLO FL10	HC	1.0		F	809.1N	
ENGINE	110000 C.C.	CO	1.0		F	-1.985 N/kmh	
TRANS TYPE	MTB	NOx	1.0		F	0.34343 N/kmh ²	
FUEL TYPE	PLDMP	PM	1.0		F	-0.001547 N/kmh ³	

Test No. ML02001111		15/10/1997								
Odo	185289	UNITS	HC	CO	NOx	CO ₂	PM	Fuel Cons (Carb Bal)		
Phase 1	Urban	grammes	3.487	31.245	58.455	3663.2	4.046	34.79		
Phase 2	Motorway	grammes	6.324	19.123	126.510	9381.0	6.108	20.03		
Phase 3	Suburban	grammes	5.625	29.818	88.031	6341.6	3.475	21.68		
Combined result		g/km	0.471	2.449	8.336	592.0	0.416	litres/100km		
								22.40		

Test No. ML02001112		15/10/1997								
Odo	185289	UNITS	HC	CO	NOx	CO ₂	PM	Fuel Cons (Carb Bal)		
Phase 1	Urban	grammes	3.302	31.674	57.952	3730.1	2.960	35.44		
Phase 2	Motorway	grammes	6.109	18.954	124.900	9447.0	4.026	20.14		
Phase 3	Suburban	grammes	5.459	38.375	87.184	6455.7	3.652	22.30		
Combined result		g/km	0.455	2.724	8.266	600.9	0.526	litres/100km		
								22.74		

Test No. ML02001113		15/10/97								
Odo	185289	UNITS	HC	CO	NOx	CO ₂	PM	Fuel Cons (Carb Bal)		
Phase 1	Urban	grammes	2.982	36.093	55.790	3749.5	3.258	35.58		
Phase 2	Motorway	grammes	6.146	18.574	123.350	9460.0	4.122	20.18		
Phase 3	Suburban	grammes	5.341	30.193	86.084	6395.2	3.379	21.86		
Combined result		g/km	0.442	2.590	8.090	598.4	0.328	litres/100km		
								22.64		

Average of Combined Tests. (g/km)	0.456	2.590	8.230	597.100	0.357	22.590
Standard Deviation/Mean x100	2.67	4.34	1.26	0.63	11.79	0.64

COMMENTS

TESTED BY: DATE: 15/10/97

APPROVED BY: _____ DATE: _____

APPENDIX 3

FUEL CONSUMPTION GRAPHS

VEHICLE EMISSIONS LABORATORY

3 PHASE TRUCK CYCLE DIESEL EMISSIONS TEST SUMMARY SHEET

TEST PURPOSE-		FUEL CONDITIONER EVALUATION, POST OFF SITE RUNNING			
DATE	08/NOV/97	Site No.	2		DYNAMOMETER SETTINGS
VEHICLE NO	K639 FFU	Deterioration Factors		INERTIA : 14515 kg	
VEHICLE TYPE	VOVLO FL10	HC	1.0	F : 809.10 N	
ENGINE	10000 C.C.	CO	1.0	F : -1.985 N/kmh	
TRANS TYPE	MT8	NOx	1.0	F : 0.34343 N/kmh ²	
FUEL TYPE	RUMMP	PM	1.0	F : -0.001547 N/kmh ³	

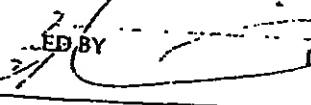
Test No. ML02001145		8/11/1997								
Odo	195720	UNITS	HC	CO	NOx	CO ₂	PM	Fuel Cons (Carb Bal)		
Phase 1	Urban	grammes	3.598	35.382	56.576	3603.4	3.254	34.80		
Phase 2	Motorway	grammes	7.073	19.326	119.490	8905.3	3.604	19.03		
Phase 3	Suburban	grammes	5.638	29.785	83.883	6119.2	3.091	20.97		
Combined result		g/km	0.499	2.587	7.960	570.4	0.305	21.60		
								litres/100km		
								21.60		

Test No. ML02001146		8/11/1997								
Odo	195720	UNITS	HC	CO	NOx	CO ₂	PM	Fuel Cons (Carb Bal)		
Phase 1	Urban	grammes	4.016	37.946	51.595	3670.5	3.465	35.17		
Phase 2	Motorway	grammes	6.786	20.284	109.897	8934.1	3.531	19.06		
Phase 3	Suburban	grammes	5.685	26.360	71.750	5771.6	2.583	19.83		
Combined result		g/km	0.504	2.587	7.134	562.0	0.293	21.29		
								litres/100km		
								21.29		

Test No. ML02001147		08/11/1997								
Odo	195720	UNITS	HC	CO	NOx	CO ₂	PM	Fuel Cons (Carb Bal)		
Phase 1	Urban	grammes	3.248	40.232	49.229	3676.5	3.379	35.45		
Phase 2	Motorway	grammes	7.023	19.959	104.248	9005.6	3.807	19.22		
Phase 3	Suburban	grammes	5.589	36.682	72.024	6171.8	3.550	21.16		
Combined result		g/km	0.485	2.962	6.894	576.4	0.338	21.84		
								litres/100km		
								21.84		

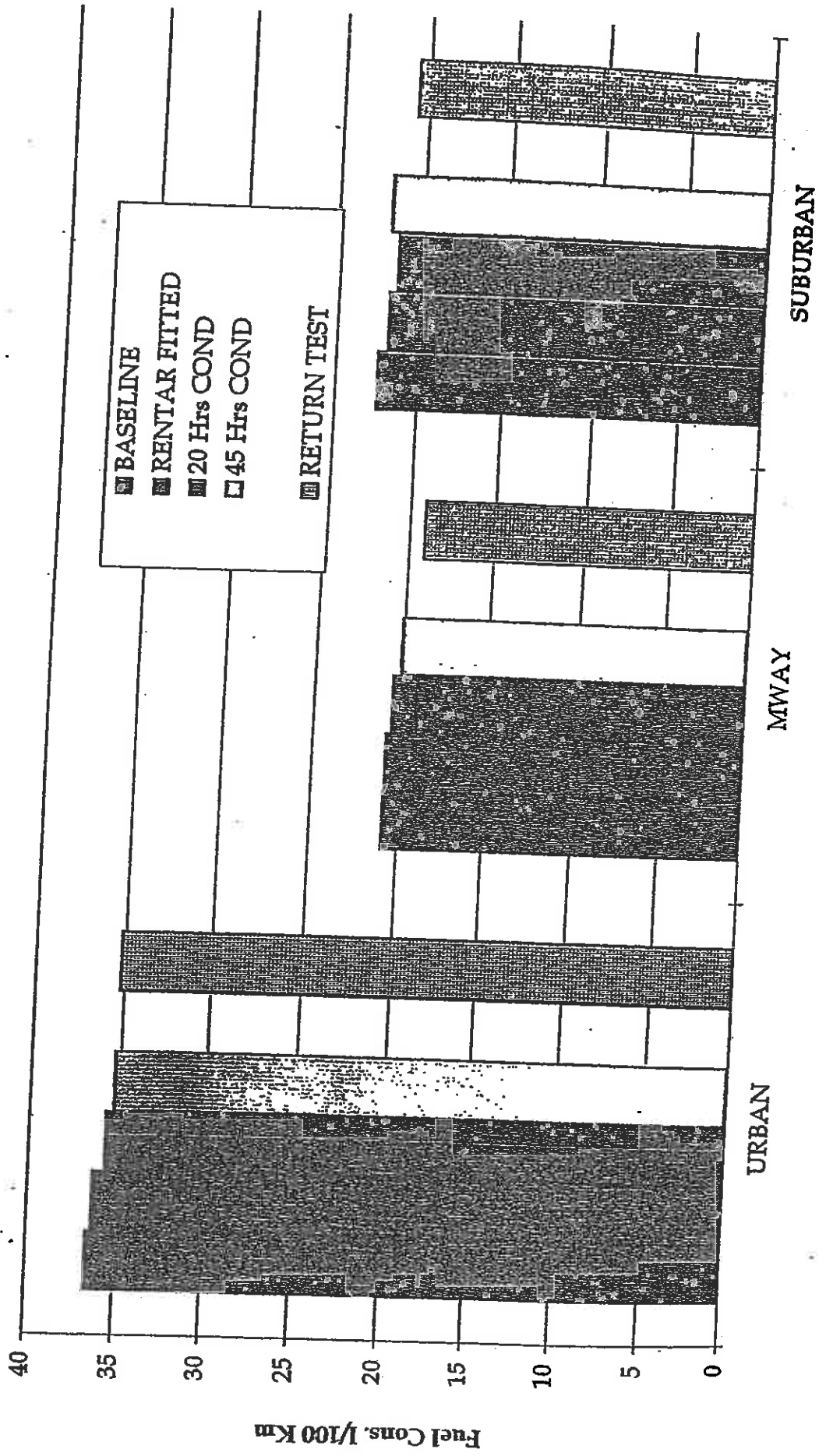
Average of Combined Tests (g/km)	0.496	2.712	7.329	569.6	0.312	21.550
Standard Deviation/Mean x100	1.62	6.52	6.23	1.04	6.16	1.04

