

REFERENCE USE ONLY

REPORT NO. DOT-TSC-OST-76-42

FUEL CONSUMPTION, EMISSIONS, AND POWER CHARACTERISTICS
OF THE 1975 DATSUN 119-CID AUTOMOTIVE ENGINE--
EXPERIMENTAL DATA

U.S. Energy Research and Development Administration
Bartlesville Energy Research Center
P.O. Box 1398
Bartlesville OK 74003



NOVEMBER 1976

INTERIM REPORT

DOCUMENT IS AVAILABLE TO THE U.S. PUBLIC
THROUGH THE NATIONAL TECHNICAL
INFORMATION SERVICE, SPRINGFIELD,
VIRGINIA 22161

Prepared for

U.S. DEPARTMENT OF TRANSPORTATION
OFFICE OF THE SECRETARY
Office of the Assistant Secretary for
Systems Development and Technology
Office of Systems Engineering
Washington DC 20590

NOTICE

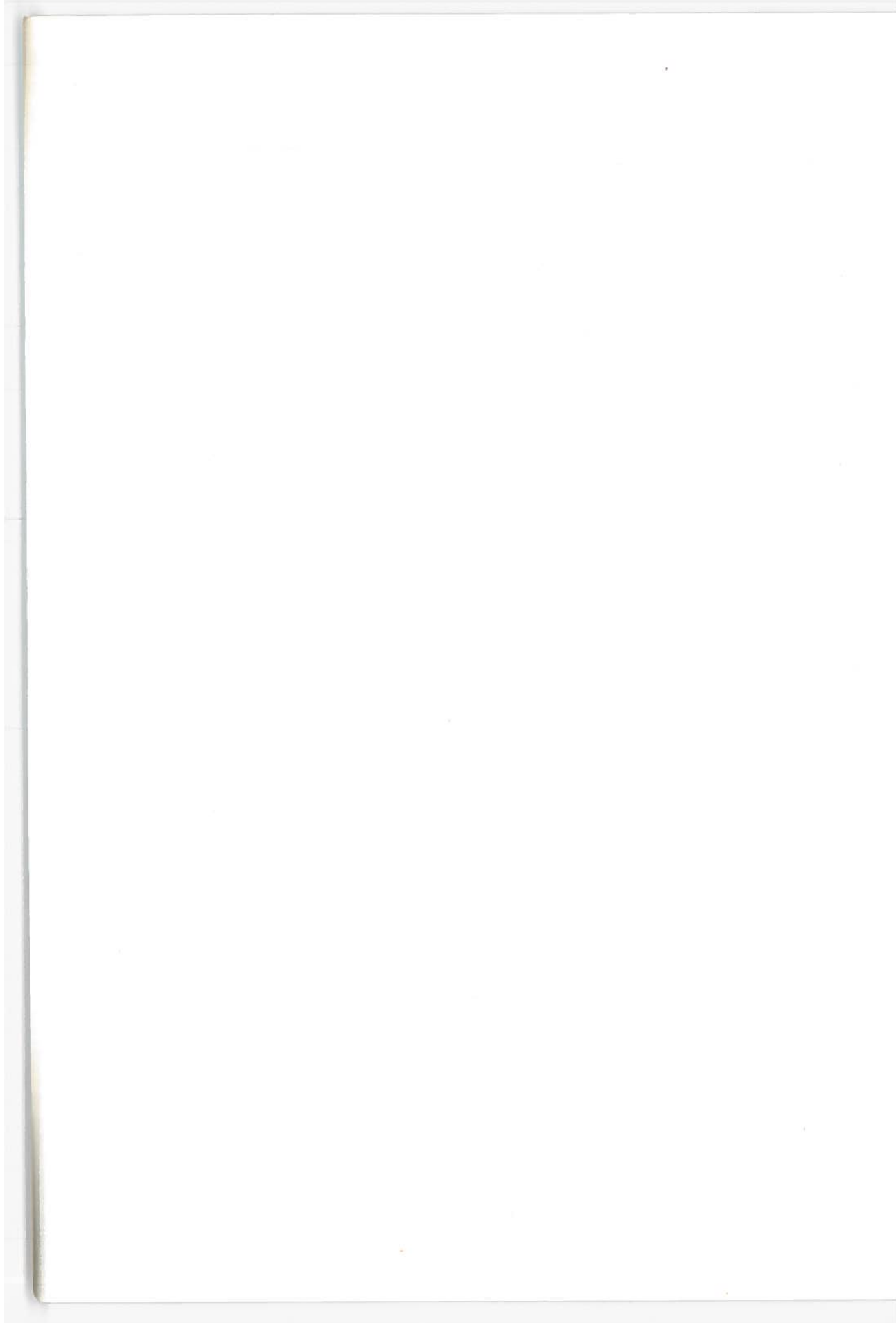
This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof.

NOTICE

The United States Government does not endorse products or manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to the object of this report.

Technical Report Documentation Page

1. Report No. DOT-TSC-OST-76-42	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle FUEL CONSUMPTION, EMISSIONS, AND POWER CHARACTERISTICS OF THE 1975 DATSUN 119-CID AUTOMOTIVE ENGINE--EXPERIMENTAL DATA		5. Report Date November 1976	
		6. Performing Organization Code	
7. Author(s) W.F. Marshall and K.R. Stamper		8. Performing Organization Report No. BERC/OP-76/16	
9. Performing Organization Name and Address U.S. Energy Research and Development Administration* Bartlesville Energy Research Center P.O. Box 1398 Bartlesville OK 74003		10. Work Unit No. (TRAIS) OS714/R7508	
		11. Contract or Grant No. RA-75-10	
12. Sponsoring Agency Name and Address U.S. Department of Transportation Office of the Secretary Office of the Asst. Sec. for Sys. Dev. and Tech. Office of Systems Engineering Washington DC 20590		13. Type of Report and Period Covered Interim Report July 1975	
		14. Sponsoring Agency Code	
15. Supplementary Notes *Interagency Agreement with:		U.S. Department of Transportation Transportation Systems Center Kendall Square Cambridge MA 02142	
16. Abstract <p>Experimental data were obtained in dynamometer tests of the 1975 Datsun, 119 cubic-inch displacement, 2-bbl engine to determine steady-state fuel consumption and emissions of hydrocarbon, carbon monoxide, and oxides of nitrogen. These data were obtained in detail adequate to construct performance maps for the entire speed/load operating range of the engine.</p> <p>The objective of the test work was to obtain data that describe engine performance characteristics in engineering terms; the data are so presented. The comparative or judgmental assessment of engine performance was not an objective and such assessment is avoided.</p>			
17. Key Words IC Engines Fuel Economy Fuel Consumption Auto Emissions		18. Distribution Statement DOCUMENT IS AVAILABLE TO THE U.S. PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22161	
19. Security Classif. (of this report) UNCLASSIFIED	20. Security Classif. (of this page) UNCLASSIFIED	21. No. of Pages 42	22. Price



PREFACE

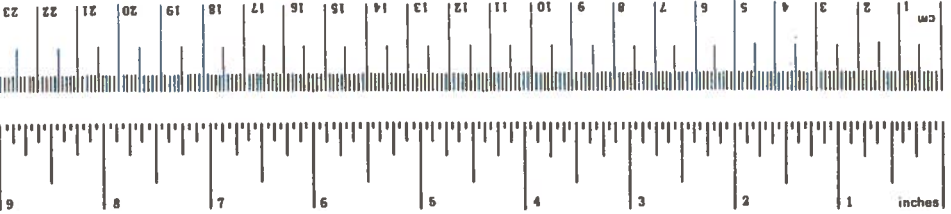
This report, prepared by the U.S. Energy Research and Development Administration, Bartlesville Energy Research Center for the U.S. Department of Transportation, Transportation Systems Center, Power and Propulsion Branch, Cambridge MA, presents results of an automobile engine test. This represents one of a series of 1975 engines tested.

Mr. Ralph G. Colello is the technical monitor on this project.

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
in ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
VOLUME				
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³
TEMPERATURE (exact)				
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
km	kilometers	1.1	yards	yd
		0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares (10,000 m ²)	2.5	acres	acres
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
		1.06	quarts	qt
l	liters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³
TEMPERATURE (exact)				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F

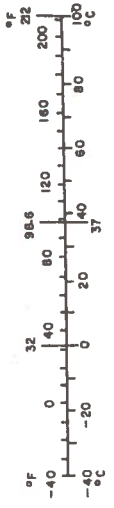


TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1 INTRODUCTION.....	1
2 ENGINE TEST REPORT.....	2
3 DISCUSSION OF TEST RESULTS.....	8
4 CONCLUSIONS.....	10

LIST OF ILLUSTRATIONS

<u>Figure</u>		<u>Page</u>
1	Brake Specific Fuel Consumption, Torque, and Brake Horsepower versus Engine rpm at Wide Open Throttle--Datsun Engine.....	11
2	Fuel Rate versus Power at Various Speed and Load Conditions--Datsun Engine.....	12
3	Carbon Monoxide Emissions versus Power at Various Speed and Load Conditions--Datsun Engine.....	13
4	Hydrocarbon Emissions versus Power at Various Speed and Load Conditions--Datsun Engine.....	14
5	Oxides of Nitrogen Emissions versus Power at Various Speed and Load Conditions--Datsun Engine.....	15
6	Ignition Timing versus Power at Various Speed and Load Conditions--Datsun Engine.....	16

LIST OF TABLES

<u>Table</u>		<u>Page</u>
1	Manufacturer's Engine Specifications.....	6
2	Fuel Specifications.....	7
3	Chassis Dynamometer Test Results.....	9

1. INTRODUCTION

This report presents data acquired from tests of a 1975 Datsun 119-CID, 2V engine. Datsun uses this specific engine in the model 710, two-door hardtop equipped with a manual transmission. Similar versions of the basic 119-CID engine are used in the model 610 and station wagon models 610 and 710. The test results are sufficient to establish steady-state maps for fuel consumption and emission levels (carbon monoxide, hydrocarbon, oxides of nitrogen) over the entire operating range of the engine. This engine is one of a series tested or to be tested.

The objective of this program is to obtain engine performance data for estimating emissions and fuel economy in varied engine service and duty. The intent of the work is to provide basic engine characteristic data required as input for engineering calculations involving ground transportation.

2. ENGINE TEST REPORT

The Datsun 119-CID, 2V engine was procured in a 1975 Datsun Model 710 vehicle equipped with manual transmission. The manufacturer's engine specifications are given in table 1. The break-in consisted of approximately 2,500 miles accumulated over city and highway roads while the engine was in the vehicle. The fuel used in break-in and testing was a single blend of unleaded regular gasoline; fuel analyses are listed in table 2.

