

# California Environmental Engineering

ENVIRONMENTAL TESTING LABORATORY  
3231 S. STANDARD AVE. SANTA ANA, CA 92705  
(714) 545-9822 FAX (714) 545-7667

February 28, 1992

Mr. Bill Williams, Chairman  
Microlon, Inc.  
1305 Fraser Street, Suite D-5  
Bellingham, Washington 98226

Re: Testing the effect of Microlon on emissions in two vehicles

Dear Mr. Williams,

In accordance with your request that California Environmental Engineering laboratories perform emissions testing to evaluate the effectiveness of your Microlon engine treatment, I am pleased to provide you with our final report on this evaluation.

This laboratory equipment and procedures are inspected on a regular basis by both the Environmental Protection Agency and the California Air Resources Board to insure full compliance with the Code of Federal regulations..

Among the 15 or 20 products or devices that we have tested for gasoline engines in the past 5 years the lab has not run across anything that has had the effectiveness in reducing Nitrous Oxide emissions that Microlon has shown us.

Very few of these other products or devices reduce Nitrous Oxide emissions at all. The best of them measured only about a 2 or 3% reduction, in most cases they increased Nitrous Oxide emissions.

Additionally, the Microlon treatment's reduction of Hydrocarbon emissions by 24.9% and Carbon Monoxide reduction by 43.8% in the Mercedes Benz, and Nitrous Oxide reduction of 21.4% in the Mazda are indicative of a very high order of effectiveness.

I have enjoyed the cooperative working relationship developed between us. We look forward to working further with the Microlon, Inc. staff on this important and timely project.

Sincerely,



Larry Swiencki  
Manager  
California Environmental Engineering

LS/tm

Encl:

# California Environmental Engineering

ENVIRONMENTAL TESTING LABORATORY  
3231 S. STANDARD AVE. SANTA ANA, CA 92705  
(714) 545-9822 FAX (714) 545-7667

## TEST REPORT

### Automotive Exhaust Emission and Fuel Economy Effects of Microlon C100 Engine Treatment

February 27, 1992

Prepared for

Microlon, Inc.  
P.O. Box 1946  
Bellingham, Wa. 98227

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A complete description of the procedures that are utilized during the FTP tests can be found in the Code of Federal Regulations, Title 40, Parts 86 and 600, revised as of July 1, 1988.

TEST VEHICLES

Two test vehicles were used for evaluation of the Microlon C100 Engine Treatment.

TEST VEHICLE #1

1989 Mazda MX6

VIN.	1YVGD31AZK5214631
Engine Type	IL4
Fuel System	Electronic Fuel Injection
Transmission	Manual 5 Speed
Ignition System	Electronic

TEST VEHICLE #2

1984 Mercedes Benz 500Sec

VIN.	WDB1260441A076367
Engine Type	V8
Fuel System	Bosch Fuel Injection
Transmission	Automatic
Ignition System	Electronic

## VEHICLE PREPARATION

The test vehicles were equipped with original equipment manufacturer's (OEM) emission controls pursuant to the year of manufacture. The test vehicles recieved an oil change, filter change (air, oil, fuel) and set to manufacture's specifications prior to baseline tests. (See Attachment "A").

## TEST PROCEDURES

All tests were conducted in exact accordance with CFR title 40, parts 86 and 600, revised July 1, 1988, using EPA 511 test plan.

The test vehicles were baseline tested in standard OEM configuration following the vehicle preparation. A complete CVS 75 cold start test and highway fuel test was on each vehicle. (See attachment "B"). The Microlon C100 Engine Treatment was then added according to the manufactures specifications. Test vehicle one (Mazda) then accumulated fifty five (55) miles and test vehicle two (MBZ) accumulated eleven hundred ten (1110) miles. The vehicles were preconditioned and a complete CVS 75 and highway fuel test conducted. (See attachment "C").

## CONCLUSIONS AND RECOMMENDATIONS

The Microlon C100 Engine Treatment showed positive results on these two test vehicles. (See test result summary; attachment "D").

California Environmental Engineering feels that these positive results warrant additional evaluation and testing on a larger fleet of vehicles from varied manufacture's with varied engine sizes.

## Test Vehicle Check-in

1 20 92  
Mo Day Yr

MC 2 89 MARDA MX 6 38538 mi  
Vehicle No. Year Make Model Mileage

2.2L M-5 YES 1YVGD31A2K5214631  
Eng. Displ. Trans. A/C Vehicle Identification No.

KTK2.2V5FC48 3000 7.3  
Eng. Family (Emission Label) Inertia AHP

- 1. Check exhaust system for leaks ✓
- 2. Check fuel system for leaks ✓
- 3. Check belts and hoses ✓
- 4. Check emission hose routing X
- 5. Check fluid levels: Engine oil ✓
- Transmission ✓
- Coolant ✓
- 6. Check air filter ✓
- 7. Check PCV ✓
- 8. Check for sufficient drive wheel tire tread ✓
- 9. Set drive wheel tire pressure to 45 psi 45
- 10. Attach smog check compliance certificate and test results —

COMMENTS: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

L. Swiencki  
Technician's Name

L. Swiencki  
Technician's Signature

# Engine Parameter Data

1 20 92  
Mo Day Yr

Mic. 2      89      Mazda      MX6      38538 mi  
Vehicle No.      Year      Make      Model      Mileage

2.2L      TV4      1YUGD31A2K5214631  
Eng. Displ.      Type      Vehicle Identification No.