COMMENTS

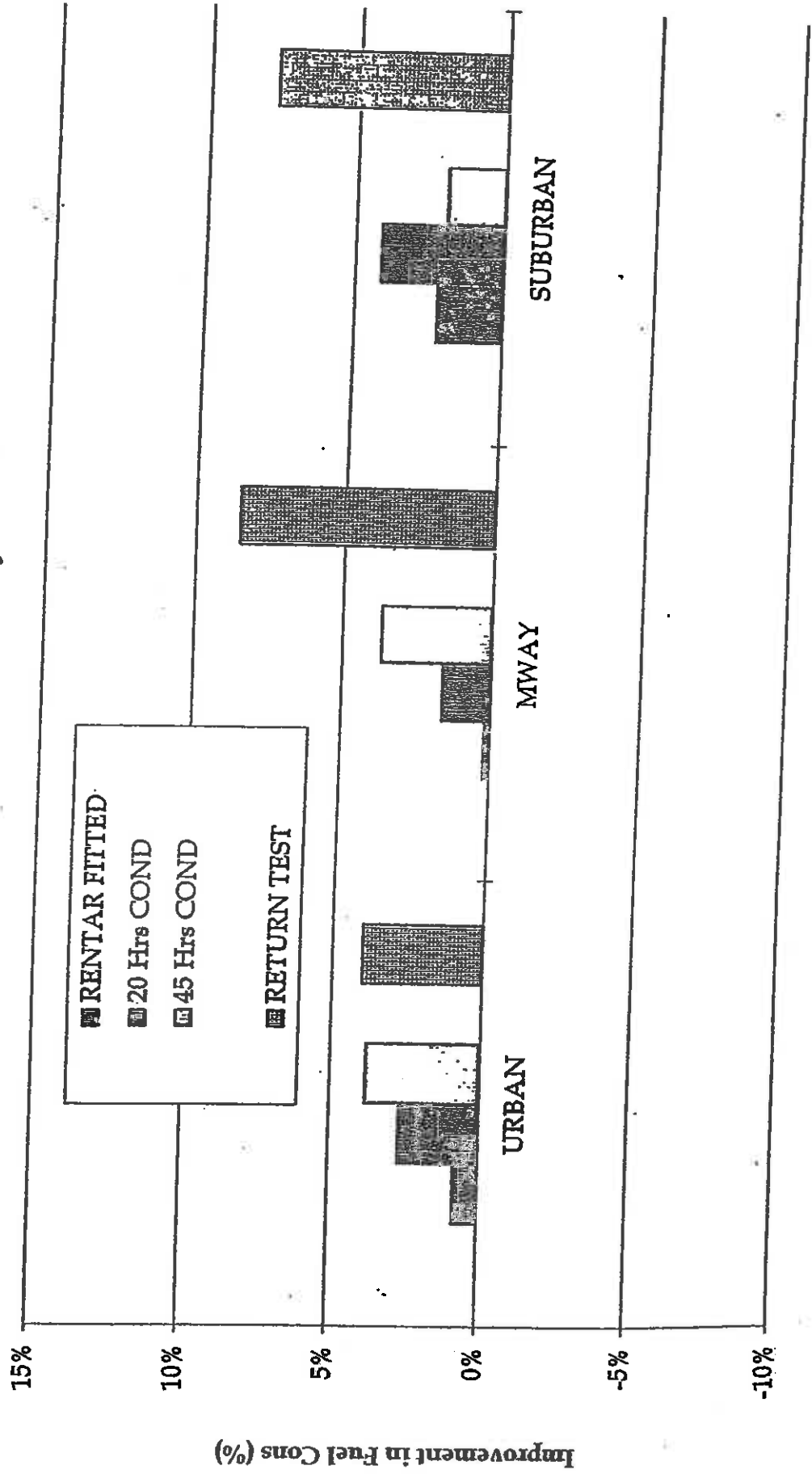
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APPROVED BY: _____ DATE: _____

