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NO. DOT-TSC-NHTSA-79-4

HS-803-833

PERFORMANCE CHARACTERISTICS OF AUTOMOTIVE ENGINES
IN THE UNITED STATES

Third Series - Report No. 4

1978 Pontiac, 151 CID (2.5 Liters), 2V

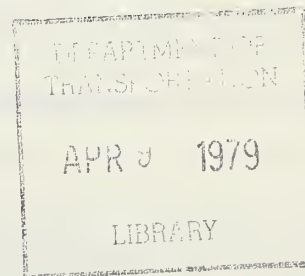
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FEBRUARY 1979

INTERIM REPORT



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NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
Office of Research and Development
Washington DC 20590

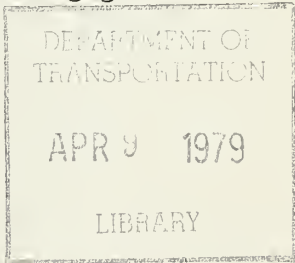
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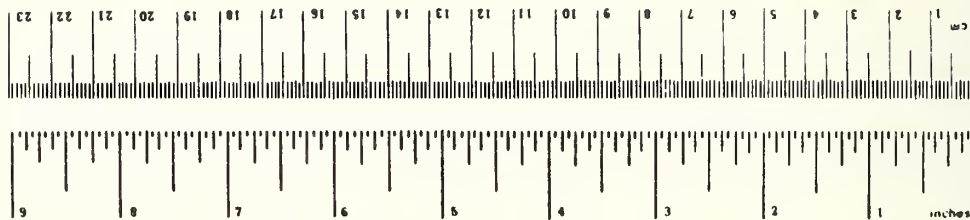
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16. Abstract Experimental data were obtained in dynamometer tests of a 1978 Pontiac 151 CID engine to determine fuel consumption and emissions (hydrocarbon, carbon monoxide, oxides of nitrogen) at steady-state engine operating modes. The objective of the program is to obtain engine performance data for estimating emissions and fuel economy for 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.					
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METRIC CONVERSION FACTORS

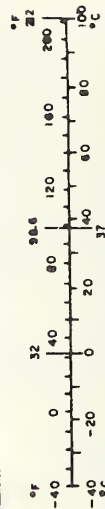
Approximate Conversions to Metric Measures

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	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons	0.9	tonnes	t
	(2000 lb)			
VOLUME				
teaspoon	teaspoons	5	milliliters	ml
Tablespoon	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cup	0.24	liters	l
pt	pint	0.47	liters	l
qt	quart	0.95	liters	l
gal	gallon	3.8	liters	l
cu ft	cubic feet	0.03	cubic meters	m ³
cu yd	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

When You Know	Multiply by	To Find	Symbol
LENGTH			
millimeters	0.04	inches	in
centimeters	0.4	inches	in
meters	3.3	feet	ft
kilometers	1.1	yards	yd
	0.6	miles	mi
AREA			
square centimeters	0.16	square inches	in ²
square meters	1.2	square yards	yd ²
square kilometers	0.4	square miles	mi ²
hectares (10,000 m ²)	2.5	acres	acres
MASS (weight)			
grams	0.035	ounces	oz
kilograms	2.2	pounds	lb
tonnes (1000 kg)	1.1	short tons	
VOLUME			
milliliters	0.03	fluid ounces	fl oz
liters	2.1	pints	pt
	1.06	quarts	qt
	0.26	gallons	gal
cubic meters	36	cubic feet	ft ³
cubic meters	1.3	cubic yards	yd ³
TEMPERATURE (exact)			
Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



1. INTRODUCTION

The objective of this program is to obtain engine performance data for estimating fuel economy and emissions for varied engine service and duty. The intent of this work, done at Bartlesville Energy Technology Center, is to provide basic engine characteristic data required as input for engineering calculations of fuel consumption and emissions involving ground transportation.

The data acquired from tests of a 1978 Pontiac 151 CID engine are presented in this report. This engine was intended for use in a forty-nine state (Federal) vehicle equipped with automatic transmission. Pontiac uses the 151 CID engine in vehicles in the 3,000 to 3,500 lb weight class. The test results are sufficient to establish steady-state maps for fuel consumption and emissions (carbon monoxide, unburned hydrocarbon, and oxides, of nitrogen) over the entire operating range of the engine.

2. ENGINE TEST PROCEDURE

The engine tests setup included a complete mean tolerance engine (SAE definition) except that the fan was not included and a cooling tower was used in place of the fan and radiator. The alternator was included but was not wired into the engine's electrical system. Emission control systems included exhaust-gas-recirculation, early fuel evaporation, positive crankcase ventilation, and an oxidation catalyst. The manufacturer's engine specifications are listed in Table 1.

Prior to testing, engine break-in consisted of 40 hours of operation at various speeds and loads representative of normal operation. Table 2 contains details of the break-in schedule. A single batch of unleaded regular grade gasoline was used throughout the break-in and test. A detailed fuel analysis is given in Table 3. Engine tests began on January 24, 1978 and ended February 27, 1978. During steady-state testing, the engine was operated at the following speed/load modes:

Speeds: 1,000; 1,500; 2,000; 2,500; 2,800; 3,200; 3,800;
and 4,400 rpm

Loads: 0, 10, 25, 40, 60, 75, 90, 100 pct of full load
(0, 10, 25, 60, and 75 pct points were repeated
for all engine speeds)

Idle speed/load modes: 650 rpm -- 0, 10, 15 lb-ft
550 rpm -- 10 lb-ft

Over speed point: 4,650 rpm -- 109 lb-ft (WOT)

Total number of test modes.....	68
Total number of repeats.....	61
Total number of tests.....	<u>129</u>

The following data were recorded for each test point:

Test number
Date
Barometric pressure, mm Hg
Dew point, °F
Inlet air temperature, °F
Speed, rpm
Torque, lb-ft -- Daytronic strain gauge load cell
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
 Intake manifold temperature, °F
 Exhaust-gas-recirculation rate as determined by the intake manifold, CO₂

The following equations were used in calculating power, air/fuel ratio, absolute humidity, and mass emission rates of carbon monoxide (CO), unburned hydrocarbons (HC), and oxides of nitrogen (NO_x):

1. Partial pressure of water vapor in intake air (millimeters of mercury):

$$P = \exp \left[18.717 - \frac{7308.1}{393 + D} \right]$$

where D = Dew point, °F

2. Absolute humidity (grains moisture per pound dry air):

$$H = \frac{4347.8(P)}{B - P}$$

where B = Barometric pressure, mm Hg

3. Humidity correction factor (dimensionless):

$$K_H = \frac{1}{1 - 0.0047(H - 75)}$$

Note: This factor is used to correct the NO_x mass emission rate to a standard humidity of 75 grains moisture per pound dry air.

4. Stoichiometric air/fuel ratio (dimensionless):

$$AF_S = \frac{69(2 + \frac{x}{2} - y)}{MW_{fuel}}$$

where x = hydrogen-carbon ratio of fuel
 y = oxygen-carbon ratio of fuel
 MW_{fuel} = fuel molecular weight per carbon atom
 $= 12.01115 + 1.00797x + 16.00000y$

5. Hydrogen concentration in raw exhaust (percent):

$$H_2 = \frac{x(CO)(CO + CO_2)}{2(CO + 3CO_2)}$$

where CO = Carbon monoxide concentration (percent)
 CO_2 = Carbon dioxide concentration (percent)

Note: This equation assumes a water-gas shift equilibrium constant

$$\frac{(CO)(H_2O)}{(CO_2)(H_2)} = 3$$

6. Correction factor for emission concentrations from wet basis to dry basis (dimensionless):

$$C_w = 1 + \frac{(\frac{x}{2})(CO + CO_2) - H_2}{100}$$

Note: In these tests only HC is measured on a wet basis.
 All other species are measured on a dry basis.