For the duration of the steady-state tests, the engine was removed from the vehicle, mounted on a test stand, and coupled to an eddy-current dynamometer. The test period began on June 17, 1975 and ended on June 25, 1975 involving about 50 hours of operating time. The engine test installation included: the fan (viscous clutch type), air cleaner, alternator (not wired into the electrical system), air-injection pump, water pump, breather exhaust system components, and a cooling tower which replaced the radiator. The emission control systems which were operating during the test included exhaust gas recirculation (EGR), air injection, early fuel evaporation, boost control deceleration, and transmission controlled vacuum advance. The vacuum advance system was designed to be engaged or disengaged depending on which gear the manual transmission was placed. In order to study the effects of both, two maps were generated--one with vacuum advance (denoted by the symbol "x" in the figures) and one without vacuum advance (denoted by the symbol "o" in the figures). The tests were conducted at the following steady-state modes:

With vacuum advance (test numbers 1-42, 118, and 119)

Idle speeds: no load, load equivalent to transmission in drive (no repeats)

High speeds: 2,500; 3,600; 4,500; 5,600 rpm

Loads: 20, 60, 100 pct of full load

Low speeds: 900; 1,500; 2,000 rpm

Loads: 0, 5, 10, 20, 40, 60, 80, 90, 100 pct of full load

Without vacuum advance (test numbers 43-117)

Idle speeds: no load, load equivalent to transmission in drive (three repeats of each)

High speeds: 3,600; 4,500; 5,600 rpm

Loads: 0, 20, 40, 60, 80, 90, 100 pct of full load (repeated at 20 and 80 pct of full power)

Low speeds: 900; 1,500; 2,000; 2,500 rpm

Loads: 0, 5, 10, 20, 40, 60, 80, 90, 100 pct of full load (repeated at 5 and 20 pct of full power)

Total number of test modes with vacuum advance..... 40
Total number of test modes without vacuum advance..... 79
Total number of tests.....119

The following data were recorded:

Test number
Date
Barometric pressure, mm Hg
Dew point, °F
Inlet air temperature, °F
Speed, rpm
Torque, lb-ft -- BLH strain gage load cell; Daytronics indicator
Fuel rate, lb/hr -- Fluidyne, positive displacement fuel flow meter
Ignition timing, °BTC
Manifold vacuum, in. Hg
Throttle angle, degrees
CO, pct -- Beckman NDIR
CO₂, pct -- Beckman NDIR
O₂, pct -- Beckman polarographic detector
HC, ppmC -- Custom-built heated flame ionization detector
NO_x, ppm -- Thermo-Electron chemiluminescent detector
Oil temperature, °F
Oil pressure, psig
Coolant temperature, °F
Exhaust temperature, °F
Exhaust pressure, in. H₂O

The computed data include absolute humidity (grains/lb dry air), power (bhp), air-fuel ratio, and emission rates of carbon monoxide (CO), unburned hydrocarbons (HC), and oxides of nitrogen (NO_x) in gram/hour. The following equations were applied in the computations:

$$W = \exp \left[12.02 \left(\frac{D - 1.4}{D + 212} \right) \right]$$

$$H = \frac{4348 W}{B - W}$$

$$P = \left(\frac{N \times T}{5252} \right) \left(\frac{736.6}{B - W} \right) \left(\frac{t + 460}{545} \right)^{0.5}$$

$$A/F = 4.895 \frac{(\text{CO}) + 2(\text{CO}_2) + 2(\text{O}_2) + \left(\frac{\text{NO}_x}{10^4} \right) + 3.148 (\text{CO}_2) \left(\frac{\text{CO} + \text{CO}_2}{\text{CO} + 3\text{CO}_2} \right)}{(\text{CO}) + (\text{CO}_2) + \left(\frac{\text{HC}}{10^4} \right) \left[1 + .03148 (\text{CO}_2) \left(\frac{\text{CO} + \text{CO}_2}{\text{CO} + 3\text{CO}_2} \right) \right]}$$

The equation for A/F is based on:

1. Fuel = CH_{2.099}
2. Water-gas-shift equilibrium constant = $\frac{(\text{CO}) (\text{H}_2\text{O})}{(\text{CO}_2) (\text{H}_2)} = 3$
3. HC was determined on a raw exhaust basis, all other species measured on a dry basis.
4. All NO_x is NO.

$$\text{Mass CO} = (\text{Exhaust flow rate}) \times (\text{CO}) \times \frac{\text{Mol. wt CO}}{\text{Mol. wt exhaust}}$$

x correction for water removal

$$\text{Mass CO} = 4.383 (F) (A/F + 1) (\text{CO}) \left[\frac{1}{1 + .03148 (\text{CO}_2) \left(\frac{\text{CO} + \text{CO}_2}{\text{CO} + 3\text{CO}_2} \right)} \right]$$

$$\text{Mass HC} = 0.0002207 (F) (A/F + 1) (\text{HC})$$

$$\text{Mass NO}_x = 0.0007201 (F) (A/F + 1) (\text{NO}_x) \left[\frac{1}{1 + .03148 (\text{CO}_2) \left(\frac{\text{CO} + \text{CO}_2}{\text{CO} + 3\text{CO}_2} \right)} \right] \times K_H$$

$$K_H = \frac{1}{1 - .0047 (H - 75)}$$

where A/F = air-fuel ratio

B = barometric pressure, mm Hg

CO = carbon monoxide concentration, vol pct
CO₂ = carbon dioxide concentration, vol pct
D = intake air dew point, °F
F = fuel rate, lb/hr
H = humidity, grains H₂O/lb dry air
HC = unburned hydrocarbon concentration, ppmC, vol
K_H = humidity correction factor
N = engine speed, rpm
NO = nitric oxide concentration, ppm, vol
NO_x = nitrogen oxides concentration, ppm, vol
O₂ = oxygen concentration, vol pct
P = corrected power, brake horsepower
T = torque, ft-lb
t = intake air temperature, °F
W = water vapor pressure, mm Hg

TABLE 1. - Manufacturer's engine specifications

Model number.....	L20B
Displacement.....	119.1 cubic inches
Maximum horsepower.....	110 hp at 5,600 rpm
Maximum torque.....	112 ft-lb at 3,600 rpm
Configuration.....	In-line 4-cylinder with OHC
Bore and stroke.....	3.35 in. x 3.39 in.
Compression ratio.....	8.5
Firing order.....	1-3-4-2
Ignition timing at idle speed:	
Manual transmission.....	12° BTC at 750 rpm
Automatic transmission.....	12° BTC at 650 rpm (in drive range)
Block material.....	Cast iron
Head material.....	Cast iron
Number of crank shaft main bearings.....	5
Number of compression rings/piston.....	2
Number of oil rings/piston.....	1
Cam drive.....	Chain and sprocket
Valve port size:	
Intake.....	1.7717 in.
Exhaust.....	1.4567 in.
Valve timing:	
Intake, open.....	16° BTC
Intake, closed.....	232° ATC
Exhaust, open.....	234° BTC
Exhaust, closed.....	14° ATC
Point gap.....	≈0.020 in.
Spark plug gap.....	≈0.035 in.
Spark advance.....	Centrifugal and transmission controlled vacuum advance
Fan drive.....	Viscous clutch
Engine weight.....	403 lb
Air-injection system:	
Pump type.....	2-vane positive displacement
Air delivery point.....	Exhaust manifold
Exhaust-gas-recirculation system:	
Valve type.....	Spring loaded diaphragm
Control signal.....	Ported carburetor vacuum
Point of discharge.....	Intake manifold
Crankcase emission control:	
Control method.....	Positive crankcase ventilation
Point of discharge.....	Intake manifold
Carburetor type.....	Two Venturi, down-draft

Carburetor No.....	DCH340-434902H
Distributor No.....	D4A4-04-408 22100N6000

TABLE 2. - Fuel specifications

Fuel No.....	7516
Research octane No.....	91.0
Motor octane No.....	83.5
Reid vapor pressure, psig..... (by micro vapor pressure test)	9.86
Distillation, °F:	
10 pct.....	125
50 pct.....	212
95 pct.....	390
100 pct.....	416
API gravity, degrees.....	66.1
FIA analysis, pct:	
Aromatics.....	11
Olefins.....	15
Paraffins.....	74
Sulfur, pct.....	0.0288
Lead, g/gallon.....	Trace

3. DISCUSSION OF TEST RESULTS

Chassis dynamometer tests were run on the vehicle prior to the steady-state engine tests; results can be seen in table 3.

The steady-state engine data (figures 1-6) showed good repeatability. Plots of engine performance at wide open throttle (WOT) for both spark advance cases (figure 1), show generally lower values of brake specific fuel consumption (bsfc) for the more advanced spark timing. The discontinuity in the bsfc plot in the vicinity of 2,000 rpm could be attributed to a change in carburetion characteristics caused by the off-on operation of accessories such as the boost control deceleration device which is deactivated at engine speeds above 2,000 rpm.

The vacuum spark advance modes showed increased fuel economy over non-advanced modes in most cases (figure 2). There was little or no difference in CO and HC emissions for the two spark timing conditions (figures 3 and 4). The high level of CO and HC emissions at WOT are typical of spark-ignition engines with enrichment for power demand.

The NO_x versus power curves for various engine speeds (figure 5) show an increased NO_x emission level for the advanced spark condition.

The spark timing for low power modes at low engine speed (below 2,000 rpm) evidences the fact that ported vacuum is used to keep the timing retarded at low throttle angles (figure 6).

The values for air-fuel ratio do not reflect the actual stoichiometry in the combustion chamber because additional air is injected into the exhaust stream. Thus, the air-fuel ratio data indicate very lean mixtures, particularly at low power modes where the exhaust flow rate is small.

TABLE 3. - Chassis dynamometer test results

Inertia weight, lb	1972 FTP			1975 FTP			HWFET					
	Fuel economy, mpg	Emissions, g/mile		Fuel economy, mpg	Emissions, g/mile		Fuel economy, mpg	Emissions, g/mile				
		CO ¹	HC		NO _x ²	CO ¹		HC	NO _x ²	CO ¹	HC	NO _x ²
3,000	17.26	13.7	1.65	2.6	18.14	11.37	1.92	2.53	29.82	4.28	0.68	3.07
2,500	18.79	10.82	1.47	3.06	19.94	8.97	1.64	2.50	31.49	4.79	.62	2.49

¹CO emissions are not corrected for H₂O and CO₂ removal.

²NO_x emissions are corrected to absolute humidity = 75 grains moisture/lb dry air.

4. CONCLUSIONS

The repeatability of engine performance and emission data over the entire operating range of the engine is sufficient for the purposes of this report.