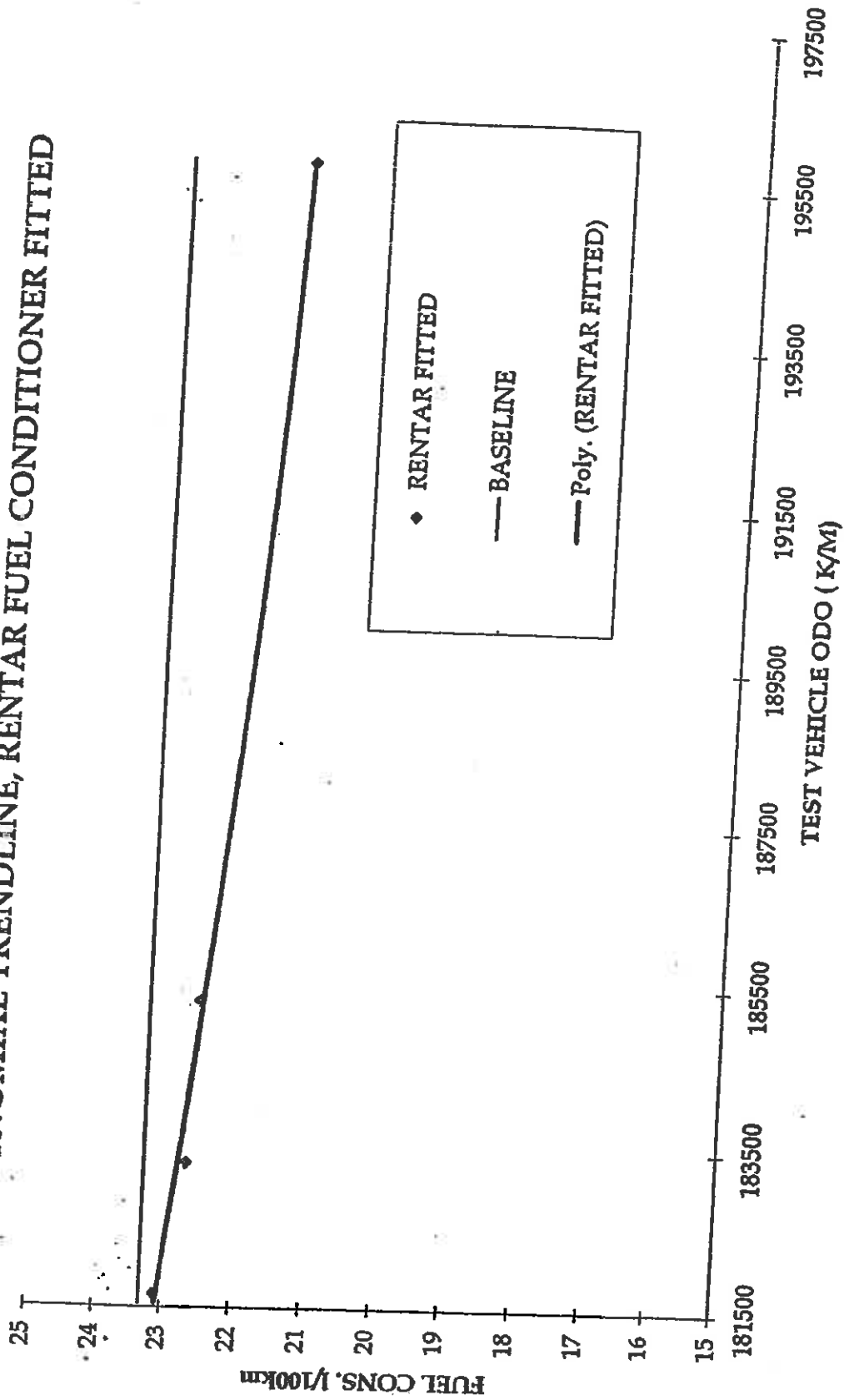
Fuel Consumption, Cycle Averages Per Test



Fuel Consumption relative to Baseline Percent Improvement by Phase



POLYNOMIAL TRENDLINE, RENTAR FUEL CONDITIONER FITTED



APPENDIX 4

EMISSIONS COMPARISON GRAPHS

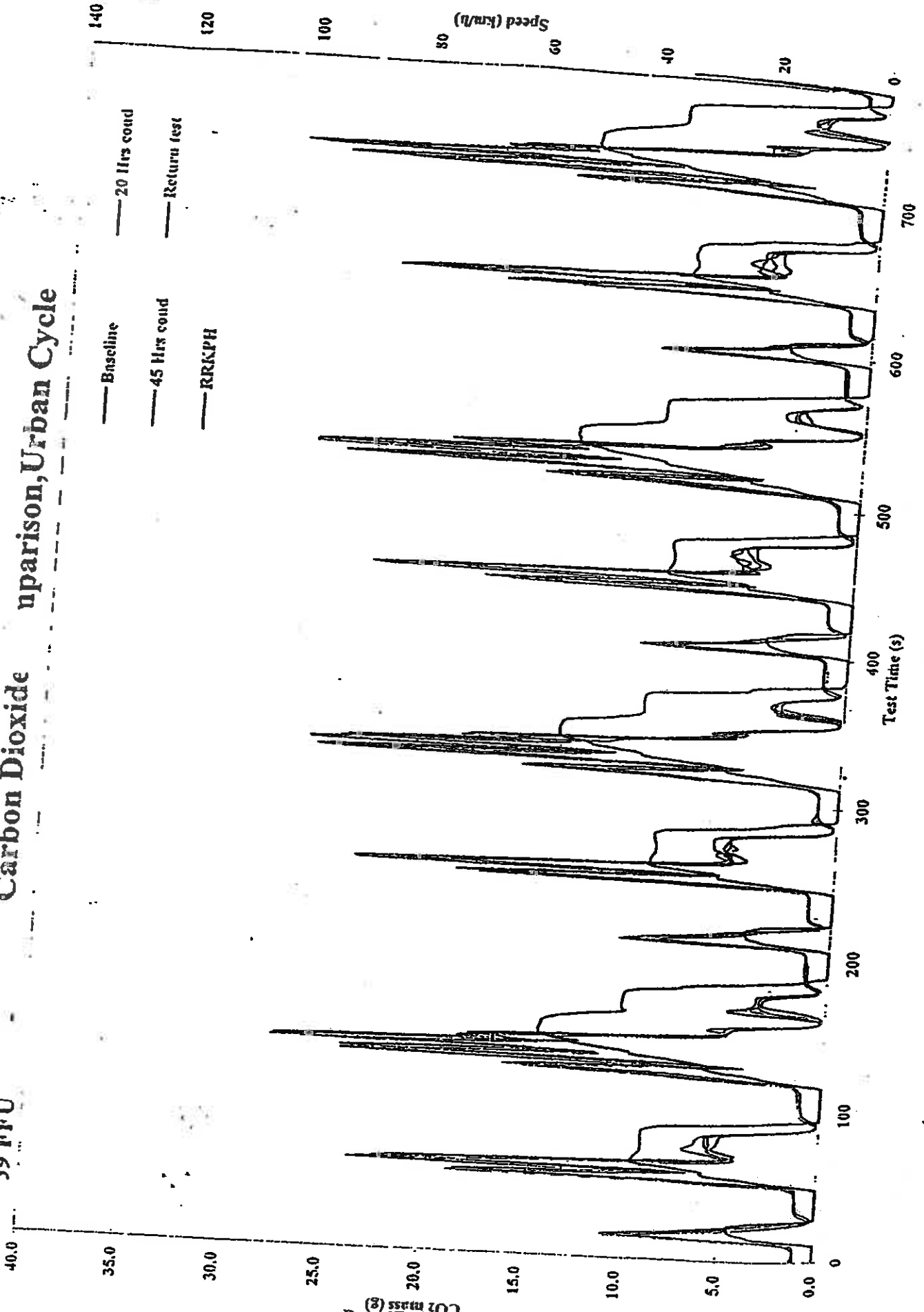
APPENDIX 5

ONE SECOND GASEOUS GRAPH (CO₂)