7. Air/Fuel ratio (dimensionless):

$$AF = \frac{AF_S}{2 + \frac{x}{2} - y} \left[\frac{(1 + \frac{x}{2} - y)(CO) + (2 + \frac{x}{2} - y)(CO_2) + 2(O_2) + \frac{NO_x}{10^4} - H_2}{CO + CO_2 + C_w (\frac{HC}{10^4})} \right]$$

where O_2 = oxygen concentration (percent)
 NO_x = oxides of nitrogen (ppm)
 HC = unburned hydrocarbon concentration (ppmC)

8. Exhaust flow (pounds per hour):

$$M_{EX} = M_F(1 + AF)$$

where M_F = fuel flow rate (pounds per hour)

9. Carbon monoxide mass emission rate (grams per hour):

$$M_{CO} = \left(\frac{MW_{CO}}{MW_f} \right) \left[\frac{(\%CO) (M_f)}{\%CO + \%CO_2 + C_w(\%HC)} \right] (453.59237)$$

MW_{CO} = molecular weight of CO (28.01115)
 MW_f = molecular weight of fuel (12.01115 + 1.00797x + 16.00000y)
 M_f = fuel rate in lbs/hour
 $\%HC$ = HC(ppm)/10⁴

10. Unburned hydrocarbon mass emission rate (grams per hour):

$$M_{HC} = \left(\frac{MW_{HC}}{MW_f} \right) \left[\frac{(\%HC) (M_f) (C_w)}{\%CO + \%CO_2 + C_w(\%HC)} \right] (453.59237)$$

MW_{HC} = molecular weight of hydrocarbon
 = 12.01115 + 1.00797x + 16.00000y

11. Oxides of nitrogen mass emission rate (grams per hour):

$$M_{NO_x} = \left(\frac{MW_{NO_x}}{MW_f} \right) \left[\frac{\%NO_x + M_f}{\%CO + \%CO_2 + C_w(\%HC)} \right] (453.59237)$$

MW_{NO_x} = molecular weight of NO₂ = 46.0055

12. Power (brake horsepower corrected to a standard barometric pressure of 736.6 mm Hg and a standard temperature of 85° F):

$$HP = \left(\frac{N (T)}{5252.113} \right) \left(\frac{736.6}{B - P} \right) \sqrt{\frac{t + 460}{545}}$$

where N = engine speed (revolutions per minute)
 T = brake torque (lb-Ft)
 t = air temperature (°F)
 B = barometric pressure (mm Hg)
 P = partial pressure of water vapor in intake air (mm Hg)

3. DISCUSSION OF TEST RESULTS

Maximum corrected brake horsepower, maximum torque, and brake specific fuel consumption (bsfc) are plotted as a function of engine speed at wide-open-throttle (WOT) (Figure 1). The maximum brake horsepower produced by the engine exceeded the value quoted in Table 1. The maximum torque produced was similar to the value quoted in Table 1 and was produced at the specified speed. Fuel rates were found to be nearly a linear function of power for all speeds (Figure 2). Fuel rates were repeatable for all speeds duplicated.

Air-fuel ratios are plotted as a function of power for all engine speeds (Figure 3). The air-fuel ratios were repeatable for most engine test modes. Additional tests were made at certain test modes due to the non-repeatability of the air-fuel ratios. The results from the additional testing indicate that the modes are at critical operating conditions; thus causing significant differences in air-fuel ratios.

Emissions of carbon monoxide (CO), hydrocarbon (HC), and oxides of nitrogen (NO_x) are plotted as a function of power for all engine speeds (Figures 4, 5, 6). Emissions of CO and HC were effectively controlled by the oxidation catalyst at all speed/load modes except those at and near WOT operation. Emissions of NO_x tended to peak at approximately 60 to 90 percent of maximum power at each speed and were repeatable for most speeds duplicated.

4. CONCLUSIONS

The experimental work to obtain engine performance data for a 1978 Pontiac 151 CID engine has been completed, and these data are presented in the tables accompanying this report.

TABLE 1. MANUFACTURER'S ENGINE SPECIFICATIONS

Displacement, cubic inches.....	151
Maximum horsepower, bhp @ 4,400 rpm.....	85
Maximum torque, lb-ft @ 2,800 rpm.....	123
Bore and stroke, inches.....	4.00 - 3.00
Configuration.....	in-line 4 cylinder
Compression ratio.....	8.3 to 1
Firing order.....	1-3-4-2
Ignition timing at idle speed, °BTDC @ 1,000 rpm.	12
Block material.....	cast iron alloy
Head material.....	cast iron alloy
Number of crankshaft main bearings.....	5
Number of compression rings/piston.....	2
Number of oil rings/piston.....	1
Cam drive type.....	gear drive
Valve lift;	
Intake, inches.....	0.406
Exhaust, inches.....	0.406
Valve timing:	
Intake opens, °BTC.....	33
Intake closes, °ABC.....	81
Exhaust opens, °BBC.....	76
Exhaust closes, °ATC.....	38
Spark plug gap, inches.....	0.06
Exhaust-gas-recirculation system:	
Valve type.....	vacuum modulated shut-off and metering
Control signal.....	carburetor vacuum
Point of discharge.....	intake manifold
Crankcase emission control:	
Control method.....	positive crankcase ventilation
Point of discharge.....	intake manifold
Carburetor type.....	2V downdraft
Distributor specifications:*	
Centrifugal advance, begins, ° @ 1,200 rpm..	0
Centrifugal advance, full, ° @ 4,400 rpm....	20
Vacuum advance, begins, ° @ 3.5 in. Hg.....	0
Vacuum advance, maximum, ° @ 9 in. Hg.....	20
Carburetor number.....	10004048
Distributor number.....	1103328
EGR valve number.....	17057046
Engine weight, lb.....	350

*Engine rpm, crankshaft degrees.

TABLE 2. ENGINE BREAK-IN SCHEDULE

Simulated vehicle speed, mph	Engine speed, rpm	Intake manifold vacuum, in Hg	Fraction of time in mode
0	650	15.8	1/10
20	1,400	17.7	"
30	1,450	10.1	"
40	1,850	10	"
50	2,250	9.2	"
60	2,650	7.5	"
25	1,700	12.6	"
35	1,650	9.8	"
45	2,025	9.6	"
55	2,450	8.3	"

Mileage per cycle = 90.

Total mileage simulated over 40 hours break-in period = 1,440.