Test #	Test	Computer Scanner - Make/Model
* 1.	Battery Voltage	13.8V
* 2.	Trouble Codes	no codes
3.	Prom I. D. No.	n/a
* 4.	Closed/Open Loop - Rich/Lean Status	closed yes
* 5.	O <sub>2</sub> Voltage (Varies)	.2V - .6V
* 6.	Air Cleaner Divert-Air Switch Solenoid	n/a
* 7.	EGR Solenoid-Canister Purge Solenoid	n/a
8.	Park/Neutral Switch - A/C Clutch	ok ok
* 9.	RPM - Throttle Position Sensor	750
10.	Nose Switch - Wide Open Throttle	n/a
* 11.	RPM - MPH	750 0
12.	RPM - Torque Conv. Clutch	n/a ok
13.	MPH - Torque Conv. Clutch	ok
14.	3rd Gear SW - 4th Gear SW	n/a
15.	Manifold Press. KPA - Volts	n/a
16.	Barometric Press. KPA - Volts	<del>n/a</del> n/a
* 17.	Coolant Temperature-Idle Air Position	195F
18.	Knock retard-Throttle Body Backup	n/a
* 19.	RPM - Mixture Control Dwell	n/a
20.	Ignition - Crank	n/a

21. Power Steering	___	<u>N/A</u>
22. Block Learn - Integrator	___	<u>N/A</u>
* 23. Turbo Boost - O <sub>2</sub> Cross Counts	___	<u>N/A</u>
24. Start-up Enrich - Blend Enrich	___	<u>N/A</u>
25. ALCL Vote - MC Sol. Dwell	___	<u>N/A</u>
26. O <sub>2</sub> Loop region - MC Sol. Dwell	___	<u>N/A</u>
27. Altitude SW - Temp. SW	___	<u>N/A</u>
28. Press. diagnostic State (Min-T)	___	<u>N/A</u>
* 29. Fan Sol. - Early Fuel Evaporation	___	<u>N/A</u>
30. Spark Advance Ref. - 1SC Motor	___	<u>N/A</u>
31. E-Cell	___	<u>N/A</u>
32. Hi Batt - Lo Batt Status	<u>NO</u>	<u>WO</u>
33. Quasi Asynch - Asynch	___	<u>N/A</u>
34. Manifold Air Temp.- Fan	___	<u>N/A</u>
35. Air Flow - Filtered Load (LV8)	___	<u>N/A</u>
36. Prop. Step Taken	___	<u>YES</u>
37. Clear Flood Mode	___	<u>N/A</u>
38. Selected Diagnostic State	___	<u>N/A</u>
39. O/D Disable - 4th Gear Delay	___	<u>N/A</u>
40. A/C Head Pressure	___	<u>N/A</u>
41. Inj. Pulse Width	___	<u>N/A</u>
42. Vacuum - Wastegate Bypass	___	___
43. Ignition Spark	___	<u>22°</u>
44. Eng. Temp. Warm - Hot	___	<u>202</u>
45. EST	___	<u>N/A</u>
46. Rear Vac-Brk - A/C Freon Low	___	<u>N/A</u>



47. Diesel EGR Min. - Max. JA

48. Exh. Press. Reg. N/A

49. EGR Press. Desired - Actual YES

\* 50. Ignition Timing Spec.-Actual Measured 6° BTC

\* Items marked must be verified by conventional means, i.e., timing light, digital multimeter (10,000 ohm impedance), OEM procedure, etc., if computer scanner is not available.

COMMENTS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Walter Warton

Technician's Name

Walter Warton

Technician's Signature

# Test Vehicle Check-in

2 3 92  
Mo Day Yr

Micro 3 84 MSZ 500 SEC 54576 mi  
Vehicle No. Year Make Model Mileage

303.5 Auto YES WDA1260441A076367  
Eng. Displ. Trans. A/C Vehicle Identification No.

Eng. Family (Emission Label) 3875 13.2  
Inertia AHP

- 1. Check exhaust system for leaks ✓
- 2. Check fuel system for leaks ✓
- 3. Check belts and hoses ✓
- 4. Check emission hose routing ✓
- 5. Check fluid levels: Engine oil ✓  
Transmission ✓  
Coolant ✓
- 6. Check air filter ✓
- 7. Check PCV ✓
- 8. Check for sufficient drive wheel tire tread ✓
- 9. Set drive wheel tire pressure to 45 psi 45
- 10. Attach smog check compliance certificate and test results N/A

COMMENTS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

L. Swiencki  
Technician's Name

L. Swiencki  
Technician's Signature

# Engine Parameter Data

2 3 92  
Mo Day Yr

<u>Micro 3</u>	<u>84</u>	<u>MSZ</u>	<u>500SEC</u>	<u>54576 mi</u>
Vehicle No.	Year	Make	Model	Mileage
<u>303.5</u>	<u>V8</u>	<u>WDB1260441A076367</u>		
Eng. Displ.	Type	Vehicle Identification No.		