39 FFU

Carbon Dioxide

Comparison, Urban Cycle

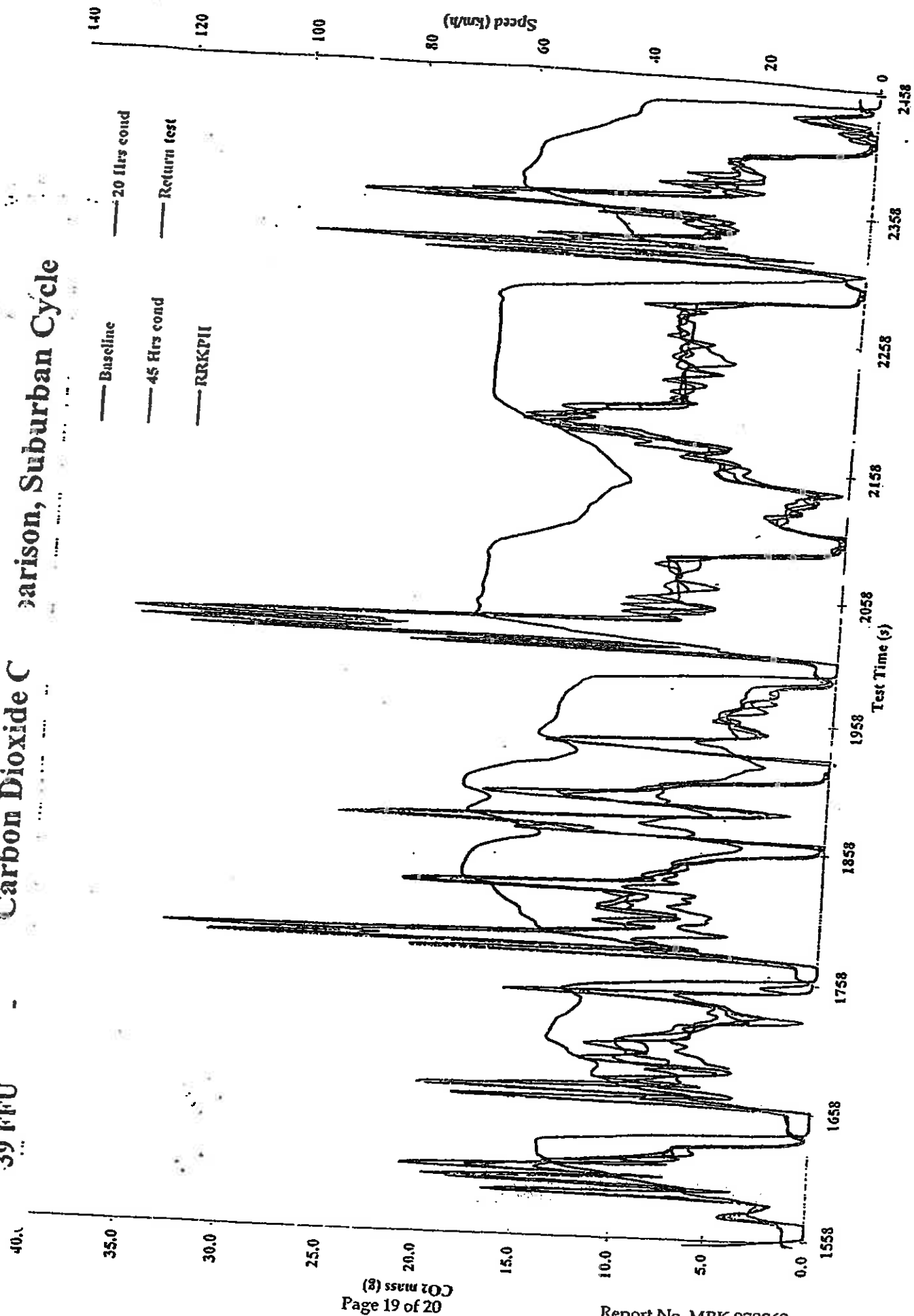


— Baseline
- - - 20 Hrs cond
... 45 Hrs cond
- · - Return test

39 FFU

Carbon Dioxide C

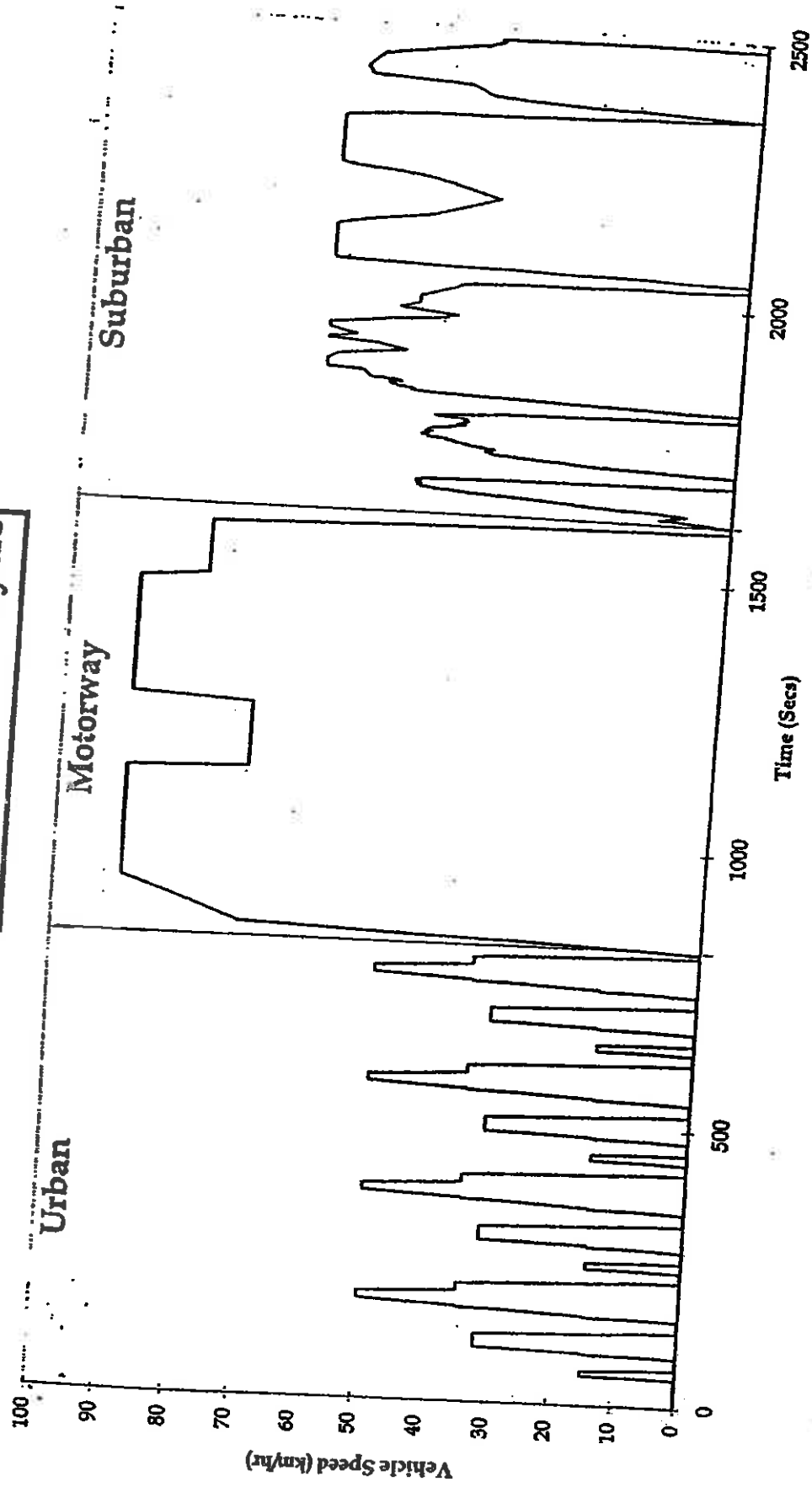
arison, Suburban Cycle



APPENDIX 6

MILLBROOK HD TRUCK CYCLE GRAPH

Millbrock H.D. Cycle