TABLE 3. FUEL ANALYSIS

Fuel No.....	7718
Research octane No.....	91.8
Motor octane No.....	84.0
Specific gravity.....	0.717
API gravity, degrees.....	65.9
Distillation, °F:	
10 pct evaporated.....	123
50 pct ".....	209
95 pct ".....	402
100 pct ".....	413
Reid vapor pressure, psi.....	11.26
FIA analysis, pct:	
Aromatics.....	9
Olefins.....	15
Paraffins.....	76
Sulfur, pct.....	0.016
Lead, grams per gallon.....	Trace
Hydrogen/carbon atomic ratio.....	2.038

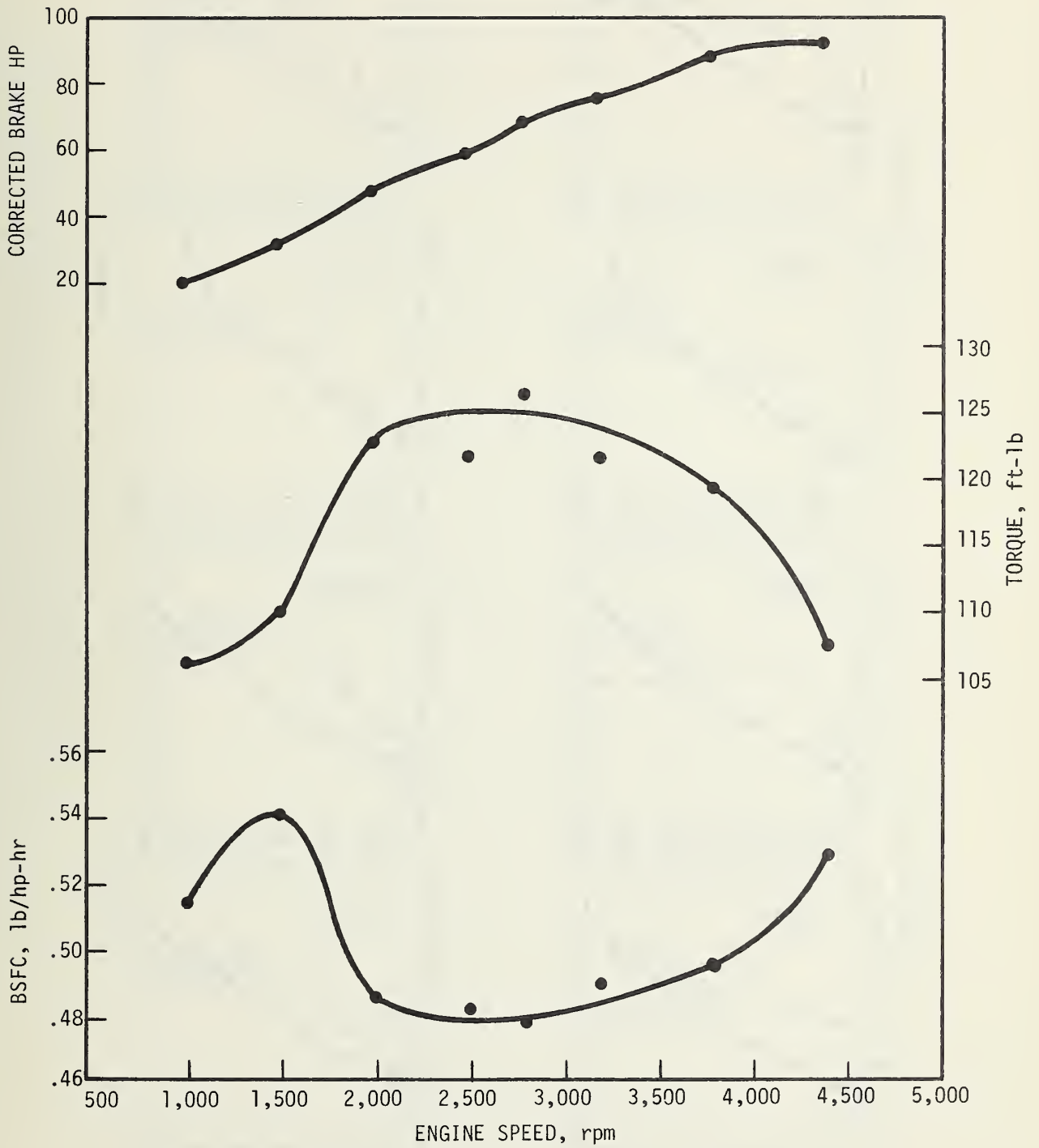


FIGURE 1. Brake Specific Fuel Consumption, Torque, and Brake Horsepower Versus Engine rpm at Wide-Open Throttle--Pontiac 151 CID Engine.

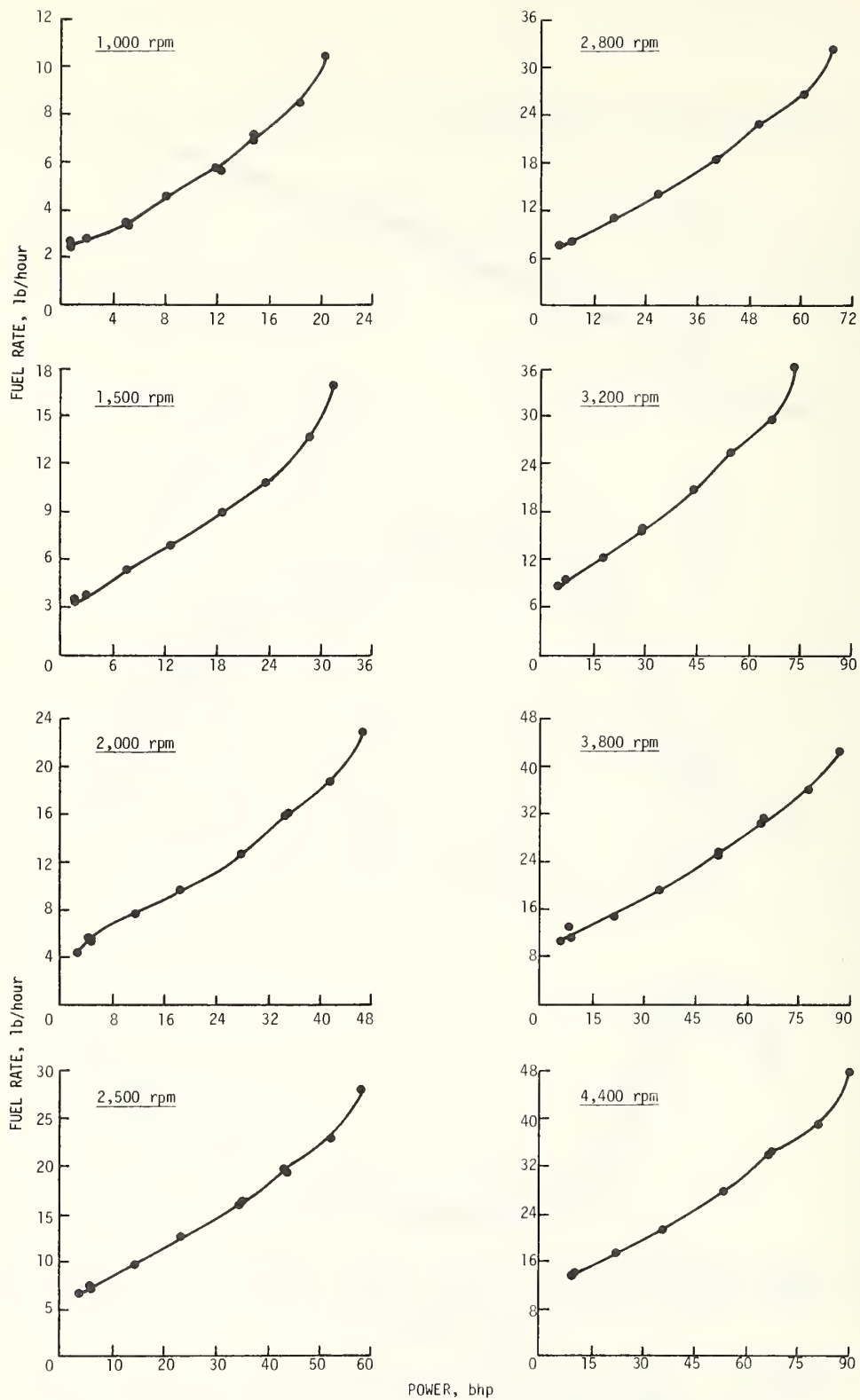


FIGURE 2. Fuel Rate Versus Power at Various Speed and Load Conditions--Pontiac 151 CID Engine.