Test #	Test	Computer Scanner - Make/Model
* 1.	Battery Voltage	<u>13.8V</u>
* 2.	Trouble Codes	<u>N/A</u>
3.	Prom I. D. No.	<u>N/A</u>
* 4.	Closed/Open Loop - Rich/Lean Status	<u>Closed Yes</u>
* 5.	O <sub>2</sub> Voltage (Varies)	<u>.2V - .6V</u>
* 6.	Air Cleaner Divert-Air Switch Solenoid	<u>N/A</u>
* 7.	EGR Solenoid-Canister Purge Solenoid	<u>N/A</u>
8.	Park/Neutral Switch - A/C Clutch	<u>Yes Yes</u>
* 9.	RPM - Throttle Position Sensor	<u>850 ± 100 N/A</u>
10.	Nose Switch - Wide Open Throttle	<u>N/A N/A</u>
* 11.	RPM - MPH	<u>850 0</u>
12.	RPM - Torque Conv. Clutch	<u>850 N/A</u>
13.	MPH - Torque Conv. Clutch	<u>0 N/A</u>
14.	3rd Gear SW - 4th Gear SW	<u>Yes Yes</u>
15.	Manifold Press. KPA - Volts	<u>N/A N/A</u>
16.	Barometric Press. KPA - Volts	<u>N/A N/A</u>
* 17.	Coolant Temperature-Idle Air Position	<u>175 F N/A</u>
18.	Knock retard-Throttle Body Backup	<u>N/A</u>
* 19.	RPM - Mixture Control Dwell	<u>N/A</u>
20.	Ignition - Crank	<u>—</u>

- 21. Power Steering yes \_\_\_\_\_
- 22. Block Learn - Integrator N/A \_\_\_\_\_
- \* 23. Turbo Boost - O<sub>2</sub> Cross Counts N/A \_\_\_\_\_
- 24. Start-up Enrich - Blend Enrich N/A \_\_\_\_\_
- 25. ALCL Vote - MC Sol. Dwell N/A \_\_\_\_\_
- 26. O<sub>2</sub> Loop region - MC Sol. Dwell N/A \_\_\_\_\_
- 27. Altitude SW - Temp. SW N/A \_\_\_\_\_
- 28. Press. diagnostic State (Min-T) \_\_\_\_\_ N/A
- \* 29. Fan Sol. - Early Fuel Evaporation \_\_\_\_\_ N/A
- 30. Spark Advance Ref. - ISC Motor \_\_\_\_\_ N/A
- 31. E-Cell \_\_\_\_\_ N/A
- 32. Hi Batt - Lo Batt Status No No
- 33. Quasi Asynch - Asynch \_\_\_\_\_ N/A
- 34. Manifold Air Temp.- Fan \_\_\_\_\_ N/A
- 35. Air Flow - Filtered Load (LV8) \_\_\_\_\_ N/A
- 36. Prop. Step Taken \_\_\_\_\_ yes
- 37. Clear Flood Mode \_\_\_\_\_ N/A
- 38. Selected Diagnostic State \_\_\_\_\_ N/A
- 39. O/D Disable - 4th Gear Delay \_\_\_\_\_ yes
- 40. A/C Head Pressure \_\_\_\_\_ N/A
- 41. Inj. Pulse Width \_\_\_\_\_ N/A
- 42. Vacuum - Wastegate Bypass \_\_\_\_\_ N/A
- 43. Ignition Spark \_\_\_\_\_ 16 etc
- 44. Eng. Temp. Warm - Hot 145 N/A
- 45. EST \_\_\_\_\_ N/A
- 46. Rear Vac-Brk - A/C Freon Low \_\_\_\_\_ N/A

47. Diesel EGR Min. - Max.

\_\_\_\_ N/A

48. Exh. Press. Reg.

\_\_\_\_ W/A

49. EGR Press. Desired - Actual

YES \_\_\_\_

\* 50. Ignition Timing Spec.-Actual Measured

16° BFC

\* Items marked must be verified by conventional means, i.e., timing light, digital multimeter (10,000 ohm impedance), OEM procedure, etc., if computer scanner is not available.