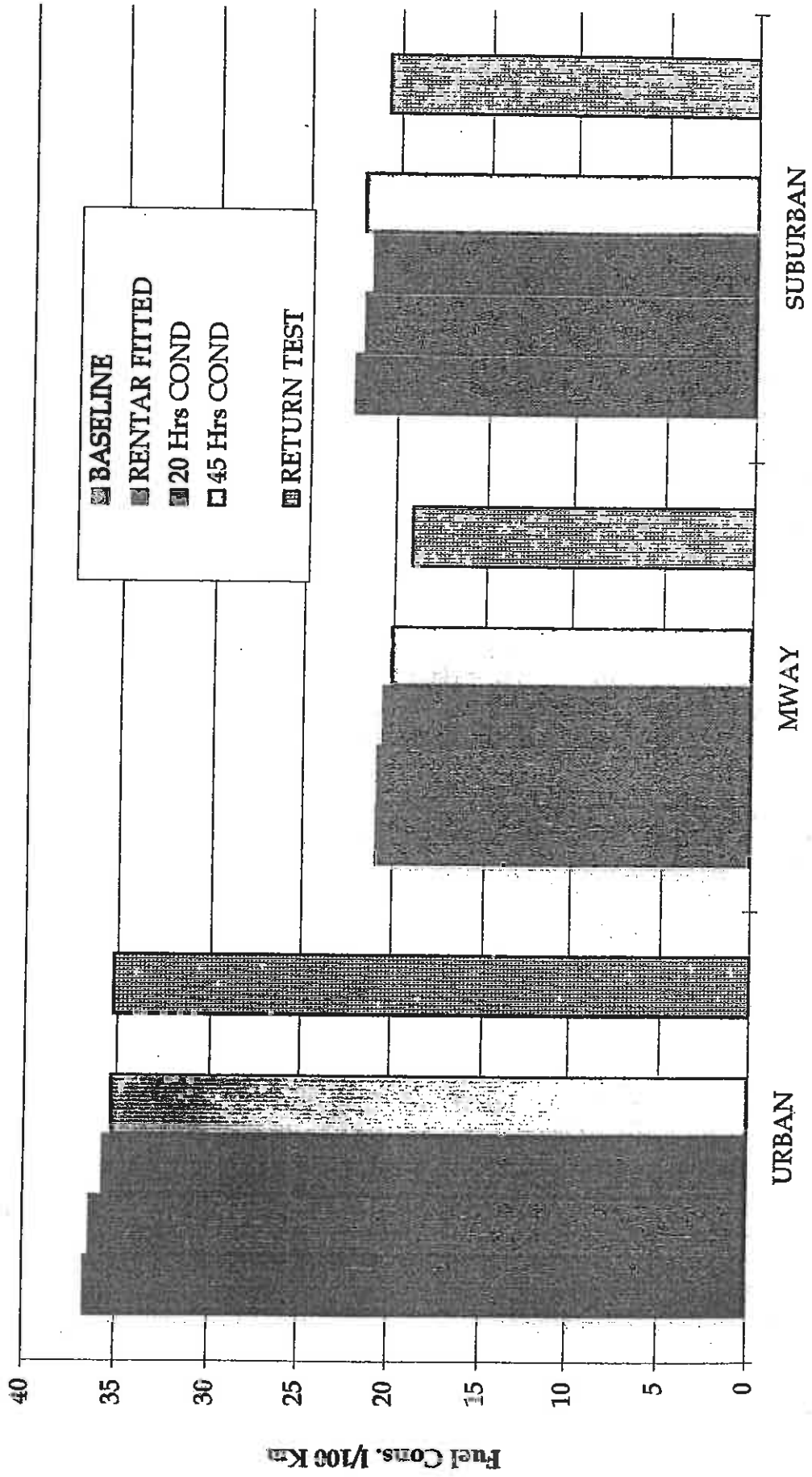
APPENDIX 4

EMISSIONS COMPARISON GRAPHS

APPENDIX 3

FUEL CONSUMPTION GRAPHS

Fuel Consumption, Cycle Averages Per Test

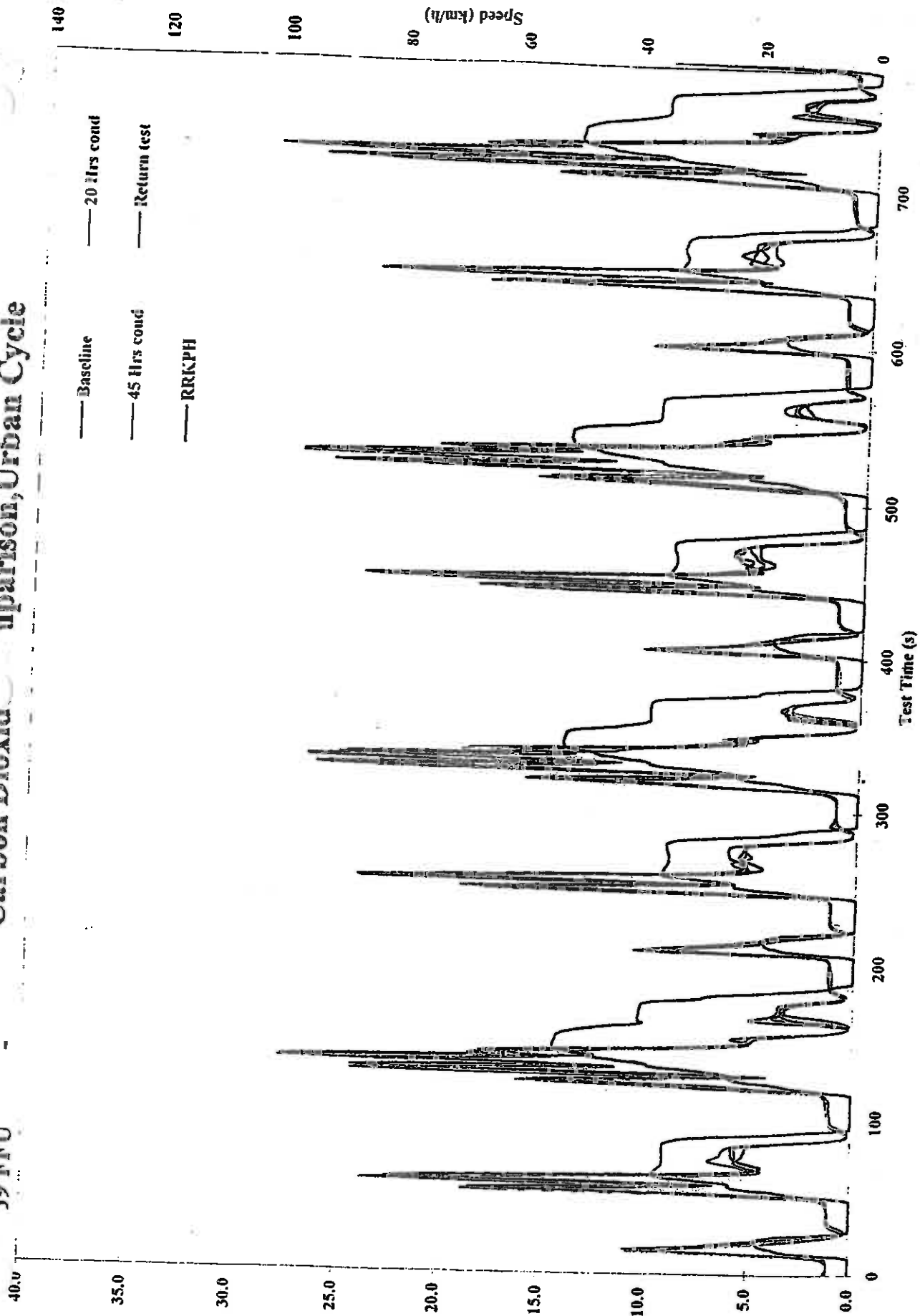


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APPENDIX 5

ONE SECOND GASEOUS GRAPH (CO₂)