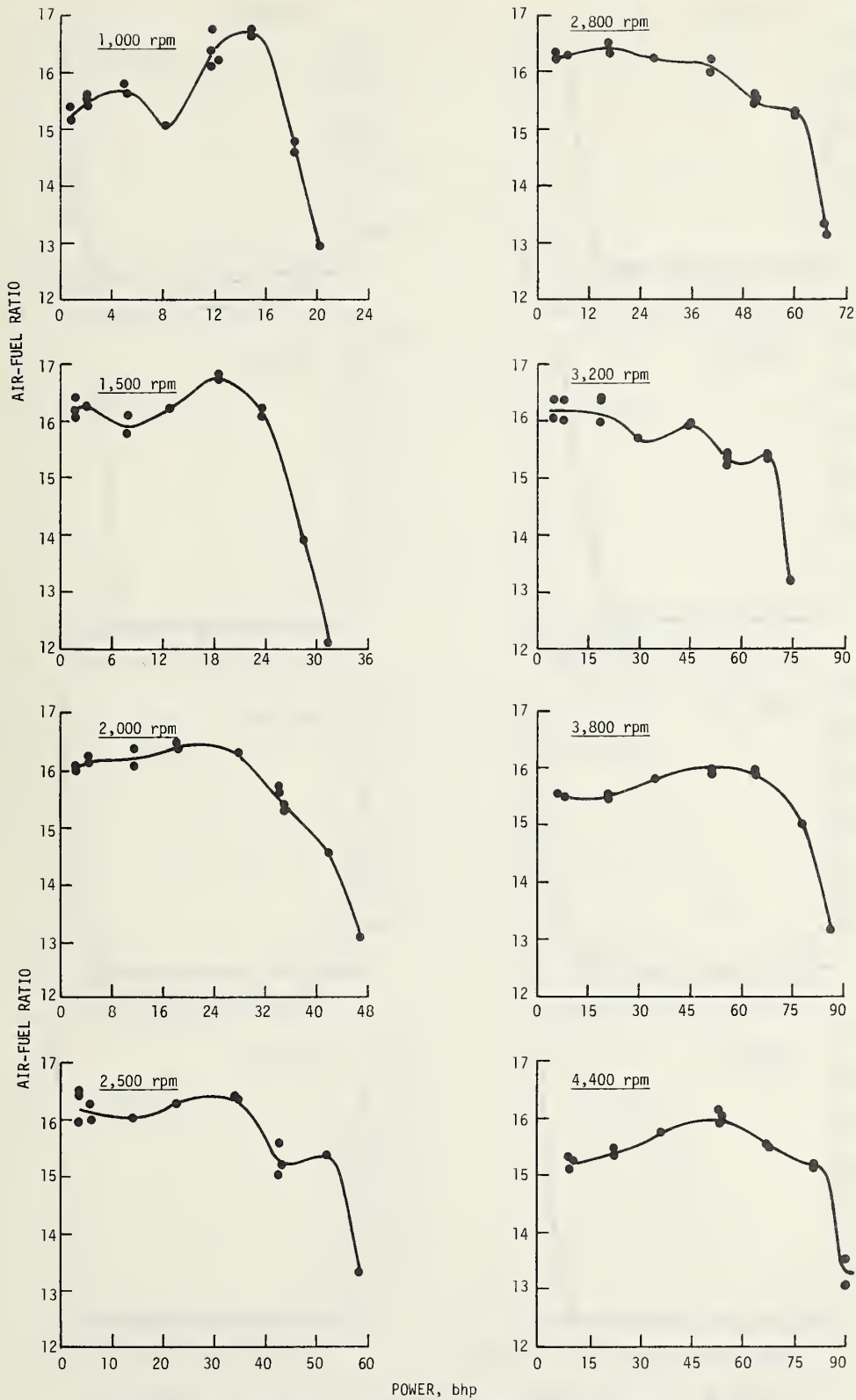


FIGURE 3. Air Fuel Ratio Versus Power at Various Speed and Load Conditions--Pontiac 151 CID Engine.

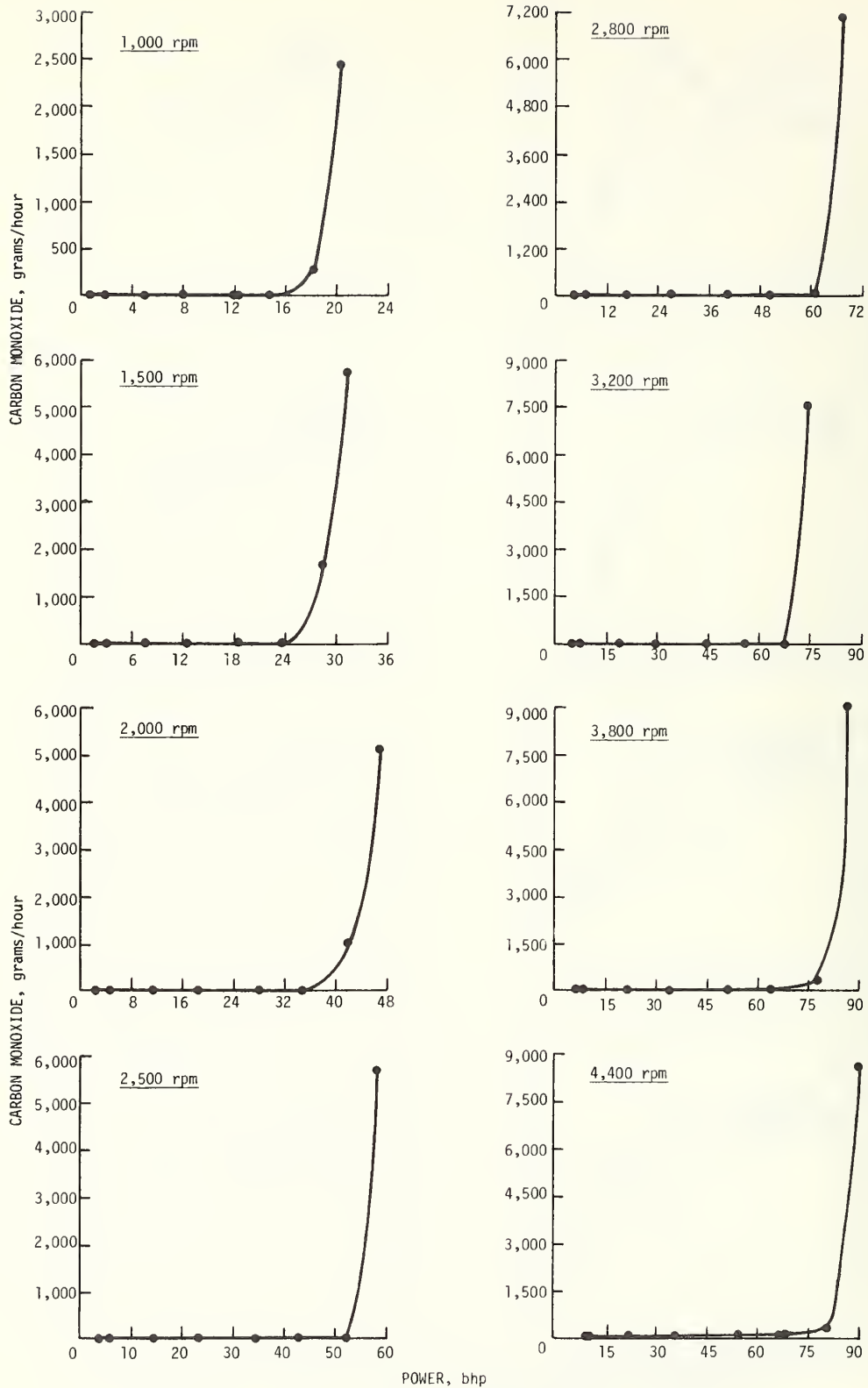


FIGURE 4. Carbon Monoxide Emissions Versus Power at Various Speed and Load Conditions-- Pontiac 151 CID Engine.