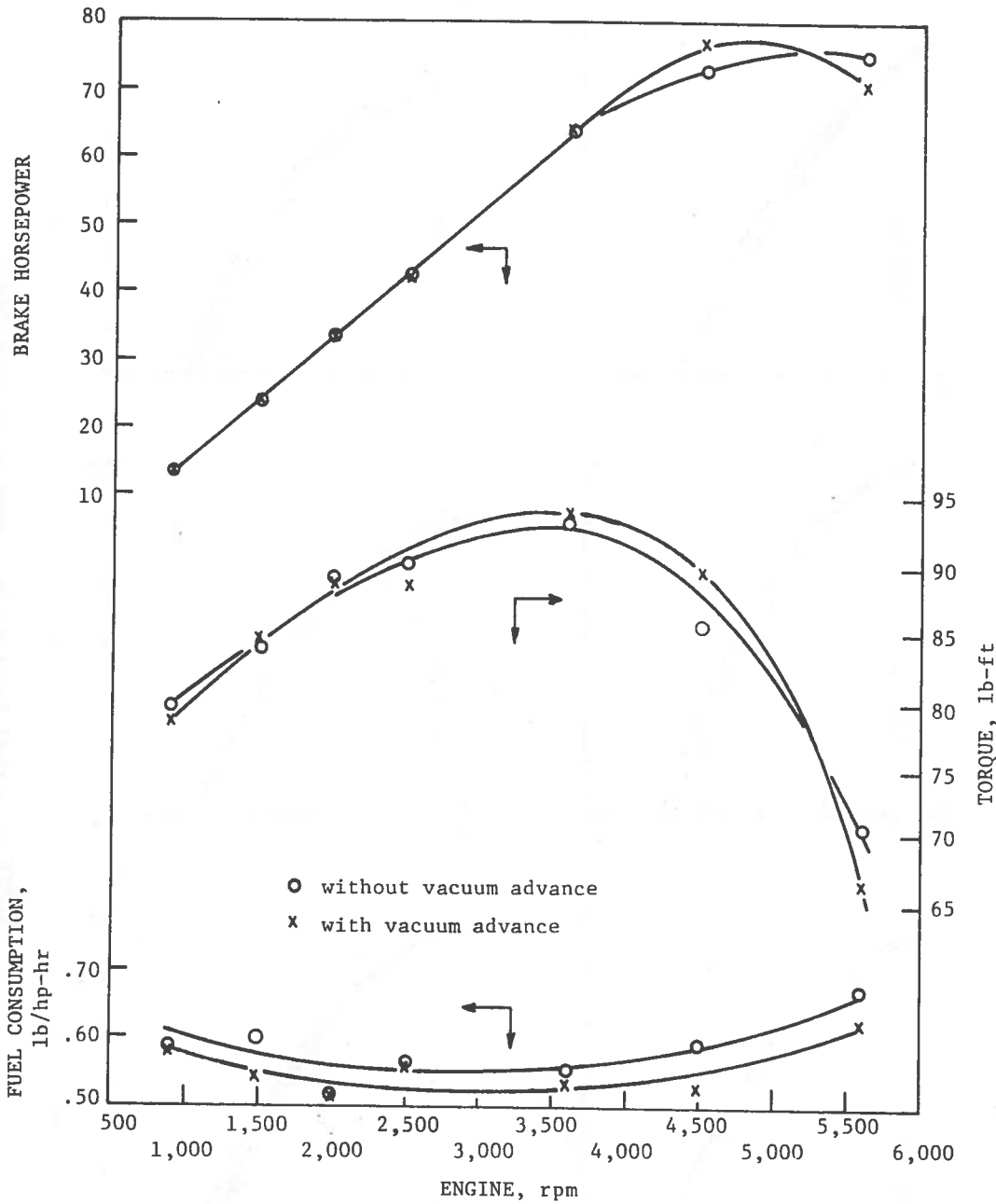


FIGURE 1. - Brake Specific Fuel Consumption, Torque, and Brake Horsepower versus Engine rpm at Wide Open Throttle--Datsun Engine.

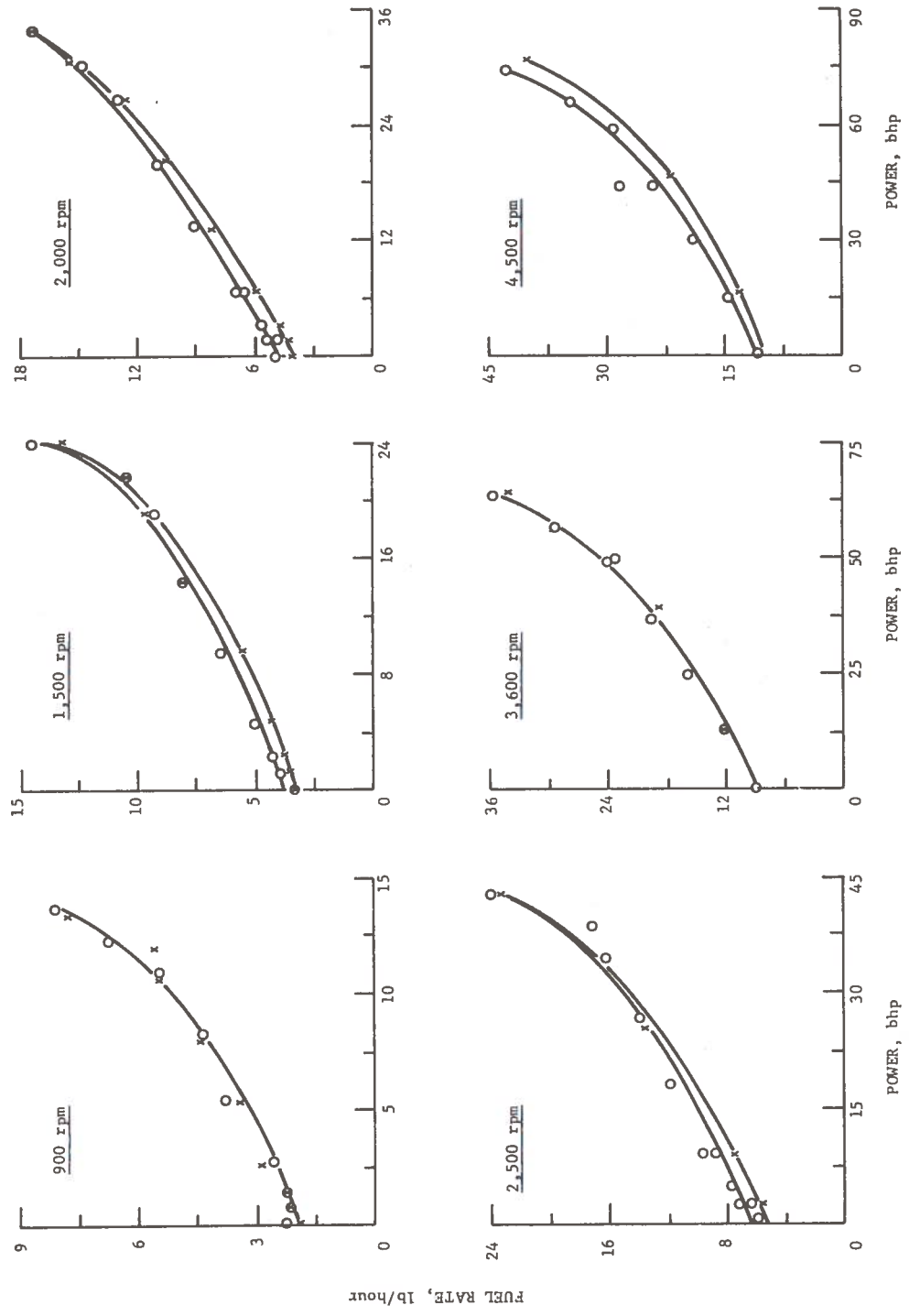


FIGURE 2. - Fuel Rate versus Power at Various Speed and Load Conditions--Datsun Engine.

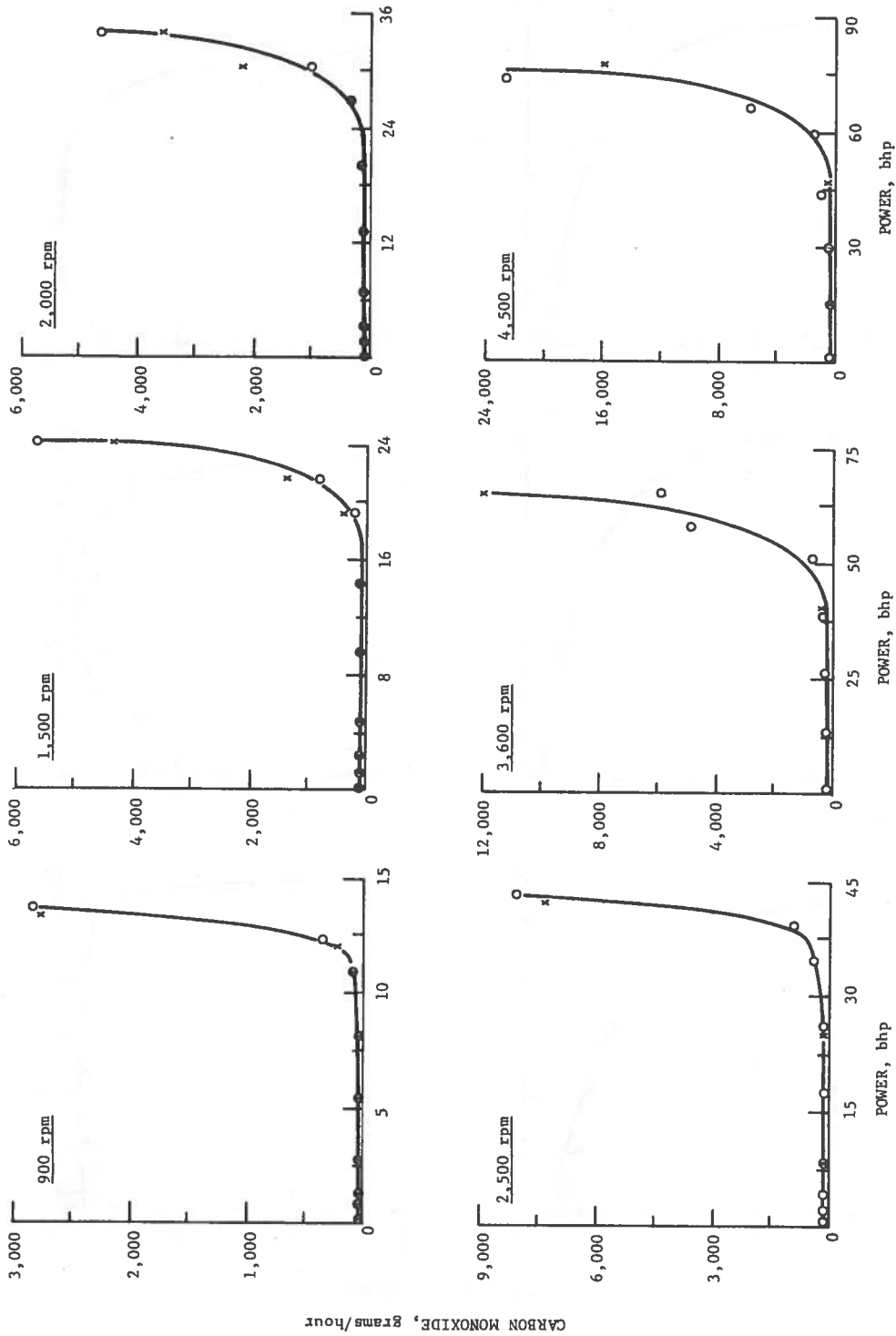


FIGURE 3. - Carbon Monoxide Emissions versus Power at Various Speed and Load Conditions--Datsun Engine.