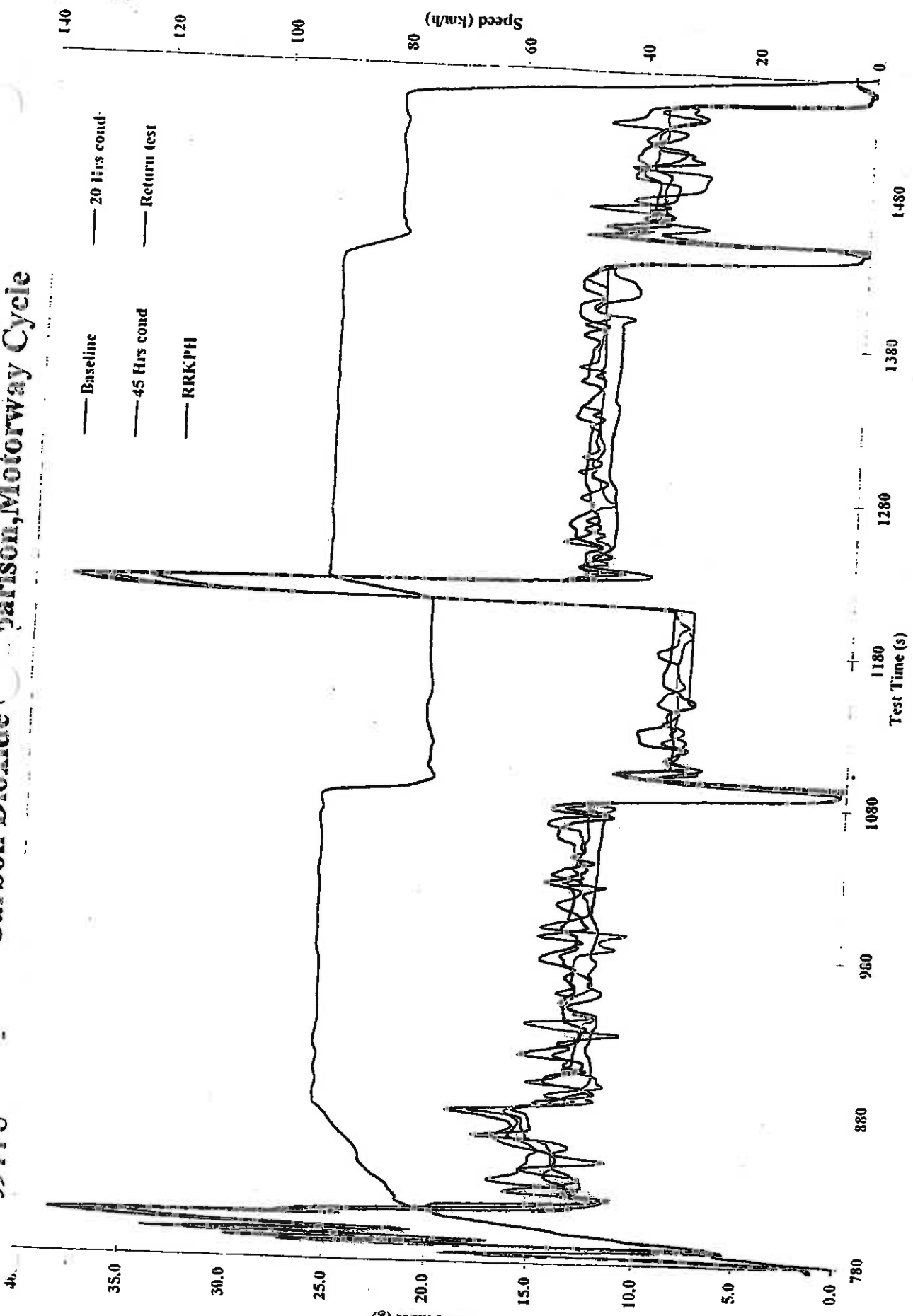
Carbon Dioxide Comparison, Urban Cycle

39 FFU

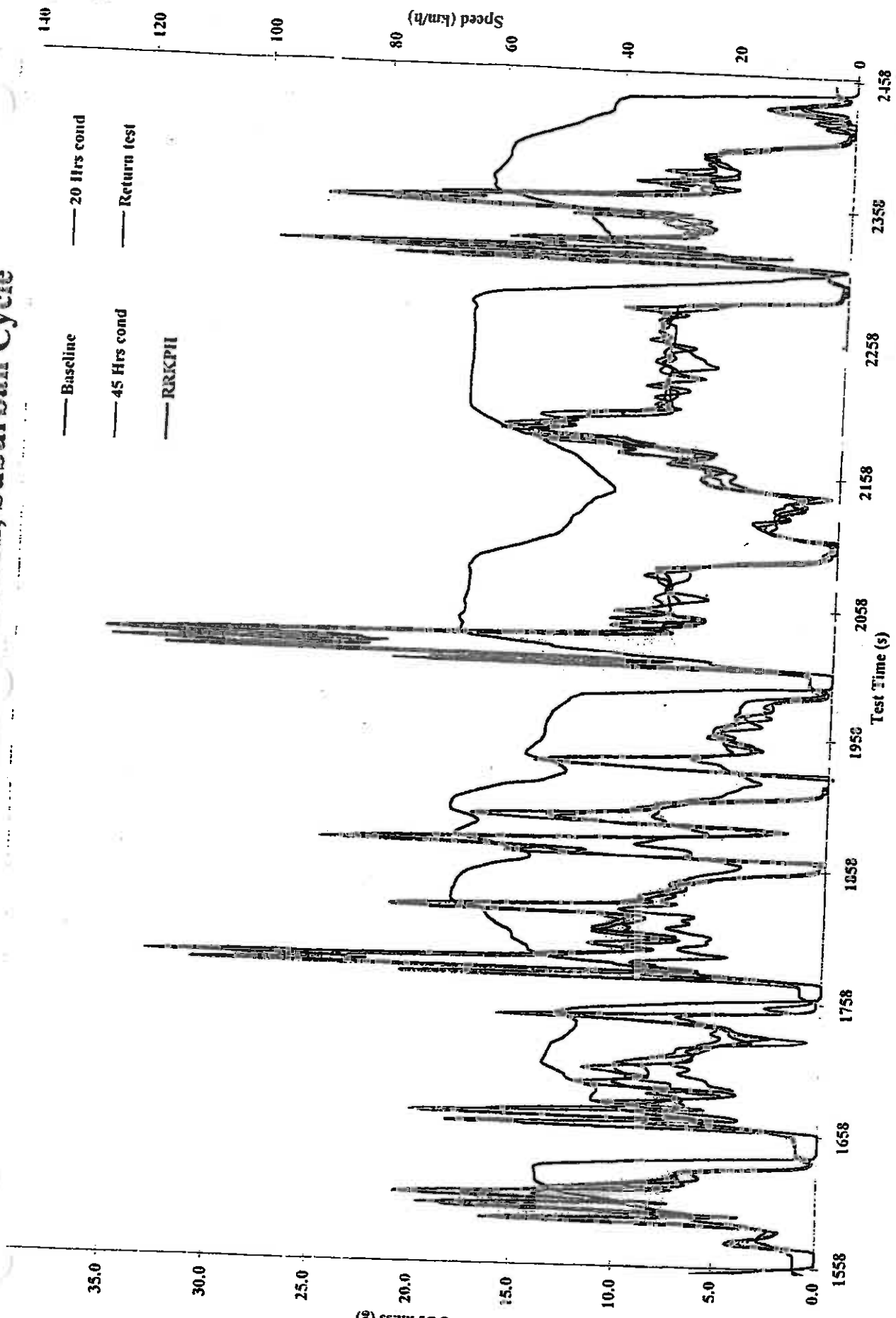


Carbon Dioxide Comparison, Motorway Cycle

39 FFU



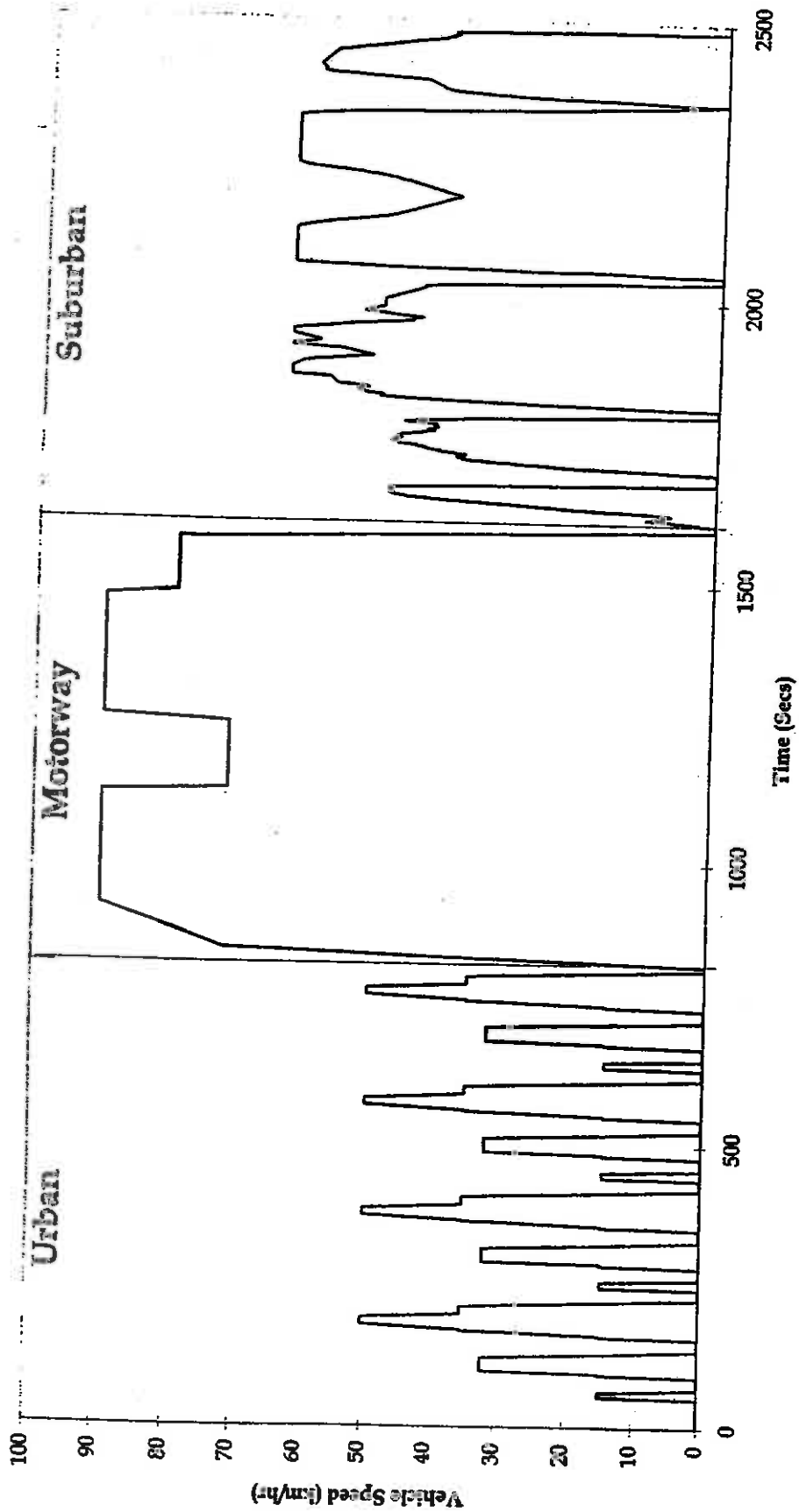
Carbon Dioxide Comparison, Suburban Cycle



-
APPENDIX 6

MILLBROOK HD TRUCK CYCLE GRAPH

Millbrook H.D. Cycle



MILLBROOK VEHICLE EMISSIONS LABORATORY

3 PHASE TRUCK CYCLE DIESEL EMISSIONS TEST SUMMARY SHEET

TEST PURPOSE:-		FUEL CONDITIONER EVALUATION, TEST FOLLOWING 45 HRS COND				
DATE	15/10/1997	Site No.	2		DYNAMOMETER SETTINGS	
VEHICLE NO	K639 FFU	Deterioration Factors		INERTIA	14515 kg	
VEHICLE TYPE	VOVLO FL10	HC	1.0	F ⁰	809.1N	
ENGINE	10000 C.C.	CO	1.0	F ¹	-4.985 N/kmh	
TRANS TYPE	MT8	NOx	1.0	F ²	0.34343 N/kmh ²	
FUEL TYPE	PUMP	PM	1.0	F ³	-0.001547 N/kmh ³	

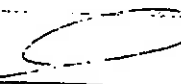
Test No. ML02001111		15/10/1997							Fuel Cons
Odo	185289	UNITS	HC	CO	NOx	CO ₂	PM	(Carb Bal)	
Phase 1	Urban	grammes	3.487	31.245	58.455	3663.2	4.046	34.79	
Phase 2	Motorway	grammes	6.324	19.123	126.510	9381.0	6.108	20.03	
Phase 3	Suburban	grammes	5.625	29.818	88.031	6341.6	3.475	21.68	
Combined result		g/km	0.471	2.449	8.336	592.0	0.416	litres/100km	
								22.40	