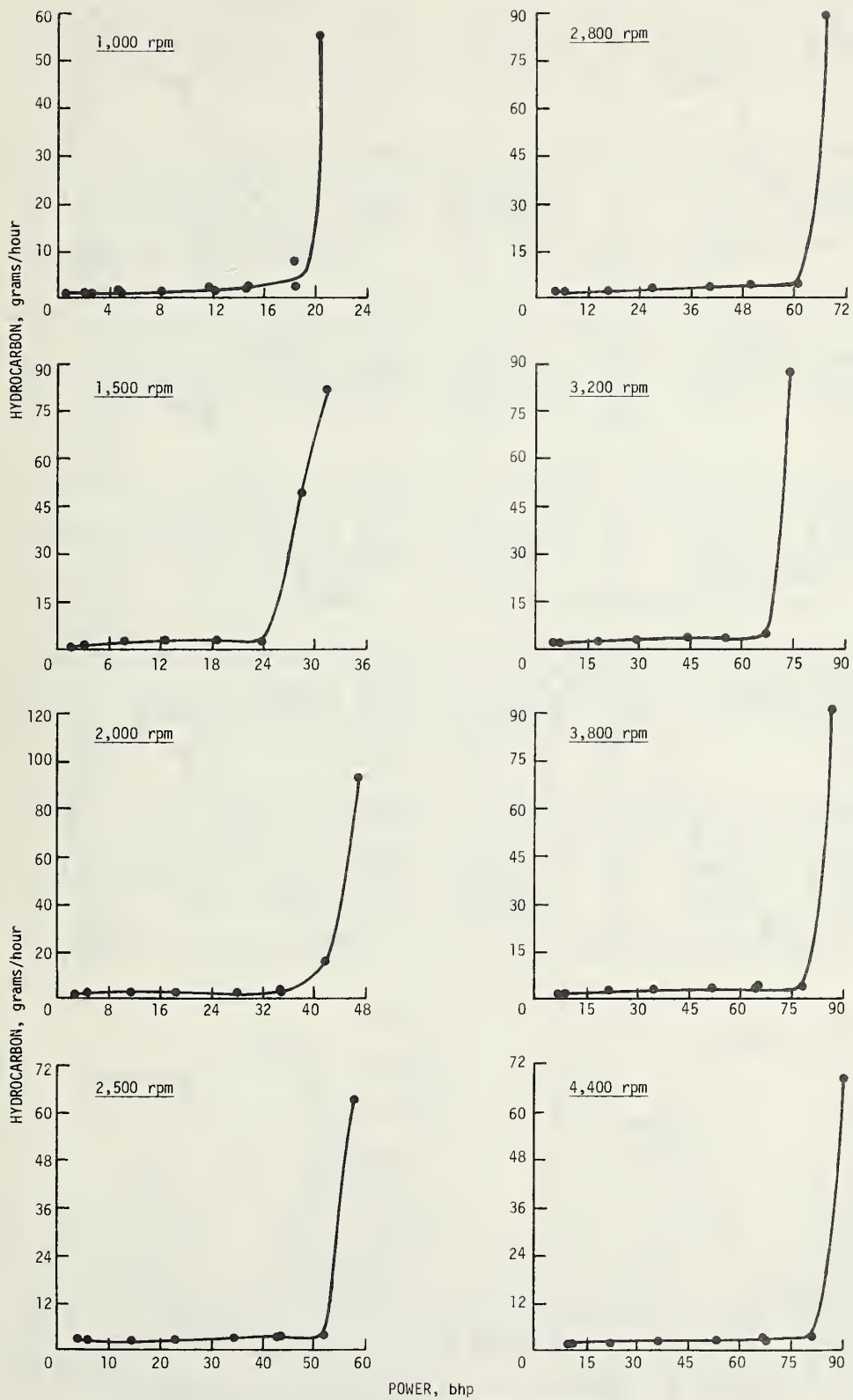


FIGURE 5. Hydrocarbon Emissions Versus Power at Various Speed and Load Conditions-- Pontiac 151 CID Engine.

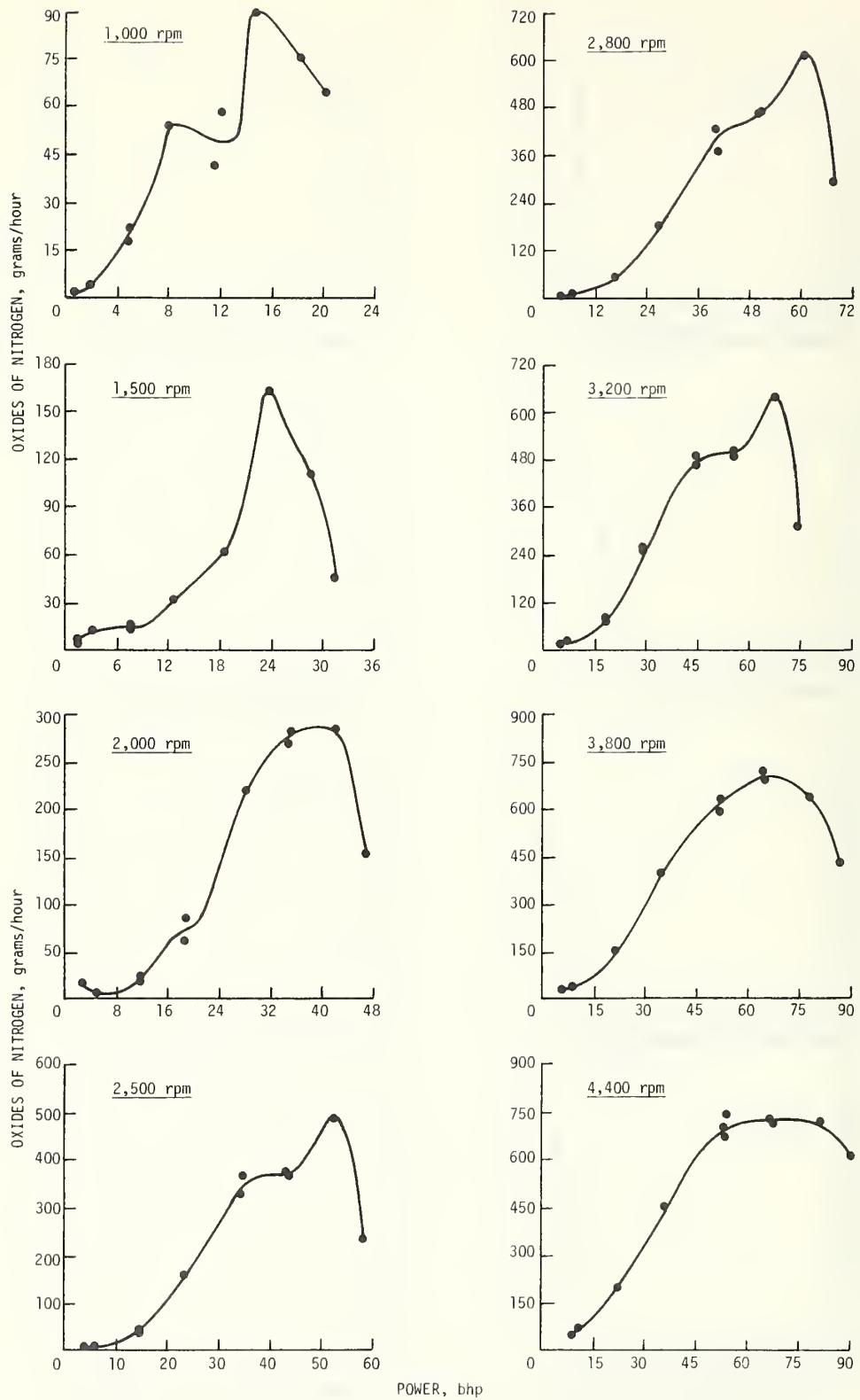


FIGURE 6. Oxides of Nitrogen Emissions Versus Power at Various Speed and Load Conditions--Pontiac 151 CID Engine.