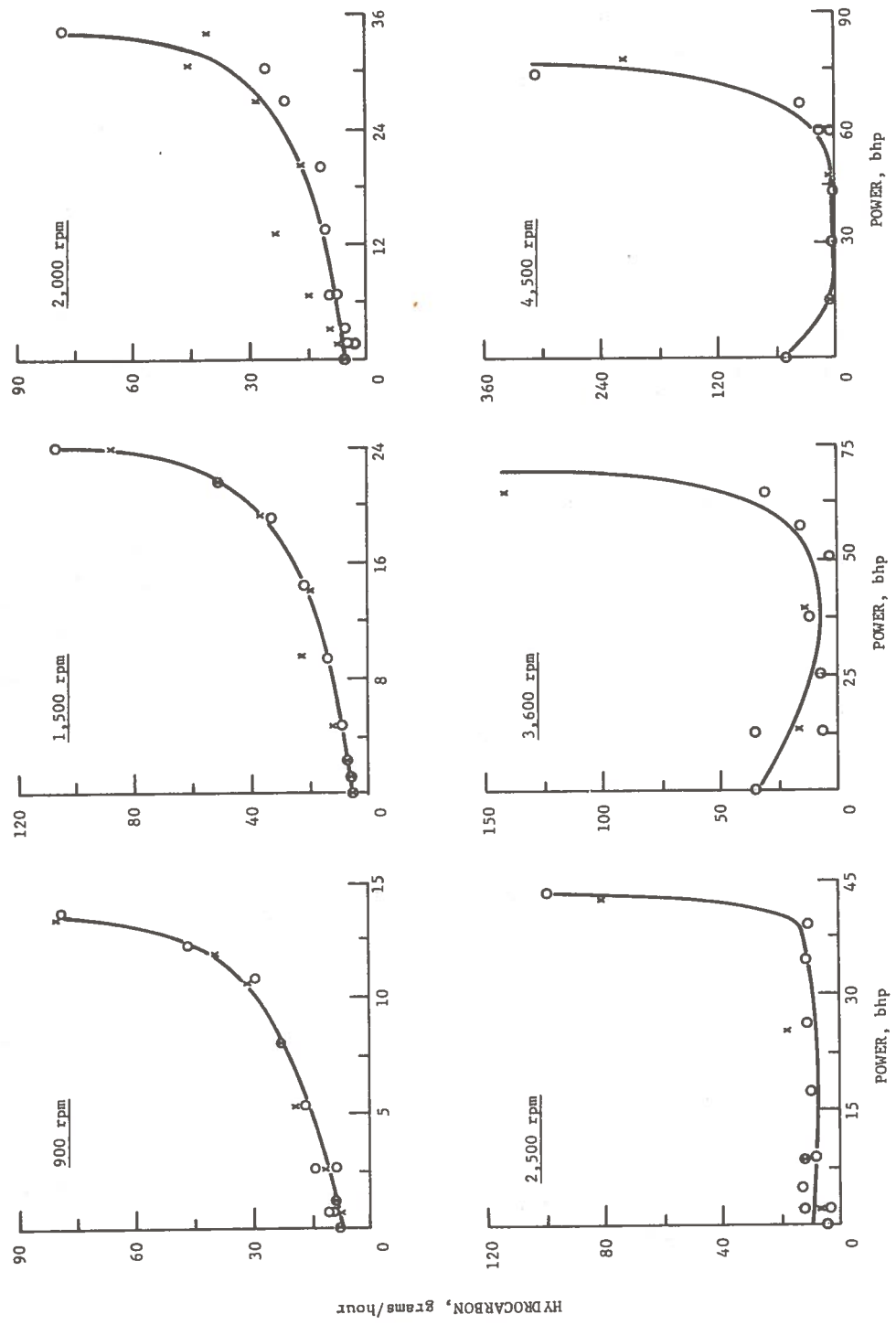


FIGURE 4. - Hydrocarbon Emissions versus Power at Various Speed and Load Conditions--Datsun Engine.

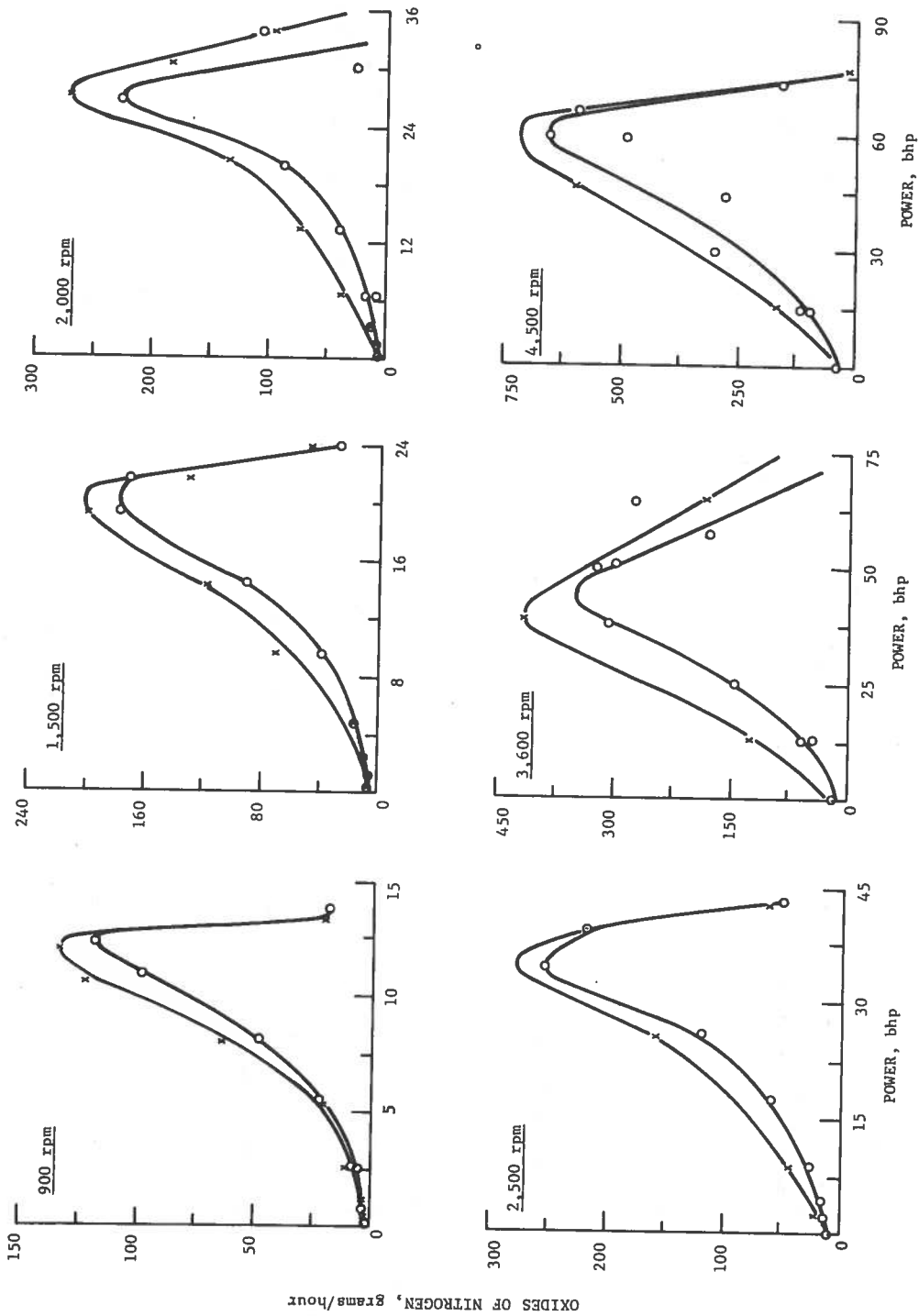


FIGURE 5. - Oxides of Nitrogen Emissions versus Power at Various Speed and Load Conditions--Datsun Engine.