COMMENTS:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Waneis Wastan

Technician's Name

Waneis Wastan

Technician's Signature

# CALIFORNIA ENVIRONMENTAL ENGINEERING

40 CFR 86.144-78

TEST #	6937	DATE	1/23/92	VEHICLE	MAZDA
MODEL	MX6	VIN	31A2K5214631	ENG. DISP.	2.2L
CAT. CONV.	YES	YEAR	1989	A/C	YES
CURB WT	N/A	INERTIA WT	3000	ARHP	7.3
IRHP	5.2	OPERATOR	L. SWIENCKI	DRIVER	J. DIETRICH
TIME	11:57	ODOMETER	38528MI	TRANS.	M-5
CARB.	NO	FUEL INJ.	YES	FUEL	INDOLENE
CARBON WT F	.867	SPEC. GRAV	.793	NET HEAT V	18500

**COMMENTS**

MICROLON #2-BASELINE

78 FTP CVS TEST WITH CRITICAL FLOW VENTURI

	BAROMETER	TEMP WET	TEMP. DRY	V. MIX
BAG#1	30.1	58.40	73.80	2757.64
BAG#2	30.1	58.60	74.90	4732.54
BAG#3	30.1	58.10	76.00	2743.26

	MILES	REL HUM	NOX CORECTION	DIL. FCT.
BAG#1	3.6	38.03	0.88	13.18
BAG#2	3.8	35.90	0.88	19.51
BAG#3	3.6	31.65	0.86	15.43

HYDROCARBONS	RANGE CODES	0=CONC.	1=30	2=100	3=300	4=1000 PPM
CARBON MONOXIDE	RANGE CODES	0=CONC.	1=200	2=500	3=1000	4=3000 PPM
OXIDES OF NITROGEN	RANGE CODES	0=CONC.	1=30	2=100	3=300	4=1000 PPM
CARBON DIOXIDE	RANGE CODES	0=CONC.	1=2%	2=6%		

	RANGE	%F. S.	AMBIENT BAG CONC.	SAMPLE BAG %F. S.	CONC.	MASS DATA GRAMS
HC PPM BAG#1	3	4.0	12.47	27.3	82.30	3.19
HC PPM BAG#2	2	11.1	11.24	12.8	12.95	0.18
HC PPM BAG#3	2	9.1	9.24	13.2	13.35	0.21
CO PPM BAG#1	3	1.9	12.59	52.9	439.42	38.89
CO PPM BAG#2	1	4.4	8.05	13.1	24.16	2.58
CO PPM BAG#3	1	4.1	7.49	34.8	65.39	5.28
NOX PPM BAG#1	2	0.5	0.47	15.0	14.96	1.91
NOX PPM BAG#2	2	0.4	0.37	1.8	1.77	0.32
NOX PPM BAG#3	2	0.3	0.27	3.1	3.07	0.36
CO2 % BAG#1	2	2.4	0.09	23.9	0.96	1258.17
CO2 % BAG#2	2	2.3	0.09	17.3	0.68	1473.35
CO2 % BAG#3	2	2.1	0.08	21.5	0.86	1118.08

**WEIGHTED MASS EMISSIONS SUMMARY**

HYDROCARBONS	CARBON MONOXIDE	OXIDES OF NITROGEN	CARBON DIOXIDE
GM/MI	GM/MI	GM/MI	GM/MI
0.225	3.006	0.182	357.099

78 FTP FUEL ECONOMY PER 40 CFR 600.113-88  
25.18 MILES PER GALLON

QUALITY CONTROL

BY L. Swiencki  
PASS  FAIL

**CALIFORNIA ENVIRONMENTAL ENGINEERING**

40 CFR 86.144-78

TEST #	6939	DATE	1/23/92	VEHICLE	MAZDA
MODEL	MX6	VIN	31A2K5214631	ENG. DISP.	2.2L
CAT. CONV.	YES	YEAR	1989	A/C	YES
CURB WT	N/A	INERTIA WT	3000	ARHP	7.3
IRHP	5.2	OPERATOR	L. SWIENCKI	DRIVER	J. DIETRICH
TIME	13:47	ODOMETER	38538MI	TRANS.	M-5
CARB.	NO	FUEL INJ.	YES	FUEL	INDOLENE
CARBON WT F	.867	SPEC. GRAV	.793	NET HEAT V	18500

COMMENTS            MICROLON #2-BASELINE  
                          HFET CVS TEST WITH CRITICAL FLOW VENTURI

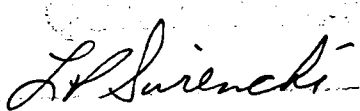
	BAROMETER	TEMP WET	TEMP. DRY	V. MIX
BAG#1	30.1	60.20	78.20	4123.08
	MILES	REL HUM	NOX CORECTION	DIL. FCT.
BAG#1	10.4	33.19	0.88	10.81

HYDROCARBONS	RANGE CODES	0=CONC.	1=30	2=100	3=300	4=1000	PPM
CARBON MONOXIDE	RANGE CODES	0=CONC.	1=200	2=500	3=1000	4=3000	PPM
OXIDES OF NITROGEN	RANGE CODES	0=CONC.	1=30	2=100	3=300	4=1000	PPM
CARBON DIOXIDE	RANGE CODES	0=CONC.	1=2%	2=6%			

		AMBIENT BAG		SAMPLE BAG		MASS DATA
	RANGE	%F. S.	CONC.	%F. S.	CONC.	GRAMS
HC PPM BAG#1	2	9.2	9.34	13.2	13.35	0.33
CO PPM BAG#1	1	4.2	7.68	19.9	36.89	4.07
NOX PPM BAG#1	2	0.4	0.37	3.5	3.47	0.62
CO2 % BAG#1	2	2.0	0.08	30.0	1.23	2491.04