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER 1 01

DATA SOURCE CODE 1

TEST DATE 1/24/78

BAROMETER, MMHG 740.5

HUMIDITY, GRAINS/LB 37

TEMPERATURE, F 84

ENGINE SPEED, RPM 650

TORQUE, FT-LB 3.2

POWER, BHP* .4

FUEL RATE, LB/HR 1.5

IGNITION TIMING, DEG BTDC 14.0

MANIFOLD VACUUM, IN HG 18.6

THROTTLE ANGLE, DEG .0

INTAKE MAN. TEMP., F 192

CONCENTRATIONS, DRY BASIS

CO, % .1515

CO2, % 13.75

O2, % 1.85

HC, PPMC 3417

NOX, PPM 65

AIR/FUEL RATIO 15.66

EMISSION RATES, G/HR

CO 14.6

HC 16.5

NOX+ .9

OIL TEMPERATURE, F 189

OIL PRESSURE, PSI 17

COOLANT TEMPERATURE, F 186

EXHAUST PRESSURE, IN. H2O 1.0

EXHAUST TEMPERATURE, F 589

	1.02	2.01	2.02	3.01	3.02
	1	1	2	1	2
TEST DATE	1/24/78	1/24/78	1/24/78	1/24/78	1/24/78
BAROMETER, MMHG	740.5	740.5	740.5	740.5	740.5
HUMIDITY, GRAINS/LB	37	37	37	37	37
TEMPERATURE, F	84	80	80	80	80
ENGINE SPEED, RPM	650	650	650	650	650
TORQUE, FT-LB	3.2	8.0	8.0	15.0	15.0
POWER, BHP*	.4	1.0	1.0	1.8	1.8
FUEL RATE, LB/HR	1.5	2.0	2.0	2.1	2.1
IGNITION TIMING, DEG BTDC	14.0	14.0	14.0	14.0	14.0
MANIFOLD VACUUM, IN HG	18.6	18.0	18.0	17.0	17.0
THROTTLE ANGLE, DEG	.0	.8	.8	1.2	1.2
INTAKE MAN. TEMP., F	192	161	161	152	152
CONCENTRATIONS, DRY BASIS					
CO, %	.0076	.2419	.0386	.4936	.5564
CO2, %	14.05	14.39	14.90	14.55	14.64
O2, %	1.23	.81	.27	.56	.34
HC, PPMC	244	3407	613	3664	3490
NOX, PPM	49	97	24	156	107
AIR/FUEL RATIO	15.64	14.90	14.91	14.61	14.46
EMISSION RATES, G/HR					
CO	.7	29.6	4.7	60.3	69.2
HC	1.1	20.9	3.8	22.5	21.8
NOX+	.6	1.7	.4	2.7	1.9
OIL TEMPERATURE, F	189	178	178	176	176
OIL PRESSURE, PSI	17	19	19	20	20
COOLANT TEMPERATURE, F	186	186	186	186	186
EXHAUST PRESSURE, IN. H2O	.0	1.0	.0	.0	.0
EXHAUST TEMPERATURE, F	590	542	541	543	482

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER

DATA SOURCE CODE

TEST DATE

BAROMETER, MMHG

HUMIDITY, GRAINS/LB

TEMPERATURE, F

ENGINE SPEED, RPM

TORQUE, FT-LB

POWER, BHP*

FUEL RATE, LB/HR

IGNITION TIMING, DEG BTDC

MANIFOLD VACUUM, IN HG

THROTTLE ANGLE, DEG

INTAKE MAN. TEMP., F

CONCENTRATIONS, DRY BASIS

CO, %

CO2, %

O2, %

HC, PPMC

NOX, PPM

AIR/FUEL RATIO

EMISSION RATES, G/HR

CO

HC

NOX+

OIL TEMPERATURE, F

OIL PRESSURE, PSI

COOLANT TEMPERATURE, F

EXHAUST PRESSURE, IN. H2O

EXHAUST TEMPERATURE, F

4.01	5.01	5.02	6.01	6.02
1	1	2	1	2
1/24/78	1/24/78	1/24/78	1/24/78	1/24/78
740.5	740.5	740.5	740.5	740.5
37	37	37	37	37
80	78	78	79	79
550	1000	1000	1000	1000
11.0	107.6	107.6	96.9	96.9
1.1	20.3	20.3	18.3	18.3
1.5	10.5	10.4	8.5	8.4
14.0	14.0	14.0	14.0	14.0
17.9	.1	.1	2.5	2.5
.0	76.0	76.0	25.0	25.0
149	126	126	158	158
.9985	4.3216	4.2441	.6261	.5880
14.18	12.17	12.04	14.27	14.49
.39	.21	.10	.45	.10
4689	2472	1919	1464	311
71	1065	807	2246	1075
14.19	12.96	12.94	14.76	14.62
87.6	2439.3	2428.4	321.1	294.4
20.7	70.1	55.2	37.7	7.8
.9	84.0	64.6	161.1	75.2
179	173	173	203	203
15	30	30	26	26
186	190	190	188	188
.0	5.0	1.0	2.0	.0
489	960	881	986	874