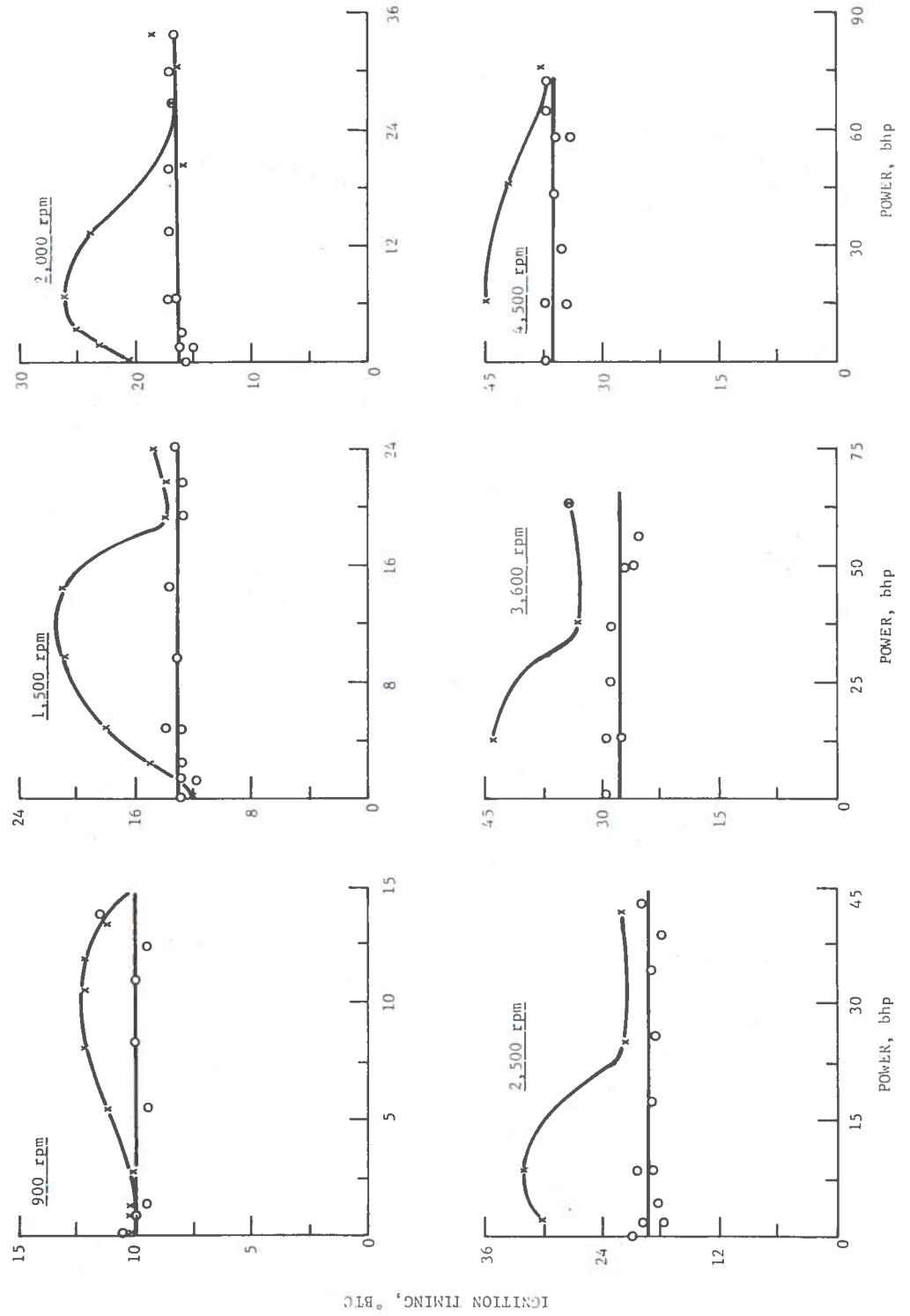


FIGURE 6. - Ignition Timing versus Power at Various Speed

Engine..... Datsun 119-CID
 Fuel..... 7516

Test Number.....	1	2	3	4	5	6
Test Date.....	6/17/75	6/17/75	6/17/75	6/17/75	6/17/75	6/17/75
Barometer, mm Hg.....	739.2	739.2	739.2	739.2	739.2	739.2
Humidity, grains/lb.....	98	98	98	98	98	98
Temperature, F.....	96	97	78	76	79	82
Engine speed, rpm.....	750	650	900	900	900	900
Torque, lb-ft.....	0.0	9.0	77.0	69.0	61.0	46.0
Power, bhp*.....	0.0	1.1	13.4	11.9	10.6	8.0
Fuel rate, lb/hr.....	1.7	1.6	7.8	5.6	5.4	4.4
Ignition timing, deg BTC.....	12.0	12.5	11.0	12.0	12.0	12.0
Manifold vacuum, in Hg.....	17.8	15.6	1.0	2.2	3.2	5.4
Throttle angle, deg.....	0.0	0.0	63.0	22.5	20.0	16.0
Concentrations, dry basis:						
CO, %.....	0.930	0.650	5.5000	5.200	1.750	0.608
CO2, %.....	9.95	10.40	10.30	12.80	12.40	11.75
O2, %.....	8.00	7.50	3.10	3.80	4.50	5.50
HC, ppmC.....	1216	1831	3194	1991	1584	1348
NOx, ppm.....	18	76	210	1800	1620	980
Air-fuel ratio.....	22.40	21.52	15.74	17.49	18.27	19.30
Emission rates, g/hr:						
CO.....	14.7	9.2	2756.7	207.2	70.5	21.2
HC.....	9.7	13.1	80.8	40.0	32.2	23.7
NOx**.....	.5	2.0	19.4	132.3	120.3	62.9
Oil temperature, F.....	167	168	175	178	178	178
Oil pressure, psi.....	21	15	24	24	24	24
Coolant temperature, F.....	181	182	178	179	179	178
Exhaust temperature, F.....	503	477	774	824	830	786
Exhaust pressure, in H2O.....	0.0	0.0	2.0	2.0	2.0	1.0

* Corrected - SAE J816b
 ** Corrected for humidity.

Datsun 119-CID
7516

Engine.....
Fuel.....

	7 6/17/75	8 6/17/75	9 6/17/75	10 6/17/75	11 6/17/75	12 6/17/75
Test Number.....	739.2	739.2	739.2	739.2	739.2	739.2
Test Date.....	98 94	98 95	98 97	98 95	98 95	98 81
Barometer, mm Hg.....	900	900	900	900	900	1500
Humidity, grains/lb.....	30.0	15.0	7.0	4.0	0.0	83.0
Temperature, F.....	5.3	2.6	1.2	.7	0.0	24.1
Engine speed, rpm.....	3.4	2.3	2.2	2.2	1.9	13.1
Torque, lb-ft.....	11.0	10.0	10.0	10.0	10.0	15.0
Power, bhp*.....	10.0	14.0	15.0	16.4	17.6	1.0
Fuel rate, lb/hr.....	11.0	8.5	7.0	6.5	6.0	63.0
Ignition timing, deg BTC...						
Manifold vacuum, in Hg.....						
Throttle angle, deg.....						
Concentrations, dry basis:						
CO, %.....	1030	1300	1385	1340	1380	5.1000
CO ₂ , %.....	11.35	11.10	10.40	10.30	10.20	11.00
O ₂ , %.....	6.00	6.80	8.00	8.00	8.00	2.90
HC, ppmC.....	1344	1006	945	809	864	2063
NOx, ppm.....	370	180	59	50	41	300
Air-fuel ratio.....	19.80	20.63	22.15	22.24	22.29	15.79
Emission rates, g/hr:						
CO.....	28.5	30.9	17.8	19.0	17.1	4285.5
HC.....	18.8	12.0	9.6	8.2	7.6	87.5
NOx**.....	18.9	7.9	2.2	1.9	1.5	46.5
Oil temperature, F.....	176	174	173	171	170	175
Oil pressure, psi.....	24	25	25	25	25	42
Coolant temperature, F.....	176	176	175	175	175	186
Exhaust temperature, F.....	712	660	600	585	558	981
Exhaust pressure, in H ₂ O...	0.0	0.0	0.0	0.0	0.0	12.0

* Corrected - SAE J816b.
** Corrected for humidity.

Datsun 119-CID
7516

Engine.....
Fuel.....

	13 6/17/75	14 6/17/75	15 6/17/75	16 6/17/75	17 6/17/75	18 6/17/75
Test Number.....	739.2	739.2	739.2	739.2	739.2	739.2
Test Date.....	98 86	98 84	98 84	98 86	98 84	98 84
Barometer, mm Hg.....	1500	1500	1500	1500	1500	1500
Humidity, grains/lb.....	74.0	66.0	49.0	33.0	16.0	8.0
Temperature, F.....	21.6	19.2	14.2	9.6	4.7	2.3
Engine speed, rpm.....	10.5	9.5	8.0	5.5	4.3	3.8
Torque, lb-ft.....	14.0	14.0	21.0	21.0	18.0	15.0
Power, bhp*.....	2.4	3.2	5.3	12.0	16.0	16.8
Fuel rate, lb/hr.....	32.5	29.5	24.0	15.0	12.0	11.0
Ignition timing, deg BTC.....						
Manifold vacuum, in Hg.....						
Throttle angle, deg.....						
Concentrations, dry basis:						
CO, %.....	1.8500	5200	1350	1250	1340	1550
CO ₂ , %.....	12.65	12.90	12.50	11.35	10.65	10.40
O ₂ , %.....	3.00	3.50	4.50	6.00	7.00	7.50
HC, ppmC.....	1431	1082	679	1025	656	466
NOx, ppm.....	1000	1600	1050	830	225	130
Air-fuel ratio.....	16.59	17.36	18.34	19.88	21.11	21.73
Emission rates, g/hr:						
CO.....	1306.6	348.7	80.8	56.1	50.2	52.8
HC.....	51.0	36.6	20.5	23.2	12.4	8.0
NOx**.....	130.3	197.9	115.9	68.8	15.5	8.2
Oil temperature, F.....	184	185	184	178	178	178
Oil pressure, psi.....	40	40	40	41	41	42
Coolant temperature, F.....	182	180	179	178	177	178
Exhaust temperature, F.....	1030	1040	1005	819	768	751
Exhaust pressure, in H ₂ O.....	11.0	10.0	9.0	4.0	2.0	1.0

* Corrected - SAE J816b.
** Corrected for humidity.

Engine..... Datsun 119-CID
 Fuel..... 7516

Test Number.....	19 6/17/75	20 6/17/75	21 6/17/75	22 6/17/75	23 6/17/75	24 6/17/75
Test Date.....	739.2 98 83	739.2 98 83	739.2 98 84	739.2 98 87	739.2 98 86	739.2 98 86
Barometer, mm Hg.....	1500	1500	2000	2000	2000	2000
Humidity, grains/lb.....	4.0	0.0	27.0	73.0	69.0	52.0
Temperature, F.....	1.2	0.0	33.7	30.3	26.8	20.2
Engine speed, rpm.....	3.6	3.4	17.4	15.3	12.7	10.7
Torque, lb-ft.....	12.5	12.0	18.5	16.5	17.0	16.0
Power, bhp*.....	17.4	19.2	1.0	1.8	3.2	5.0
Fuel rate, lb/hr.....	10.5	10.0	65.0	49.5	37.0	28.5
Ignition timing, deg BTC.....						
Manifold vacuum, in Hg.....						
Throttle angle, deg.....						
Concentrations, dry basis:						
CO, %.....	1500	1520	3.1700	2.1700	3.570	1620
CO2, %.....	10.30	10.20	12.65	12.65	12.80	12.40
O2, %.....	7.50	7.50	2.00	2.40	3.80	4.80
HC, ppmC.....	566	366	750	918	625	436
NOx, ppm.....	90	80	500	1000	1600	900
Air-fuel ratio.....	21.32	21.88	15.70	16.17	17.71	18.62
Emission rates, g/hr:						
CO.....	48.7	49.3	3497.5	2176.6	326.8	131.6
HC.....	6.0	5.7	41.7	46.4	28.9	17.9
NOx**.....	5.4	4.5	101.7	135.0	270.1	134.9
Oil temperature, F.....	175	174	196	191	192	190
Oil pressure, psi.....	42	42	50	46	47	46
Coolant temperature, F.....	177	177	185	180	180	179
Exhaust temperature, F.....	746	747	1277	1241	1177	1134
Exhaust pressure, in H2O....	1.0	.5	22.0	20.0	18.0	14.0

* Corrected - SAE J316b.
 ** Corrected for humidity.

Datsun 119-CID
7516

Engine.....
Fuel.....

	25 6/17/75	26 6/17/75	27 6/17/75	28 6/17/75	29 6/17/75	30 6/25/75
Test Number.....	739.2	739.2	739.2	739.2	739.2	739.2
Test Date.....	6/17/75	6/17/75	6/17/75	6/17/75	6/17/75	6/25/75
Barometer, mm Hg.....	98	98	98	98	98	74
Humidity, grains/lb.....	86	86	84	83	83	86
Temperature, F.....						
Engine speed, rpm.....	2000	2000	2000	2000	2000	2500
Torque, lb-ft.....	34.0	17.0	8.0	4.0	0.0	88.0
Power, bhp*.....	15.2	6.6	3.1	1.5	0.0	42.1
Fuel rate, lb/hr.....	8.1	5.9	4.7	4.3	4.1	23.4
Ignition timing, deg BTC...	24.0	26.0	25.0	23.0	20.5	22.0
Manifold vacuum, in Hg.....	10.6	16.0	18.0	13.4	19.0	1.0
Throttle angle, deg.....	20.5	15.0	13.0	12.5	12.0	63.0
Concentrations, dry basis:						
CO, %.....	1380	2080	1900	1730	1700	5.2500
CO2, %.....	11.75	11.00	10.40	10.30	10.20	11.50
O2, %.....	5.50	6.30	8.00	8.00	8.50	1.20
HC, ppmG.....	731	592	444	355	310	1153
NOx, ppm.....	630	420	195	128	100	270
Air-fuel ratio.....	19.31	20.81	22.18	22.27	22.82	14.84
Emission rates, g/hr:						
CO.....	120.4	105.0	77.4	70.3	65.6	7392.7
HC.....	23.6	15.1	9.6	7.1	6.0	81.9
NOx**.....	74.4	39.1	15.5	9.3	7.1	62.1
Oil temperature, F.....	187	185	184	179	179	195
Oil pressure, psi.....	49	50	50	51	51	51
Coolant temperature, F.....	178	177	177	177	177	184
Exhaust temperature, F.....	1014	877	805	795	791	1340
Exhaust pressure, in H2O...	8.0	3.0	1.0	1.0	1.0	30.0

* Corrected - SAE J816b.
** Corrected for humidity.