WEIGHTED MASS EMISSIONS SUMMARY			
HYDROCARBONS	CARBON MONOXIDE	OXIDES OF NITROGEN	CARBON DIOXIDE
GM/MI	GM/MI	GM/MI	GM/MI
0.031	0.390	0.059	239.041

HFET FUEL ECONOMY PER 40 CFR 600.113-88  
 38.07 MILES PER GALLON

  
 \_\_\_\_\_  
 ✓

**CALIFORNIA ENVIRONMENTAL ENGINEERING**

40 CFR 86.144-78

TEST #	6983	DATE	2/4/92	VEHICLE	MBZ
MODEL	500SEC	VIN	0441A076367	ENG. DISP.	303.5
CAT. CONV.	YES	YEAR	1984	A/C	YES
CURB WT	3550	INERTIA WT	3875	ARHP	13.2
IRHP	11.6	OPERATOR	J. DIETRICH	DRIVER	E. ATACHIAN
TIME	15:20	ODOMETER	54594MI	TRANS.	AUTO
CARB.	NO	FUEL INJ.	YES	FUEL	INDOLENE
CARBON WT F	.867	SPEC. GRAV	.793	NET HEAT V	18500

**COMMENTS**

MICROLON #3-BASELINE  
78 FTP CVS TEST WITH CRITICAL FLOW VENTURI

	BAROMETER	TEMP WET	TEMP. DRY	V. MIX
BAG#1	30.0	55.00	76.50	2708.81
BAG#2	30.0	55.30	77.50	4641.41
BAG#3	30.0	55.00	77.00	2693.56

	MILES	REL HUM	NOX CORECTION	DIL. FCT.
BAG#1	3.6	21.29	0.82	7.95
BAG#2	3.9	20.27	0.82	11.21
BAG#3	3.6	20.33	0.82	8.87

HYDROCARBONS	RANGE CODES	0=CONC.	1=30	2=100	3=300	4=1000	PPM
CARBON MONOXIDE	RANGE CODES	0=CONC.	1=200	2=500	3=1000	4=3000	PPM
OXIDES OF NITROGEN	RANGE CODES	0=CONC.	1=30	2=100	3=300	4=1000	PPM
CARBON DIOXIDE	RANGE CODES	0=CONC.	1=2%	2=6%			

		AMBIENT BAG		SAMPLE BAG		MASS DATA
	RANGE	%F.S.	CONC.	%F.S.	CONC.	GRAMS
HC PPM BAG#1	3	1.7	5.57	28.9	87.10	3.64
HC PPM BAG#2	2	5.9	6.03	7.9	8.04	0.19
HC PPM BAG#3	2	5.3	5.43	18.6	18.76	0.61
CO PPM BAG#1	3	0.5	3.36	51.8	428.11	37.97
CO PPM BAG#2	1	2.0	3.63	5.0	9.15	0.89
CO PPM BAG#3	1	1.8	3.26	14.3	26.39	2.09
NOX PPM BAG#1	2	0.3	0.27	26.7	26.65	3.18
NOX PPM BAG#2	2	0.3	0.27	9.1	9.06	1.82
NOX PPM BAG#3	2	0.0	-0.03	15.1	15.06	1.80
CO2 % BAG#1	2	1.3	0.05	38.6	1.63	2231.95
CO2 % BAG#2	2	1.6	0.06	29.1	1.19	2739.21
CO2 % BAG#3	2	1.3	0.05	35.9	1.51	2040.68

**WEIGHTED MASS EMISSIONS SUMMARY**

HYDROCARBONS	CARBON MONOXIDE	OXIDES OF NITROGEN	CARBON DIOXIDE
GM/MI	GM/MI	GM/MI	GM/MI
0.281	2.459	0.563	650.125

78 FTP FUEL ECONOMY PER 40 CFR 600.113-88  
13.94 MILES PER GALLON

**QUALITY CONTROL**

BY L. L. L. L.

PASS  FAIL



# CALIFORNIA ENVIRONMENTAL ENGINEERING

40 CFR 86.144-78

TEST #	6984	DATE	2/4/92	VEHICLE	MBZ
MODEL	500SEC	VIN	0441A076367	ENG. DISP.	303.5
CAT. CONV.	YES	YEAR	1984	A/C	YES
CURB WT	3550	INERTIA WT	3875	ARHP	13.2
IRHP	11.6	OPERATOR	J. DIETRICH	DRIVER	E. ATACHIAN
TIME	17:10	ODOMETER	54605MI	TRANS.	AUTO
CARB.	NO	FUEL INJ.	YES	FUEL	INDOLENE
CARBON WT F	.867	SPEC. GRAV	.793	NET HEAT V	18500