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER

DATA SOURCE CODE

TEST DATE

BAROMETER, MMHG

HUMIDITY, GRAINS/LB

TEMPERATURE, F

ENGINE SPEED, RPM

TORQUE, FT-LB

POWER, BHP*

FUEL RATE, LB/HR

IGNITION TIMING, DEG BTDC

MANIFOLD VACUUM, IN HG

THROTTLE ANGLE, DEG

INTAKE MAN. TEMP., F

CONCENTRATIONS, DRY BASIS

CO, %

CO2, %

O2, %

HC, PPMC

NOX, PPM

AIR/FUEL RATIO

EMISSION RATES, G/HR

CO

HC

NOX+

OIL TEMPERATURE, F

OIL PRESSURE, PSI

COOLANT TEMPERATURE, F

EXHAUST PRESSURE, IN. H2O

EXHAUST TEMPERATURE, F

	7.01	7.02	8.01	8.02	9.01	9.02
TEST NUMBER	1	2	1	2	1	2
DATA SOURCE CODE	2/ 2/78	2/ 2/78	1/24/78	1/24/78	1/24/78	1/24/78
TEST DATE	753.1	753.1	740.5	740.5	740.5	740.5
BAROMETER, MMHG	15	15	37	37	37	37
HUMIDITY, GRAINS/LB	63	63	82	82	83	83
TEMPERATURE, F	1000	1000	1000	1000	1000	1000
ENGINE SPEED, RPM	80.7	80.1	64.6	64.6	43.0	43.0
TORQUE, FT-LB	14.8	14.7	12.2	12.2	8.1	8.1
POWER, BHP*	.1	.1	5.7	5.7	4.6	4.6
FUEL RATE, LB/HR	21.0	21.0	29.0	29.0	35.0	35.0
IGNITION TIMING, DEG BTDC	4.0	4.0	5.5	5.5	12.5	12.5
MANIFOLD VACUUM, IN HG	19.0	19.0	14.0	14.0	8.5	8.5
THROTTLE ANGLE, DEG	132	132	173	173	172	172
INTAKE MAN. TEMP., F	0559	0008	0669	0076	0373	0360
CONCENTRATIONS, DRY BASIS	13.35	13.57	13.68	13.92	14.62	15.40
CO, %	2.58	2.42	2.15	1.94	.78	.33
CO2, %	1375	84	1719	89	1981	100
O2, %	1504	1508	1230	1121	2408	1426
HC, PPMC	16.56	16.61	16.16	16.20	15.04	15.04
NOX, PPM	.3	.0	24.9	2.8	102.8	9.7
AIR/FUEL RATIO	.3	.0	32.1	1.7	27.0	1.3
EMISSION RATES, G/HR	.9	.9	63.9	58.2	91.2	53.8
CO	196	196	203	203	202	202
HC	28	28	26	26	26	26
NOX+	191	191	190	190	191	191
OIL TEMPERATURE, F	3.0	.0	1.0	.0	1.0	.0
OIL PRESSURE, PSI	915	783	865	820	803	779

* CORRECTED SAE J8168

+ CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER 10.01 10.02 11.01 11.02 12.01 12.02

DATA SOURCE CODE 1 2 1 2 1 2

TEST DATE 1/24/78 1/24/78 1/24/78 1/24/78 1/24/78 1/24/78

BAROMETER, MMHG 740.5 740.5 740.5 740.5 740.5 740.5

HUMIDITY, GRAINS/LB 37 37 37 37 37 37

TEMPERATURE, F 83 83 83 83 83 83

ENGINE SPEED, RPM 1000 1000 1000 1000 1000 1000

TORQUE, FT-LB 26.9 26.9 10.8 10.8 4.2 4.2

POWER, BHP* 5.1 5.1 2.0 2.0 0.8 0.8

FUEL RATE, LB/HR 3.4 3.4 2.8 2.9 2.4 2.5

IGNITION TIMING, DEG BTDC 23.0 23.0 14.0 14.0 14.0 14.0

MANIFOLD VACUUM, IN HG 16.5 16.5 18.0 18.0 19.5 19.5

THROTTLE ANGLE, DEG 5.5 5.5 4.0 4.0 3.0 3.0

INTAKE MAN. TEMP., F 163 163 157 157 155 155

CONCENTRATIONS, DRY BASIS

CO, % .0079 .0079 .1483 .0074 .2662 .0074

CO2, % 14.24 14.24 13.80 14.12 14.08 14.68

O2, % 1.15 1.15 1.41 1.11 1.19 0.85

HC, PPMC 113 113 1320 109 1460 122

NOX, PPM 720 720 193 178 111 107

AIR/FUEL RATIO 15.61 15.61 15.59 15.57 15.35 15.37

EMISSION RATES, G/HR

CO 1.7 1.7 27.0 1.4 40.6 1.1

HC 1.2 1.2 12.1 1.0 11.2 0.9

NOX+ 22.0 22.0 4.9 4.6 2.4 2.3

OIL TEMPERATURE, F 199 199 196 196 193 193

OIL PRESSURE, PSI 26 26 28 28 28 28

COOLANT TEMPERATURE, F 191 191 191 191 186 186

EXHAUST PRESSURE, IN. H2O 0 0 0 0 0 0

EXHAUST TEMPERATURE, F 730 730 737 655 708 609

* CORRECTED SAE J8168

+ CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER

DATA SOURCE CODE

TEST DATE

BAROMETER, MMHG

HUMIDITY, GRAINS/LB

TEMPERATURE, F

ENGINE SPEED, RPM

TORQUE, FT-LB

POWER, BHP*

FUEL RATE, LB/HR

IGNITION TIMING, DEG BTDC

MANIFOLD VACUUM, IN HG

THROTTLE ANGLE, DEG

INTAKE MAN. TEMP., F

CONCENTRATIONS, DRY BASIS

CO, %

CO2, %

O2, %

HC, PPMC

NOX, PPM

AIR/FUEL RATIO

EMISSION RATES, G/HR

CO

HC

NOX+

OIL TEMPERATURE, F

OIL PRESSURE, PSI

COOLANT TEMPERATURE, F

EXHAUST PRESSURE, IN. H2O

EXHAUST TEMPERATURE, F

* CORRECTED SAE J8168

+ CORRECTED FOR HUMIDITY

13.01	13.02	14.01	14.02	15.01	15.02
1	2	1	2	1	2
1/25/78	1/25/78	1/24/78	1/24/78	1/25/78	1/25/78
740.3	740.3	740.5	740.5	740.3	740.3
25	25	37	37	25	25
74	74	83	83	77	77
1500	1500	1500	1500	1500	1500
113.0	113.0	101.1	101.1	84.7	84.7
31.5	31.5	28.6	28.6	23.6	23.6
17.0	17.1	13.7	13.7	10.9	10.8
17.0	17.0	17.0	17.0	21.0	21.0
.1	.1	2.5	2.5	3.2	3.2
76.0	76.0	33.0	33.0	28.5	28.0
129	132	162	162	158	158
6.4700	6.5100	2.1979	2.2364	.0920	.0080
11.06	10.90	13.94	14.30	13.38	13.74
.17	.08	.21	.10	2.03	1.68
2452	1855	1691	1332	884	67
567	405	1316	1072	1576	1729
12.13	12.07	13.92	13.88	16.20	16.07
5589.5	5701.6	1664.3	1656.6	66.6	5.7
106.4	81.6	64.3	49.6	32.1	2.4
65.3	47.2	139.3	111.0	152.2	163.2
197	197	244	244	220	220
30	30	30	30	30	30
191	191	188	188	191	191
15.0	2.0	12.0	.0	10.0	.0
1096	1031	1134	1046	1120	1027

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718	16.01	16.02	17.01	17.02	18.01	18.02
TEST NUMBER	1	2	1	2	1	2
DATA SOURCE CODE	1/27/78	1/27/78	1/25/78	1/25/78	1/25/78	1/25/78
TEST DATE	755.4	755.4	740.3	740.3	740.3	740.3
BAROMETER, MMHG	30	30	25	25	25	25
HUMIDITY, GRAINS/LB	67	67	81	81	85	85
TEMPERATURE, F	1500	1500	1500	1500	1500	1500
ENGINE SPEED, RPM	67.8	67.8	45.2	45.2	28.1	28.1
TORQUE, FT-LB	18.6	18.6	12.6	12.6	7.8	7.8
POWER, BHP*	1	1	6.9	6.9	5.4	5.4
FUEL RATE, LB/HR	26.0	26.0	37.0	37.0	37.0	37.0
IGNITION TIMING, DEG BTDC	5.5	5.5	9.0	9.0	14.0	14.0
MANIFOLD VACUUM, IN HG	21.0	21.0	14.5	14.5	10.0	10.0
THROTTLE ANGLE, DEG	147	147	192	192	191	191
INTAKE MAN. TEMP., F						
CONCENTRATIONS, DRY BASIS						
CO, %	.0697	.0075	.0684	.0076	.1631	.0076
CO2, %	12.39	12.75	13.18	13.46	13.35	13.70
O2, %	2.78	2.48	2.26	1.85	1.70	1.34
HC, PPMC	1434	92	2193	116	2197	133
NOX, PPM	693	724	512	526	375	346
AIR/FUEL RATIO	16.80	16.73	16.20	16.16	15.73	15.76
EMISSION RATES, G/HR						
CO	.5	.0	31.6	3.5	58.3	2.7
HC	.5	.0	50.8	2.7	39.5	2.4
NOX+	.6	.6	31.5	32.6	17.9	16.3
OIL TEMPERATURE, F	213	213	218	218	214	214
OIL PRESSURE, PSI	30	30	30	30	30	30
COOLANT TEMPERATURE, F	191	191	192	192	191	191
EXHAUST PRESSURE, IN. H2O	9.0	.0	2.0	.0	1.0	.0
EXHAUST TEMPERATURE, F	1068	1031	962	942	918	874