Engine..... Datsun 119-CID
 Fuel..... 7516

	31 6/17/75	32 6/17/75	33 6/17/75	34 6/17/75	35 6/17/75	36 6/17/75
Test Number.....	31	32	33	34	35	36
Test Date.....	6/17/75	6/17/75	6/17/75	6/17/75	6/17/75	6/17/75
Barometer, mm Hg.....	744.2	744.2	744.2	744.2	744.2	744.2
Humidity, grains/lb.....	96	96	96	96	96	96
Temperature, F.....	71	76	84	80	84	84
Engine speed, rpm.....	2500	2500	2500	3600	3600	3600
Torque, lb-ft.....	52.8	17.6	4.4	93.0	55.3	18.6
Power, bhp*.....	25.1	8.4	2.1	54.2	38.7	12.9
Fuel rate, lb/hr.....	13.6	7.7	5.5	34.5	19.0	12.7
Ignition timing, deg BTDC.....	21.5	32.0	30.0	34.0	33.0	44.0
Manifold vacuum, in HG.....	4.3	14.4	18.5	.8	6.0	14.4
Throttle angle, deg.....	37.0	20.0	16.0	63.0	39.0	21.0
Concentrations, dry basis:						
CO, %.....	1620	1880	1700	59500	1700	2230
CO2, %.....	12.65	11.35	10.50	11.90	12.90	11.75
O2, %.....	5.00	6.50	8.00	1.00	4.50	6.00
HC, ppmC.....	340	392	278	1393	182	315
NOx, ppm.....	830	350	189	490	1600	650
Air-fuel ratio.....	18.71	20.34	22.16	14.63	18.54	19.77
Emission rates, g/hr:						
CO.....	157.7	120.7	95.9	12035.6	240.7	229.0
HC.....	17.8	12.7	7.2	142.1	13.0	16.3
NOx**.....	156.5	41.0	17.6	180.6	412.7	121.6
Oil temperature, T.....	134	134	188	210	214	210
Oil pressure, psi.....	55	53	54	55	55	55
Coolant temperature, F.....	135	180	178	183	178	178
Exhaust temperature, F.....	1205	1015	914	1354	1523	1151
Exhaust pressure, in H2O.....	19.0	7.0	2.0	71.0	43.0	17.0

* Corrected - SAE J816b.
 ** Corrected for humidity.

Datsun 119-CID
7516

Engine.....
Fuel.....

	37 6/17/75	38 6/17/75	39 6/17/75	40 6/25/75	41 6/25/75	42 6/25/75
Test Number.....						
Test Date.....						
Barometer, mm Hg.....	744.2	744.2	744.2	757.8	757.8	757.8
Humidity, grains/lb.....	96	96	96	83	83	83
Temperature, F.....	78	82	85	69	74	70
Engine speed, rpm.....	4500	4500	4500	5600	5600	5600
Torque, lb-ft.....	89.0	53.4	17.8	68.0	43.0	14.0
Power, bhp*.....	76.6	46.2	15.4	70.8	45.0	14.6
Fuel rate, lb/hr.....	40.3	22.2	13.3	43.9	31.0	17.8
Ignition timing, deg BTC...	38.0	42.0	45.0	38.0	39.0	42.0
Manifold vacuum, in Hg.....	2.0	7.6	14.4	3.0	6.5	14.0
Throttle angle, deg.....	63.0	40.0	25.5	63.0	49.5	32.0
Concentrations, dry basis:						
CO, %.....	6.7000	.2750	.2150	3.0500	1.1500	.1970
CO2, %.....	11.50	13.60	11.90	13.20	14.60	12.50
O2, %.....	1.00	3.50	6.00	.35	.65	4.35
HC, ppmC.....	1856	80	203	1158	35	57
NOx, ppm.....	40	2100	850	1500	1750	1000
Air-fuel ratio.....	14.46	17.47	19.74	13.80	14.89	18.21
Emission rates, g/hr:						
CO.....	15758.9	431.4	230.6	7498.8	2139.2	260.7
HC.....	220.2	6.3	11.0	143.4	3.3	3.8
NOx**.....	17.1	600.2	166.1	630.9	556.9	226.4
Oil temperature, F.....	213	228	226	226	257	230
Oil pressure, psi.....	57	55	55	57	55	55
Coolant temperature, F.....	184	184	181	187	184	185
Exhaust temperature, F.....	1323	1378	1235	1570	1401	520
Exhaust pressure, in H2O...	84.0	51.0	25.0	110.0	70.0	41.0

* Corrected - SAE J816b.
** Corrected for humidity.

Engine..... Datsun 119-CID
 Fuel..... 7516

	43 6/20/75	44 6/20/75	45 6/20/75	46 6/20/75	47 6/20/75	48 6/20/75
Test Number.....	746.0	746.0	746.0	746.0	746.0	746.0
Test Date.....	74 90	74 90	74 84	74 85	74 84	74 86
Barometer, mm Hg.....	750	650	900	900	900	900
Humidity, grains/lb.....	0.0	8.0	79.0	71.0	63.0	47.0
Temperature, F.....	0.0	1.0	13.6	12.2	10.8	8.1
Engine speed, rpm.....	1.5	1.5	8.0	6.7	5.4	4.3
Torque, lb-ft.....	10.0	12.0	11.5	9.5	10.0	10.0
Power, bhp*.....	16.4	16.4	1.0	2.0	3.2	5.8
Fuel rate, lb/hr.....	0.0	0.0	63.0	22.0	19.0	16.0
Ignition timing, deg BTC.....						
Manifold vacuum, in Hg.....						
Throttle angle, deg.....						
Concentrations, dry basis:						
CO, %.....	1030	0305	5.5000	6950	1550	1550
CO ₂ , %.....	9.95	10.30	10.20	12.40	12.10	11.60
O ₂ , %.....	7.25	7.00	2.80	3.18	4.15	5.00
HC, ppmC.....	1326	1663	3077	1986	1466	1347
NOx, ppm.....	32	53	215	1550	1490	850
Air-fuel ratio.....	21.65	21.14	15.57	17.04	18.09	18.93
Emission rates, g/hr:						
CO.....	13.9	10.6	2801.8	324.1	62.0	24.1
HC.....	9.0	11.0	79.1	45.7	29.6	22.7
NOx**.....	.7	1.1	17.9	118.0	97.3	46.4
Oil temperature, F.....	159	170	175	177	177	177
Oil pressure, psi.....	16	16	24	24	24	24
Coolant temperature, F.....	179	181	180	182	181	179
Exhaust temperature, F.....	485	465	777	841	832	765
Exhaust pressure, in H ₂ O.....	0.0	0.0	5.0	5.0	3.0	2.0

* Corrected - SAE J816b.
 ** Corrected for humidity.

Datsun 119-CID
7516

Engine.....
Fuel.....

	49 6/20/75	50 6/20/75	51 6/20/75	52 6/20/75	53 6/20/75	54 6/20/75
Test Number.....						
Test Date.....						
Barometer, mm Hg.....	746.0	746.0	746.0	746.0	746.0	746.0
Humidity, grains/lb.....	74	74	74	74	74	74
Temperature, F.....	87	90	80	80	80	76
Engine speed, rpm.....	900	900	900	900	900	1500
Torque, lb-ft.....	31.0	15.0	7.0	4.0	0.0	84.0
Power, bhp*.....	5.3	2.6	1.2	.7	0.0	23.9
Fuel rate, lb/hr.....	3.7	2.7	2.2	2.2	2.2	14.4
Ignition timing, deg BTC.....	9.5	10.0	9.5	10.0	10.5	13.5
Manifold vacuum, in Hg.....	9.2	15.0	16.0	16.8	17.4	1.0
Throttle angle, deg.....	11.5	8.5	6.5	6.0	5.5	63.0
Concentrations, dry basis:						
CO, %.....	0.750	1.180	0.940	1.010	1.030	6.2000
CO ₂ , %.....	11.10	10.65	10.20	9.85	9.70	9.60
O ₂ , %.....	5.50	5.50	6.00	7.00	7.50	2.40
HC, ppmC.....	1117	779	886	372	772	2330
NOx, ppm.....	450	175	70	50	44	180
Air-fuel ratio.....	19.54	19.75	20.41	21.57	22.19	15.26
Emission rates, g/hr:						
CO.....	22.4	26.0	17.5	19.9	20.9	5595.3
HC.....	16.8	8.7	8.3	8.7	7.9	106.1
NOx**.....	21.9	6.3	2.1	1.6	1.5	26.5
Oil temperature, F.....	175	173	172	173	170	177
Oil pressure, psi.....	24	25	24	24	24	41
Coolant temperature, F.....	178	177	176	176	176	183
Exhaust temperature, F.....	719	654	595	586	580	1005
Exhaust pressure, in H ₂ O.....	1.0	.5	0.0	0.0	0.0	16.0

* Corrected - SAE J816b.
** Corrected for humidity.

Engine..... Datsun 119-CID
 Fuel..... 7516

Test Number.....	55 6/20/75	56 6/20/75	57 6/20/75	58 6/20/75	59 6/20/75	60 6/20/75
Test Date.....						
Barometer, mm Hg.....	746.0	746.0	746.0	745.0	746.0	746.0
Humidity, grains/lb.....	74	74	74	74	74	74
Temperature, F.....	78	79	80	81	82	83
Engine speed, rpm.....	1500	1500	1500	1500	1500	1500
Torque, lb-ft.....	75.0	67.0	50.0	33.0	15.0	8.0
Power, bhp*.....	21.4	19.1	14.5	9.4	4.6	2.3
Fuel rate, lb/hr.....	10.4	9.5	8.0	6.5	5.0	4.3
Ignition timing, deg BTC.....	13.0	13.0	13.3	13.5	14.0	13.0
Manifold vacuum, in Hg.....	2.3	3.2	5.6	9.3	14.0	16.0
Throttle angle, deg.....	32.5	26.0	22.0	14.5	11.0	9.0
Concentrations, dry basis:						
CO, %.....	1.0000	2150	1450	1500	1500	1550
CO ₂ , %.....	12.30	12.40	11.95	11.35	10.75	10.40
O ₂ , %.....	2.90	3.50	4.40	5.00	6.00	6.50
HC, ppmC.....	1420	962	710	549	384	389
NOx, ppm.....	1450	1625	900	450	250	150
Air-fuel ratio.....	16.32	17.57	18.40	19.07	20.21	20.83
Emission rates, g/hr:						
CO.....	714.7	145.7	87.5	76.5	62.5	57.4
HC.....	51.2	32.4	21.6	14.1	8.1	7.3
NOx**.....	169.2	177.5	88.7	37.5	17.0	9.1
Oil temperature, F.....	183	185	184	183	180	178
Oil pressure, psi.....	40	40	39	39	40	41
Coolant temperature, F.....	182	182	181	180	178	177
Exhaust temperature, F.....	1043	1033	1000	957	860	811
Exhaust pressure, in H ₂ O.....	14.0	13.0	12.0	9.0	6.0	5.0

* Corrected - SAE J816b.
 ** Corrected for humidity.