COMMENTS            MICROLON #3-BASELINE  
                          HFET CVS TEST WITH CRITICAL FLOW VENTURI

	BAROMETER	TEMP WET	TEMP. DRY	V. MIX
BAG#1	30.0	54.00	76.80	4010.63

	MILES	REL HUM	NOX CORECTION	DIL. FCT.
BAG#1	10.4	17.85	0.81	6.12

HYDROCARBONS	RANGE CODES	0=CONC.	1=30	2=100	3=300	4=1000	PPM
CARBON MONOXIDE	RANGE CODES	0=CONC.	1=200	2=500	3=1000	4=3000	PPM
OXIDES OF NITROGEN	RANGE CODES	0=CONC.	1=30	2=100	3=300	4=1000	PPM
CARBON DIOXIDE	RANGE CODES	0=CONC.	1=2%	2=6%			

		AMBIENT BAG		SAMPLE BAG		MASS DATA	
	RANGE	%F. S.	CONC.	%F. S.	CONC.	GRAMS	
HC	PPM BAG#1	2	7.4	7.54	12.1	12.24	0.39
CO	PPM BAG#1	1	2.7	4.92	37.2	70.07	8.72
NOX	PPM BAG#1	2	0.3	0.27	12.3	12.26	2.11
CO2	% BAG#1	2	1.1	0.04	49.7	2.18	4456.65

WEIGHTED MASS EMISSIONS SUMMARY			
HYDROCARBONS	CARBON MONOXIDE	OXIDES OF NITROGEN	CARBON DIOXIDE
GM/MI	GM/MI	GM/MI	GM/MI
0.037	0.837	0.202	427.661

HFET FUEL ECONOMY PER 40 CFR 600.113-88  
 21.27 MILES PER GALLON

## QUALITY CONTROL

BY *J. L. Lurich*  
 P. ✓ FA.

**CALIFORNIA ENVIRONMENTAL ENGINEERING**

40 CFR 86.144-7B

TEST #	6942	DATE	1/24/92	VEHICLE	MAZDA
MODEL	MX6	VIN	31A2K5214631	ENG. DISP.	2.2L
CAT. CONV.	YES	YEAR	1989	A/C	YES
CURB WT	N/A	INERTIA WT	3000	ARHP	7.3
IRHP	5.2	OPERATOR	L. SWIENCKI	DRIVER	J. DIETRICH
TIME	10:21	ODOMETER	38600MI	TRANS.	M-5
CARB.	NO	FUEL INJ.	YES	FUEL	INDOLENE
CARBON WT F	.867	SPEC. GRAV	.793	NET HEAT V	18500

COMMENTS                    W/MICROLON C100 AFTER 55 MILE RUN IN  
78 FTP CVS TEST WITH CRITICAL FLOW VENTURI

	BAROMETER	TEMP WET	TEMP. DRY	V. MIX
BAG#1	30.1	56.60	71.30	2757.33
BAG#2	30.1	57.60	73.10	4715.05
BAG#3	30.1	57.80	75.20	2744.03

	MILES	REL HUM	NOX CORECTION	DIL. FCT.
BAG#1	3.6	38.42	0.87	13.33
BAG#2	3.8	37.11	0.87	19.71
BAG#3	3.6	32.56	0.86	15.57

HYDROCARBONS            RANGE CODES 0=CONC. 1=30 2=100 3=300 4=1000 PPM  
 CARBON MONOXIDE        RANGE CODES 0=CONC. 1=200 2=500 3=1000 4=3000 PPM  
 OXIDES OF NITROGEN    RANGE CODES 0=CONC. 1=30 2=100 3=300 4=1000 PPM  
 CARBON DIOXIDE         RANGE CODES 0=CONC. 1=2% 2=6%

		AMBIENT BAG		SAMPLE BAG		MASS DATA	
		RANGE	%F. S. CONC.	%F. S. CONC.	CONC.	GRAMS	
HC	PPM BAG#1	3	3.0	9.47	22.3	67.32	2.64
HC	PPM BAG#2	2	9.1	9.24	11.7	11.84	0.24
HC	PPM BAG#3	2	8.0	8.14	13.9	14.05	0.29
CO	PPM BAG#1	3	2.2	14.59	47.3	382.99	33.59
CO	PPM BAG#2	1	5.3	9.70	20.3	37.64	4.42
CO	PPM BAG#3	1	4.5	8.23	38.6	72.81	5.89
NOX	PPM BAG#1	2	0.9	0.87	12.5	12.46	1.51
NOX	PPM BAG#2	2	0.9	0.87	1.7	1.67	0.19
NOX	PPM BAG#3	2	0.6	0.57	3.6	3.57	0.39
CO2	% BAG#1	2	2.8	0.11	23.8	0.96	1231.67
CO2	% BAG#2	2	2.8	0.11	17.1	0.67	1403.47
CO2	% BAG#3	2	2.6	0.10	21.3	0.85	1080.98