Test No. ML02001112		15/10/1997							Fuel Cons
Odo	185289	UNITS	HC	CO	NOx	CO ₂	PM	(Carb Bal)	
Phase 1	Urban	grammes	3.302	31.674	57.982	3730.1	2.960	35.44	
Phase 2	Motorway	grammes	6.109	18.954	124.900	9447.0	4.026	20.14	
Phase 3	Suburban	grammes	5.459	38.375	87.184	6455.7	3.652	22.30	
Combined result		g/km	0.455	2.724	8.266	600.9	0.326	litres/100km	
								22.74	

Test No. ML02001113		15/10/97							Fuel Cons
Odo	185289	UNITS	HC	CO	NOx	CO ₂	PM	(Carb Bal)	
Phase 1	Urban	grammes	2.982	36.093	55.790	3749.5	3.258	35.58	
Phase 2	Motorway	grammes	6.146	18.574	123.350	9460.0	4.122	20.18	
Phase 3	Suburban	grammes	5.341	30.193	86.084	6395.2	3.379	21.86	
Combined result		g/km	0.442	2.590	8.090	598.4	0.328	litres/100km	
								22.64	

Average of Combined Tests (g/km)	0.456	2.590	8.230	597.100	0.357	22.590
Standard Deviation/Mean x100	2.67	4.34	1.26	0.63	11.79	0.64

COMMENTS

TESTED BY:  DATE: 15/10/97

APPROVED BY: _____ DATE: _____

MILLBROOK VEHICLE EMISSIONS LABORATORY

3 PHASE TRUCK CYCLE DIESEL EMISSIONS TEST SUMMARY SHEET

TEST PURPOSE- **FUEL CONDITIONER EVALUATION, TEST FOLLOWING 20 HRS COND**

DATE	13/10/1997	Site No.	2	DYNAMOMETER SETTINGS	
VEHICLE NO	K639 FFU	Deterioration Factors		INERTIA	14515 kg
VEHICLE TYPE	VOVLO FL10	HC	1.0	F ⁰	0 809.1N
ENGINE	10000 C.C.	CO	1.0	F ¹	-4.985 N/kmh
TRANS TYPE	MT8	NOx	1.0	F ²	0.34343 N/kmh ²
FUEL TYPE	PUMP	PM	1.0	F ³	-0.001547 N/kmh ³

Test No. ML02001098	13/10/1997						Fuel Cons	
Odo	183314	UNITS	HC	CO	NOx	CO ₂	PM	(Carb Bal)
Phase 1	Urban	grammes	3.740	30.633	62.727	3770.1	3.145	36.01
Phase 2	Motorway	grammes	6.473	17.689	136.290	9715.8	4.251	20.77
Phase 3	Suburban	grammes	5.913	30.939	94.039	6481.5	3.301	22.20
Combined result		g/km	0.494	2.426	8.968	611.0	0.327	litres/100km
								23.11

Test No. ML02001099	13/10/1997						Fuel Cons	
Odo	183314	UNITS	HC	CO	NOx	CO ₂	PM	(Carb Bal)
Phase 1	Urban	grammes	3.496	31.167	58.045	3741.2	2.952	35.61
Phase 2	Motorway	grammes	6.595	19.077	126.220	9586.3	4.180	20.46
Phase 3	Suburban	grammes	5.899	28.337	88.202	6391.6	3.246	21.90
Combined result		g/km	0.488	2.402	8.329	602.8	0.317	litres/100km
								22.80

Test No. ML02001100	13/10/97						Fuel Cons	
Odo	183314	UNITS	HC	CO	NOx	CO ₂	PM	(Carb Bal)
Phase 1	Urban	grammes	3.699	32.842	57.192	3725.2	3.169	35.43
Phase 2	Motorway	grammes	6.460	18.911	123.660	9554.2	3.892	20.41
Phase 3	Suburban	grammes	6.060	25.641	91.079	5949.2	2.560	20.29
Combined result		g/km	0.495	2.363	7.997	587.1	0.294	litres/100km
								22.21

Average of Combined Tests (g/km)	0.492	2.397	8.431	600.307	0.313	22.707
Standard Deviation/Mean x100	0.61	1.09	4.78	1.66	4.50	1.65

COMMENTS

TESTED BY

DATE:

20/10/97

APPROVED BY:

DATE:

MILLBROOK VEHICLE EMISSIONS LABORATORY

3 PHASE TRUCK CYCLE DIESEL EMISSIONS TEST SUMMARY SHEET

TEST PURPOSE:-		FUEL CONDITIONER EVALUATION, FUEL CONDITIONER FITTED			
DATE	10/10/97	Site No.	2	DYNAMOMETER SETTINGS	
VEHICLE NO	K639 FFU	Deterioration Factors		INERTIA	14515 kg
VEHICLE TYPE	VOLVO FL10	HC	1.0	F ²	809.10 N
ENGINE	10000 C.C.	CO	1.0	F ¹	-4.895 N/kmh
TRANS TYPE	MTS	NOx	1.0	F ²	0.34343 N/kmh ²
FUEL TYPE	PUMP	PM	1.0	F ²	-0.001547 N/kmh ³

Test No. ML02001090		09-Oct-97							Fuel Cons
Odo	181674	UNITS	HC	CO	NOx	CO ₂	PM	(Carb Bal)	
Phase 1	Urban	grammes	3.441	41.129	59.663	3879.0	3.608	36.79	
Phase 2	Motorway	grammes	6.803	21.470	132.767	9780.3	4.109	20.91	
Phase 3	Suburban	grammes	5.838	35.571	91.572	6543.9	3.539	22.54	
Combined result		g. km	0.492	3.004	8.691	618.3	0.344	litres/100km	
								23.42	

Test No. ML02001091		10-OCT-97							Fuel Cons
Odo	181674	UNITS	HC	CO	NOx	CO ₂	PM	(Carb Bal)	
Phase 1	Urban	grammes	3.987	25.077	62.210	3785.3	2.722	36.15	
Phase 2	Motorway	grammes	7.122	19.255	109.030	9756.7	4.075	20.34	
Phase 3	Suburban	grammes	5.383	29.755	95.423	6157.3	3.258	21.16	
Combined result		g. km	0.505	2.241	5.873	603.4	0.307	litres/100km	
								22.82	

Test No. ML02001092		10-Oct-97							Fuel Cons
Odo	181674	UNITS	HC	CO	NOx	CO ₂	PM	(Carb Bal)	
Phase 1	Urban	grammes	3.598	22.629	60.414	3792.2	2.772	36.15	
Phase 2	Motorway	grammes	7.047	20.645	131.730	9732.9	4.482	20.80	
Phase 3	Suburban	grammes	5.718	28.515	93.617	6426.3	3.376	21.96	
Combined result		g. km	0.500	2.164	5.757	610.0	0.325	litres/100km	
								23.06	

Average of Combined Tests (g/km): 0.499 2.480 8.767 610.6 3.325 23.190

Standard Deviation - Mean x100 1.06 14.28 3.88 1.00 4.00 1.07

COMMENTS

TESTED BY

DATE:

10/11/97

APPROVED BY:

DATE:

MILLBROOK

test and development
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