Datsun 119-CID
7516

Engine.....
Fuel.....

	61 6/20/75	62 6/20/75	63 6/25/75	64 6/20/75	65 6/20/75	66 6/20/75
Test Number.....	746.0	746.0	746.0	745.0	746.0	746.0
Test Date.....	74 84	74 86	74 91	74 80	74 84	74 85
Barometer, mm Hg.....	1500	1500	2000	2000	2000	2000
Humidity, Grains/lb.....	4.0	0.0	88.0	79.0	70.0	52.0
Temperature, F.....	1.1	0.0	53.8	30.1	26.7	19.9
Engine speed, rpm.....	3.9	3.4	17.4	14.8	13.0	10.9
Torque, lb-ft.....	13.0	13.0	16.5	17.0	17.0	17.0
Power, bhp*.....	17.0	18.0	1.0	3.0	3.0	5.4
Fuel rate, lb/hr.....	3.0	7.0	63.0	45.0	35.0	26.0
Ignition timing, deg BTC...						
Manifold vacuum, in HG.....						
Throttle angle, deg.....						
Concentrations, dry basis:						
CO, %	1450	1780	4.0000	9030	2950	1620
CO ₂ , %	10.62	9.95	11.35	12.65	12.50	12.10
O ₂ , %	6.50	7.00	2.70	2.60	3.40	4.40
HC, ppmC	367	343	1573	524	453	282
NOx, ppm	122	80	580	160	1490	660
Air-fuel ratio.....	20.72	21.56	15.97	16.60	17.51	18.39
Emission rates, g/hr:						
CO	43.4	54.1	4522.1	909.5	274.3	133.0
HC	6.2	5.3	78.3	26.5	21.3	11.7
NOx**	6.5	4.0	107.0	26.2	226.2	88.4
Oil temperature, F.....	176	175	183	190	190	189
Oil pressure, psi.....	41	41	46	46	46	46
Coolant temperature, F.....	176	176	183	181	182	180
Exhaust temperature, F.....	772	742	1246	1213	1191	1151
Exhaust pressure, in H ₂ O....	4.0	3.0	20.0	20.0	19.0	15.0

* Corrected - SAE J816b.
** Corrected for humidity.

Datsun 119-CID
7516

	67 6/20/75	68 6/20/75	69 6/20/75	70 6/20/75	71 6/20/75	72 6/20/75
Engine.....						
Fuel.....						
Test Number.....	746.0	746.0	746.0	746.0	746.0	746.0
Test Date.....	74	74	74	74	74	74
	87	84	86	85	86	80
Barometer, mm Hg.....						
Humidity, grains/lb.....	2000	2000	2000	2000	2000	2500
Temperature, F.....	35.0	17.0	8.3	4.0	0.0	90.0
Engine speed, rpm.....	15.4	6.5	3.1	1.5	0.0	42.8
Torque, lb-ft.....	9.1	5.9	5.7	5.4	5.2	24.0
Power, bhp*.....						
Fuel rate, lb/hr.....	17.0	16.5	16.0	16.0	15.5	20.0
Ignition timing, deg BTC.....	9.0	13.6	13.2	17.0	13.0	1.0
Manifold vacuum, in Hg.....	19.5	14.0	11.0	10.0	9.5	63.0
Throttle angle, deg.....						
Concentrations, dry basis:						
CO, %.....	.1790	.1520	.1500	.1520	.1500	5.6000
CO ₂ , %.....	11.60	10.90	10.40	10.20	9.95	10.65
O ₂ , %.....	4.90	5.50	6.50	6.50	7.00	1.15
HC, ppmC.....	292	318	233	233	221	1374
NOx, ppm.....	350	175	155	125	95	215
Air-fuel ratio.....	18.84	19.70	20.36	20.93	21.61	14.72
Emission rates, g/hr:						
CO.....	125.3	85.2	73.7	71.3	69.9	8078.2
HC.....	10.4	9.0	5.8	5.5	5.2	100.0
NOx**.....	40.2	16.0	12.4	9.6	7.2	50.6
Oil temperature, F.....	188	175	181	183	183	191
Oil pressure, psi.....	43	51	51	50	50	54
Coolant temperature, F.....	179	183	193	181	182	183
Exhaust temperature, F.....	1116	955	919	897	868	1319
Exhaust pressure, in H ₂ O.....	12.0	6.0	5.0	4.0	4.0	34.0

* Corrected - SAE J816b.

** Corrected for humidity.

Datsun 119-CID
7516

Engine.....
Fuel.....

	73 6/25/75	74 6/20/75	75 6/20/75	76 6/20/75	77 6/20/75	78 6/20/75
Test Number.....	746.0	746.0	746.0	746.0	746.0	746.0
Test Date.....	74 88	74 85	74 86	74 88	74 87	74 87
Barometer, mm Hg.....	2500	2500	2500	2500	2500	2500
Humidity, grains/lb.....	81.0	72.0	54.0	36.0	18.0	9.0
Temperature, F.....	58.8	34.4	25.8	17.3	8.6	4.3
Engine speed, rpm.....	17.2	16.2	13.6	11.7	9.6	7.6
Torque, lb-ft.....	18.0	19.0	18.5	19.0	19.0	18.5
Power, bhp*.....	3.0	3.2	5.0	8.0	11.4	14.4
Fuel rate, lb/hr.....	43.0	41.0	32.0	25.0	20.0	16.0
Ignition timing, deg BTG.....						
Manifold vacuum, in Hg.....						
Throttle angle, deg.....						
Concentrations, dry basis:						
CO, %.....	.8250	.3450	.1320	.1440	.1620	.1520
CO2, %.....	13.70	12.40	11.35	11.20	11.00	10.40
O2, %.....	1.70	3.00	4.80	4.30	5.00	6.00
HC, ppmC.....	184	198	207	201	279	389
NOx, ppm.....	1200	1360	690	400	230	145
Air-fuel ratio.....	16.00	17.23	18.99	19.01	19.22	20.37
Emission rates, g/hr:						
CO.....	919.3	394.0	140.3	132.0	123.4	97.4
HC.....	10.3	11.4	11.1	9.3	10.7	12.6
NOx**.....	218.3	253.6	119.7	59.9	28.6	15.2
Oil temperature, F.....	197	198	196	195	193	191
Oil pressure, psi.....	51	54	52	52	53	52
Coolant temperature, F.....	184	183	182	181	179	178
Exhaust temperature, F.....	1365	1306	1241	1218	1174	1097
Exhaust pressure, in H2O.....	26.0	29.0	24.0	19.0	14.0	9.0

* Corrected - SAE J816b.
** Corrected for humidity.

Engine..... Datsun 119-CID
 Fuel..... 7516

Test Number.....	79 6/20/75	80 6/20/75	81 6/25/75	82 6/25/75	83 6/20/75	84 6/20/75
Barometer, mm Hg.....	746.0	746.0	746.0	746.0	746.0	746.0
Humidity, grains/lb.....	74	74	74	74	74	74
Temperature, F.....	87	87	93	90	84	84
Engine speed, rpm.....	2500	2500	3600	3600	3600	3600
Torque, lb-ft.....	4.0	0.0	92.0	82.0	72.0	54.0
Power, bhp.....	1.9	0.0	63.8	56.7	49.5	37.1
Fuel rate, lb/hr.....	7.2	5.9	55.4	29.4	23.7	19.5
Ignition timing, deg BTC.....	18.0	21.0	34.0	25.5	27.0	29.0
Manifold vacuum, in Hg.....	15.6	18.0	1.2	2.2	4.2	5.8
Throttle angle, deg.....	15.0	12.0	63.0	54.0	45.5	39.5
Concentrations, dry basis:						
CO, %.....	1500	1440	2,7500	2,7500	3300	1380
CO ₂ , %.....	10.50	9.25	13.20	13.60	13.70	12.00
O ₂ , %.....	6.50	7.00	.20	.20	1.10	4.00
HC, ppmC.....	338	166	289	174	46	152
NOx, ppm.....	145	120	800	620	1300	1300
Air-fuel ratio.....	20.39	21.63	14.71	14.72	15.70	18.16
Emission rates, g/hr:						
CO.....	95.5	76.2	5792.5	4794.6	574.6	272.9
HC.....	12.2	4.4	50.7	15.3	5.5	11.1
NOx**.....	14.7	10.4	275.1	176.5	520.9	308.1
Oil temperature, F.....	139	187	202	209	214	211
Oil pressure, psi.....	52	53	55	54	55	55
Coolant temperature, F.....	178	177	132	133	183	183
Exhaust temperature, F.....	1071	938	1543	1583	1537	1344
Exhaust pressure, in H ₂ O.....	9.0	6.0	58.0	49.0	54.0	43.0

* Corrected - SAE J816b.
 ** Corrected for humidity.

Datsun 119-CID
7516

Engine.....
Fuel.....

	85 6/20/75	86 6/20/75	87 6/20/75	88 6/20/75	89 6/25/75	90 6/20/75
Test Number.....	746.0	746.0	746.0	746.0	746.0	746.0
Test Date.....	74 85	74 84	74 85	74 84	74 84	74 85
Barometer, mm Hg.....						
Humidity, grains/lb.....	3600	3600	3600	4500	4500	4500
Temperature, F.....	36.0	18.0	0.0	85.0	76.0	68.0
Engine speed, rpm.....	24.8	12.4	0.0	73.1	65.5	58.5
Torque, lb-ft.....	15.7	12.4	8.8	43.1	34.7	29.5
Power, bhp*.....	29.0	29.5	29.5	37.0	37.0	36.0
Fuel rate, lb/hr.....	10.0	14.0	17.4	2.2	2.0	4.2
Ignition timing, deg BTC.....	28.5	21.5	15.5	63.0	59.0	50.0
Manifold vacuum, in Hg.....						
Throttle angle, deg.....						
Concentrations, dry basis:						
CO, %.....	1900	2080	1880	8.0000	2.6700	.7400
CO ₂ , %.....	11.75	11.60	10.50	9.60	13.20	13.90
O ₂ , %.....	4.50	4.50	6.00	4.50	.50	3.00
HC, ppmC.....	112	730	945	2175	347	63
NOx, ppm.....	750	290	160	350	1750	1500
Air-fuel ratio.....	18.60	18.50	20.19	16.10	14.84	16.91
Emission rates, g/hr:						
CO.....	227.7	196.1	138.1	22566.9	5558.5	1477.3
HC.....	6.8	34.7	35.0	309.5	36.4	6.4
NOx**.....	146.7	44.6	19.2	161.2	594.7	488.9
Oil temperature, F.....	210	206	203	216	222	229
Oil pressure, psi.....	55	55	56	57	55	56
Coolant temperature, F.....	182	180	178	184	183	184
Exhaust temperature, F.....	1310	1248	1167	1287	1540	1580
Exhaust pressure, in H ₂ O.....	30.0	18.0	12.0	84.0	73.0	72.0

* Corrected - SAE J816b.
** Corrected for humidity.