**WEIGHTED MASS EMISSIONS SUMMARY**

HYDROCARBONS	CARBON MONOXIDE	OXIDES OF NITROGEN	CARBON DIOXIDE
GM/MI	GM/MI	GM/MI	GM/MI
0.207	2.998	0.143	343.770

78 FTP FUEL ECONOMY PER 40 CFR 600.113-88  
26.14 MILES PER GALLON

QUALITY CONTROL

BY           L. Swiencki          

PAT.           ✓                              PIA

**CALIFORNIA ENVIRONMENTAL ENGINEERING**

40 CFR 86.144-78

TEST #	6945	DATE	1/24/92	VEHICLE	MAZDA
MODEL	MX6	VIN	31A2K5214631	ENG. DISP.	2.2L
CAT. CONV.	YES	YEAR	1989	A/C	YES
CURB WT	N/A	INERTIA WT	3000	ARHP	7.3
IRHP	5.2	OPERATOR	L. SWIENCKI	DRIVER	J. DIETRICH
TIME	12:41	ODOMETER	38610MI	TRANS.	M-5
CARB.	NO	FUEL INJ.	YES	FUEL	INDOLENE
CARBON WT F	.867	SPEC. GRAV	.793	NET HEAT V	18500

COMMENTS W/MICROLON C100 AFTER 55 MILE RUN IN HFET CVS TEST WITH CRITICAL FLOW VENTURI

	BAROMETER	TEMP WET	TEMP. DRY	V. MIX
BAG#1	30.1	54.80	72.70	4109.22

	MILES	REL HUM	NOX CORECTION	DIL. FCT.
BAG#1	10.4	28.63	0.84	11.24

HYDROCARBONS	RANGE CODES	0=CONC.	1=30	2=100	3=300	4=1000	PPM
CARBON MONOXIDE	RANGE CODES	0=CONC.	1=200	2=500	3=1000	4=3000	PPM
OXIDES OF NITROGEN	RANGE CODES	0=CONC.	1=30	2=100	3=300	4=1000	PPM
CARBON DIOXIDE	RANGE CODES	0=CONC.	1=2%	2=6%			

		AMBIENT BAG		SAMPLE BAG		MASS DATA
	RANGE	%F.S.	CONC.	%F.S.	CONC.	GRAMS
HC PPM BAG#1	2	8.6	8.74	15.5	15.65	0.52
CO PPM BAG#1	1	5.3	9.70	31.2	58.42	6.72
NOX PPM BAG#1	2	0.1	0.07	3.3	3.27	0.60
CO2 % BAG#1	2	1.5	0.06	28.9	1.19	2413.30

WEIGHTED MASS EMISSIONS SUMMARY			
HYDROCARBONS	CARBON MONOXIDE	OXIDES OF NITROGEN	CARBON DIOXIDE
GM/MI	GM/MI	GM/MI	GM/MI
0.050	0.645	0.057	231.580

HFET FUEL ECONOMY PER 40 CFR 600.113-88  
39.22 MILES PER GALLON

QUALITY CONTROL

BY L. Swiencki  
PASS

**CALIFORNIA ENVIRONMENTAL ENGINEERING**

40 CFR 86.144-78

TEST #	7033	DATE	2/25/92	VEHICLE	MBZ
MODEL	500SEC	VIN	0441A076367	ENG. DISP.	303.5
CAT. CONV.	YES	YEAR	1984	A/C	YES
CURB WT	3550	INERTIA WT	3875	ARHP	13.2
IRHP	11.6	OPERATOR	L. SWIENCKI	DRIVER	E. ATACHIAN
TIME	15:00	ODMETER	55746MI	TRANS.	AUTO
CARB.	NO	FUEL INJ.	YES	FUEL	INDOLENE
CARBON WT F	.867	SPEC. GRAV	.793	NET HEAT V	18500

COMMENTS            MICROLON #3-AFTER 1116 MILE ACCUMULATION  
                              78 FTP CVS TEST WITH CRITICAL FLOW VENTURI

	BAROMETER	TEMP WET	TEMP. DRY	V. MIX
BAG#1	30.1	61.20	81.50	2730.73
BAG#2	30.1	61.00	82.00	4676.02
BAG#3	30.1	61.00	81.50	2708.38

	MILES	REL HUM	NOX CORECTION	DIL. FCT.
BAG#1	3.6	29.16	0.88	8.32
BAG#2	3.8	27.63	0.87	11.77
BAG#3	3.6	28.60	0.88	9.06

HYDROCARBONS            RANGE CODES 0=CONC. 1=30 2=100 3=300 4=1000 PPM  
 CARBON MONOXIDE        RANGE CODES 0=CONC. 1=200 2=500 3=1000 4=3000 PPM  
 OXIDES OF NITROGEN    RANGE CODES 0=CONC. 1=30 2=100 3=300 4=1000 PPM  
 CARBON DIOXIDE         RANGE CODES 0=CONC. 1=2% 2=6%