Datsun 119-CID
7516

	91 6/25/75	92 6/20/75	93 6/20/75	94 6/20/75	95 6/20/75	96 6/20/75
Engine.....						
Fuel.....						
Test Number.....	757.8	746.0	746.0	746.0	746.0	746.0
Test Date.....	83	74	74	74	74	74
	84	84	84	84	87	86
Barometer, mm Hg.....	4500	4500	4500	4500	900	900
Humidity, grains/lb.....	51.0	34.0	17.0	0.0	15.0	4.0
Temperature, F.....	43.3	29.2	14.6	0.0	2.6	.7
	24.1	19.0	14.3	10.9	2.5	2.1
Engine speed, rpm.....	36.0	35.0	37.0	37.0	10.0	10.0
Torque, lb-ft.....	7.0	16.0	14.0	17.0	14.2	16.2
Power, bhp*.....	39.5	33.5	25.0	20.0	5.0	4.0
Fuel rate, lb/hr.....						
Ignition timing, deg BTC....						
Manifold vacuum, in Hg.....						
Throttle angle, deg.....						
Concentrations, dry basis:						
CO, %.....	5200	.1720	.1700	.1750	.0880	.1050
CO2, %.....	14.60	11.75	10.90	10.20	10.00	9.60
O2, %.....	1.10	4.10	5.00	6.50	6.50	7.50
HC, ppmC.....	23	58	89	1053	1271	1085
NOx, ppm.....	1075	1275	520	240	100	55
Air-fuel ratio.....	15.44	18.33	19.32	20.80	20.93	22.19
Emission rates, g/hr:						
CO.....	780.9	246.0	193.9	164.4	19.1	20.3
HC.....	1.7	4.2	5.1	49.9	13.9	10.6
NOx**.....	276.2	297.7	96.8	36.8	3.5	1.7
Oil temperature, F.....	215	225	223	220	187	181
Oil pressure, psi.....	55	56	56	56	19	21
Coolant temperature, F.....	183	180	180	180	178	177
Exhaust temperature, F.....	1554	1364	1280	1203	630	597
Exhaust pressure, in H2O....	55.0	42.0	27.0	18.0	0.0	0.0

* Corrected - SAE J816b.
** Corrected for humidity.

Engine..... Datsun 119-CID
 Fuel..... 7516

Test Number.....	97 6/20/75	98 6/20/75	99 6/20/75	100 6/20/75	101 6/20/75	102 6/20/75
Test Date.....	745.0	746.0	746.0	746.0	746.0	746.0
Barometer, mm Hg.....	74	74	74	74	74	74
Humidity, grains/lb.....	84	84	84	86	85	86
Temperature, F.....						
Engine speed, rpm.....	1500	1500	2000	2000	2500	2500
Torque, lb-ft.....	16.0	4.0	17.0	4.0	13.0	4.0
Power, bhp*.....	4.5	1.1	6.5	1.5	8.6	1.9
Fuel rate, lb/hr.....	5.0	3.5	6.5	4.9	8.7	6.2
Ignition timing, deg BTC...	13.0	12.0	17.0	15.0	20.5	20.0
Manifold vacuum, in Hg.....	14.0	17.2	14.0	17.4	13.0	17.3
Throttle angle, deg.....	15.0	6.0	13.0	10.0	16.5	12.0
Concentrations, dry basis:						
CO, %.....	1620	1700	1620	1430	1800	1430
CO ₂ , %.....	10.40	9.95	10.75	10.20	11.00	10.20
O ₂ , %.....	6.00	7.00	6.00	7.00	5.50	6.50
HC, ppmC.....	444	365	273	211	229	144
NOx, ppm.....	190	90	80	120	220	140
Air-fuel ratio.....	20.36	21.56	20.20	21.45	19.66	21.00
Emission rates, g/hr:						
CO.....	63.2	54.7	39.1	62.2	126.9	77.1
HC.....	9.4	5.9	7.7	4.6	8.1	3.9
NOx**.....	13.1	4.7	7.2	8.5	25.3	12.3
Oil temperature, F.....	173	174	179	183	185	188
Oil pressure, psi.....	42	42	50	51	54	54
Coolant temperature, F.....	181	181	183	182	183	181
Exhaust temperature, F.....	301	759	939	876	1072	996
Exhaust pressure, in H ₂ O...	4.0	3.0	6.0	4.0	9.0	7.0

* Corrected - SAE J816b.
 ** Corrected for humidity.

Engine..... Datsun 119-CID
 Fuel..... 7516

	103 5/25/75	104 5/20/75	105 6/20/75	106 6/20/75	107 6/25/75	108 6/25/75
Test Number.....						
Test Date.....						
Barometer, mm Hg.....	746.0	746.0	746.0	746.0	757.8	757.8
Humidity, grains/lb.....	74	74	74	74	83	83
Temperature, F.....	94	89	86	86	73	73
Engine speed, rpm.....	3600	3600	4500	4500	5600	5600
Torque, lb-ft.....	72.0	18.0	68.0	17.0	72.0	64.0
Power, bhp*.....	50.0	12.4	58.6	14.6	75.2	66.9
Fuel rate, lb/hr.....	23.1	12.0	28.6	14.9	50.5	42.0
Ignition timing, deg BTC.....	26.0	27.5	34.0	34.5	37.0	37.0
Manifold vacuum, in Hg.....	3.2	13.3	4.4	13.4	3.0	3.5
Throttle angle, deg.....	49.5	21.0	50.0	25.5	63.0	58.5
Concentrations, dry basis:						
CO, %.....	4.100	1.720	5.950	1.550	6.3500	4.0000
CO2, %.....	14.20	11.10	13.70	11.35	11.60	13.20
O2, %.....	1.00	6.00	5.00	5.00	.45	.30
HC, ppmC.....	35	112	149	112	1359	978
NOx, ppm.....	1250	350	1900	590	575	1750
Air-fuel ratio.....	15.60	20.09	18.36	19.15	12.40	13.46
Emission rates, g/hr:						
CO.....	597.9	170.5	1256.7	193.7	17482.6	9150.1
HC.....	2.5	5.6	15.9	6.6	238.9	112.6
NOx**.....	297.5	55.6	655.1	113.1	251.0	684.8
Oil temperature, F.....	213	203	193	214	252	261
Oil pressure, psi.....	54	56	59	56	57	57
Coolant temperature, F.....	183	179	184	181	186	186
Exhaust temperature, F.....	1557	1238	1504	1290	1450	1469
Exhaust pressure, in H2O.....	46.0	13.0	62.0	28.0	110.0	110.0

* Corrected - SAE J816b.
 ** Corrected for humidity.

Engine..... Datsun 119-CID
 Fuel..... 7516

	109 6/25/75	110 6/25/75	111 6/25/75	112 6/25/75	113 6/25/75	114 6/25/75
Test Number.....	109	110	111	112	113	114
Test Date.....	6/25/75	6/25/75	6/25/75	6/25/75	6/25/75	6/25/75
Barometer, mm Hg.....	757.8	757.8	757.8	757.8	757.8	757.8
Humidity, grains/lb.....	83	83	83	83	83	83
Temperature, F.....	75	69	72	73	72	77
Engine speed, rpm.....	5600	5600	5600	5600	5600	5600
Torque, lb-ft.....	57.0	43.0	28.0	14.0	0.0	57.0
Power, bhp*.....	59.7	44.8	29.2	14.6	0.0	59.8
Fuel rate, lb/hr.....	35.0	30.1	24.5	18.7	15.7	34.9
Ignition timing, deg BTC.....	36.0	38.0	37.0	38.0	37.5	36.5
Manifold vacuum, in Hg.....	4.0	8.0	11.0	13.5	17.0	4.5
Throttle angle, deg.....	57.5	44.5	38.5	33.5	27.0	51.0
Concentrations, dry basis:						
CO, %.....	1.5700	1.1500	.4100	.1050	.1050	2.0700
CO ₂ , %.....	14.30	14.60	14.70	14.00	12.90	14.20
O ₂ , %.....	.51	.15	.60	2.00	.15	3.50
HC, ppmC.....	360	64	12	9	5	233
NOx, ppm.....	1725	1125	950	530	275	1250
Air-fuel ratio.....	14.60	14.56	15.17	16.20	15.00	16.19
Emission rates, g/hr:						
CO.....	3236.8	2033.6	610.2	129.6	101.7	4680.7
HC.....	37.4	5.7	.9	.5	.2	26.5
NOx**.....	608.4	340.3	241.9	111.9	45.6	483.5
Oil temperature, F.....	263	221	246	252	232	258
Oil pressure, psi.....	57	57	57	57	57	57
Coolant temperature, F.....	186	182	183	183	183	185
Exhaust temperature, F.....	1605	1658	1610	1483	1399	1595
Exhaust pressure, in H ₂ O.....	93.0	73.0	55.0	41.0	50.0	88.0

* Corrected - SAE J816b.
 ** Corrected for humidity.

Datsun 119-C1D
7516

Engine.....
Fuel.....

	115 6/25/75	116 6/25/75	117 6/25/75	118 6/25/75	119 6/25/75
Test Number.....	115	116	117	118	119
Test Date.....	6/25/75	6/25/75	6/25/75	6/25/75	6/25/75
Barometer, mm Hg.....	757.8	746.0	746.0	746.0	746.0
Humidity, grains/lb.....	83	74	74	74	74
Temperature, F.....	72	86	83	83	82
Engine speed, rpm.....	5600	750	650	650	750
Torque, lb-ft.....	14.0	0.0	2.0	3.0	0.0
Power, bhp*.....	14.6	0.0	.2	.4	0.0
Fuel rate, lb/hr.....	18.8	1.7	1.4	1.6	1.4
Ignition timing, deg BTC...	37.0	10.0	9.5	10.0	12.0
Manifold vacuum, in Hg.....	14.2	18.0	17.2	17.2	18.0
Throttle angle, deg.....	35.0	0.0	0.0	0.0	0.0
Concentrations, dry basis:					
CO, %.....	1200	.0910	.0805	.0800	.0740
CO ₂ , %.....	13.90	9.70	9.95	9.85	9.70
O ₂ , %.....	2.35	8.00	7.90	8.00	8.00
HC, ppmC.....	5	1213	1602	1546	1378
NOx, ppm.....	520	33	37	38	31
Air-fuel ratio.....	16.53	22.59	22.23	22.41	22.57
Emission rates, g/hr:					
CO.....	151.2	14.5	10.4	11.9	9.7
HC.....	.3	9.7	10.4	11.6	9.1
NOx**.....	112.1	.9	.8	.9	.7
Oil temperature, F.....	258	188	175	178	168
Oil pressure, psi.....	57	16	16	16	16
Coolant temperature, F.....	184	175	175	175	175
Exhaust temperature, F.....	1467	553	465	487	469
Exhaust pressure, in H ₂ O...	41.0	0.0	0.0	0.0	0.0

* Corrected - SAE J816b.
** Corrected for humidity.