	AMBIENT BAG		SAMPLE BAG		MASS DATA	
	RANGE	%F. S.	CONC.	%F. S.	CONC.	GRAMS
HC PPM BAG#1	3	1.7	5.26	19.2	57.96	2.38
HC PPM BAG#2	2	6.1	6.37	8.0	8.28	0.19
HC PPM BAG#3	2	5.7	5.96	19.1	19.48	0.63
CO PPM BAG#1	3	0.5	3.31	30.4	227.47	20.22
CO PPM BAG#2	1	2.1	3.76	3.8	6.82	0.52
CO PPM BAG#3	1	2.1	3.76	13.0	23.69	1.82
NOX PPM BAG#1	2	0.2	0.15	24.8	24.74	3.21
NOX PPM BAG#2	2	0.1	0.05	7.2	7.14	1.57
NOX PPM BAG#3	2	0.1	0.05	8.5	8.44	1.08
CO2 % BAG#1	2	1.0	0.04	38.0	1.58	2194.68
CO2 % BAG#2	2	0.9	0.03	28.3	1.14	2682.75
CO2 % BAG#3	2	1.0	0.04	35.7	1.47	2024.36

WEIGHTED MASS EMISSIONS SUMMARY

HYDROCARBONS	CARBON MONOXIDE	OXIDES OF NITROGEN	CARBON DIOXIDE
GM/MI	GM/MI	GM/MI	GM/MI
0.211	1.381	0.480	643.765

78 FTP FUEL ECONOMY PER 40 CFR 600.113-88  
 14.11 MILES PER GALLON

**QUALITY CONTROL**

BY R. Swiencki

PASS  FAIL

# CALIFORNIA ENVIRONMENTAL ENGINEERING

40 CFR 86.144-78

TEST #	7036	DATE	2/25/92	VEHICLE	MBZ
MODEL	500SEC	VIN	0441A076367	ENG. DISP.	303.5
CAT. CONV.	YES	YEAR	1984	A/C	YES
CURB WT	3550	INERTIA WT	3875	ARHP	13.2
IRHP	11.6	OPERATOR	L. SWIENCKI	DRIVER	E. ATACHIAN
TIME	17:02	ODMETER	55756MI	TRANS.	AUTO
CARB.	NO	FUEL INJ.	YES	FUEL	INDOLENE
CARBON WT F	.867	SPEC. GRAV	.793	NET HEAT V	18500

COMMENTS      MICROLON #3-AFTER 1116 MILE ACCUMULATION  
                  HFET CVS TEST WITH CRITICAL FLOW VENTURI

	BAROMETER	TEMP WET	TEMP. DRY	V. MIX
BAG#1	30.1	61.20	82.20	4019.64

	MILES	REL HUM	NOX CORECTION	DIL. FCT.
BAG#1	10.4	27.79	0.88	6.17

HYDROCARBONS	RANGE CODES	0=CONC.	1=30	2=100	3=300	4=1000	PPM
CARBON MONOXIDE	RANGE CODES	0=CONC.	1=200	2=500	3=1000	4=3000	PPM
OXIDES OF NITROGEN	RANGE CODES	0=CONC.	1=30	2=100	3=300	4=1000	PPM
CARBON DIOXIDE	RANGE CODES	0=CONC.	1=2%	2=6%			

		AMBIENT BAG		SAMPLE BAG		MASS DATA
	RANGE	%F. S.	CONC.	%F. S.	CONC.	GRAMS
HC PPM BAG#1	2	6.1	6.37	16.8	17.16	0.78
CO PPM BAG#1	1	2.3	4.12	46.4	88.23	11.24
NOX PPM BAG#1	2	0.0	-0.05	11.0	10.94	2.10
CO2 % BAG#1	2	1.0	0.04	49.8	2.16	4441.47

WEIGHTED MASS EMISSIONS SUMMARY			
HYDROCARBONS	CARBON MONOXIDE	OXIDES OF NITROGEN	CARBON DIOXIDE
GM/MI	GM/MI	GM/MI	GM/MI
0.074	1.078	0.201	426.204

HFET FUEL ECONOMY PER 40 CFR 600.113-88  
 21.32 MILES PER GALLON

## QUALITY CONTROL

BY           L. Swiencki            
 PASS  FAIL

TEST RESULT SUMMARY

Vehicle #1	Mazda	<u>HC</u>	<u>CO</u>	<u>NOX</u>	<u>CO2</u>	<u>City Fe</u>	<u>Hwy. Fe</u>
	Baseline	.225	3.006	.182	357.099	25.18	38.07
	W/C100	.207	2.998	.143	343.770	26.14	39.22
	% Change	-8%	-.3%	-21.4%	-3.7%	+3.8%	+3%

Vehicle #2	Mercedes Benz	<u>HC</u>	<u>CO</u>	<u>NOX</u>	<u>CO2</u>	<u>City Fe</u>	<u>Hwy. Fe</u>
	Baseline	.281	2.459	.563	650.125	13.94	21.27
	W/C100	.211	1.381	.480	643.765	14.11	21.32
	% Change	-24.9%	-43.8%	-14.7%	-1%	+1.2%	+2%

Two vehicle combined average percent change.

<u>HC</u>	<u>CO</u>	<u>NOX</u>	<u>CO2</u>	<u>City Fe</u>	<u>Hwy. Fe</u>
-16.45%	-22.05%	-18.05%	-2.35%	+2.5%	+1.6%