* CORRECTED SAE J816B
 + CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-C1D

FUEL CODE: 7718

TEST NUMBER

DATA SOURCE CODE

TEST DATE

BAROMETER, MMHG

HUMIDITY, GRAINS/LB

TEMPERATURE, F

ENGINE SPEED, RPM

TORQUE, FT-LB

POWER, BHP*

FUEL RATE, LB/HR

IGNITION TIMING, DEG BTDC

MANIFOLD VACUUM, IN HG

THROTTLE ANGLE, DEG

INTAKE MAN. TEMP., F

CONCENTRATIONS, DRY BASIS

CO, %

CO2, %

O2, %

HC, PPM

NOX, PPM

AIR:FUEL RATIO

EMISSION RATES, G/HR

CO

HC

NOX+

OIL TEMPERATURE, F

OIL PRESSURE, PSI

COOLANT TEMPERATURE, F

EXHAUST PRESSURE, IN. H2O

EXHAUST TEMPERATURE, F

	19.01	19.02	20.01	20.02	21.01	21.02
TEST NUMBER	1	2	1	2	1	2
DATA SOURCE CODE	1	2	1	2	1	2
TEST DATE	1/27/78	1/27/78	1/25/78	1/25/78	1/25/78	1/25/78
BAROMETER, MMHG	755.4	755.4	740.3	740.3	740.3	740.3
HUMIDITY, GRAINS/LB	30	30	25	25	25	25
TEMPERATURE, F	56	56	83	83	72	72
ENGINE SPEED, RPM	1500	1500	1500	1500	2000	2000
TORQUE, FT-LB	11.3	11.3	5.8	5.8	126.0	126.0
POWER, BHP*	3.1	3.1	1.6	1.6	46.8	46.8
FUEL RATE, LB/HR	0	0	3.3	3.4	22.8	22.7
IGNITION TIMING, DEG BTDC	37.0	37.0	28.0	28.0	20.0	20.0
MANIFOLD VACUUM, IN HG	20.0	20.0	20.5	20.5	5	5
THROTTLE ANGLE, DEG	5.5	5.5	5.2	5.2	76.0	76.0
INTAKE MAN. TEMP., F	143	143	155	155	113	113
CONCENTRATIONS, DRY BASIS						
CO, %	1675	0075	1755	0075	4.0996	4.1773
CO2, %	13.82	13.37	12.60	12.30	12.38	12.43
O2, %	2.25	1.94	2.30	2.07	.23	.13
HC, PPM	1594	92	1143	92	2032	1501
NOX, PPM	396	372	283	277	1181	947
AIR:FUEL RATIO	14.24	16.23	16.35	16.38	13.10	13.06
EMISSION RATES, G/HR						
CO	.4	.0	41.0	1.8	5056.0	5105.1
HC	.2	.0	13.4	1.1	129.6	92.1
NOX+	.1	.1	8.8	8.3	194.1	154.3
OIL TEMPERATURE, F	206	206	204	204	208	208
OIL PRESSURE, PSI	30	30	30	30	32	32
COOLANT TEMPERATURE, F	191	191	190	190	191	191
EXHAUST PRESSURE, IN. H2O	1.0	.0	.0	.0	32.0	6.0
EXHAUST TEMPERATURE, F	845	820	824	727	1239	1165

* CORRECTED SAE J8168

+ CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID	22.01	22.02	23.01	23.02	24.01	24.02
FUEL CODE: 7718	1	2	1	2	1	2
TEST NUMBER	1	2	1	2	1	2
DATA SOURCE CODE	1	2	1	2	1	2
TEST DATE	1/25/78	1/25/78	1/25/78	1/25/78	1/25/78	1/25/78
BAROMETER, MMHG	740.3	740.3	740.3	740.3	740.3	740.3
HUMIDITY, GRAINS/LB	25	25	25	25	25	25
TEMPERATURE, F	78	78	79	79	81	81
ENGINE SPEED, RPM	2000	2000	2000	2000	2000	2000
TORQUE, FT-LB	113.0	113.0	94.5	94.5	75.6	75.6
POWER, BHP*	41.9	41.9	35.1	35.1	28.1	28.1
FUEL RATE, LB/HR	18.8	18.7	15.8	15.9	12.6	12.7
IGNITION TIMING, DEG BTDC	20.0	20.0	22.0	22.0	31.0	31.0
MANIFOLD VACUUM, IN HG	2.0	2.0	3.0	3.0	5.5	5.5
THROTTLE ANGLE, DEG	47.0	47.0	36.0	36.0	28.0	28.0
INTAKE MAN. TEMP., F	150	150	168	168	188	188
CONCENTRATIONS, DRY BASIS						
CO, %	1.0937	.9557	1.200	.0093	.0657	.0076
CO2, %	14.42	14.69	14.67	15.15	13.33	13.62
O2, %	.44	.19	1.04	.66	2.14	1.98
HC, PPMC	1463	291	996	56	847	51
NOX, PPM	2415	1965	2276	2214	1867	1921
AIR/FUEL RATIO	14.56	14.56	15.42	15.30	16.32	16.30
EMISSION RATES, G/HR						
CO	1186.3	1027.3	115.4	8.8	55.7	6.4
HC	79.7	15.7	48.1	2.7	36.0	2.2
NOX+	349.3	281.7	291.7	279.5	210.8	216.4
OIL TEMPERATURE, F	232	232	238	238	247	247
OIL PRESSURE, PSI	31	31	30	30	30	30
COOLANT TEMPERATURE, F	193	193	193	193	190	190
EXHAUST PRESSURE, IN. H2O	21.0	2.0	20.0	.0	14.0	.0
EXHAUST TEMPERATURE, F	1279	1209	1265	1225	1174	1143

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER 1

DATA SOURCE CODE 1

TEST DATE 1/25/78

BAROMETER, MMHG 740.3

HUMIDITY, GRAINS/LB 25

TEMPERATURE, F 83

ENGINE SPEED, RPM 2000

TORQUE, FT-LB 50.4

POWER, BHP* 18.7

FUEL RATE, LB/HR 9.6

IGNITION TIMING, DEG BTDC 40.0

MANIFOLD VACUUM, IN HG 9.5

THROTTLE ANGLE, DEG 19.5

INTAKE MAN. TEMP., F 193

CONCENTRATIONS, DRY BASIS

CO, % .0801

CO2, % 13.16

O2, % 2.31

HC, PPMC 1346

NOX, PPM 964

AIR/FUEL RATIO 16.36

EMISSION RATES, G/HR

CO 52.0

HC 43.9

NOX+ 83.5

OIL TEMPERATURE, F 231

OIL PRESSURE, PSI 30

COOLANT TEMPERATURE, F 188

EXHAUST PRESSURE, IN. H2O 4.0

EXHAUST TEMPERATURE, F 1086

25.01

1

1/25/78

740.3

25

83

2000

50.4

18.7

9.6

40.0

9.5

19.5

193

.0801

13.16

2.31

1346

964

16.36

25.02

2

1/25/78

740.3

25

83

2000

50.4

18.7

9.6

40.0

9.5

19.5

193

.0075

13.37

2.14

68

964

16.40

26.01

1

1/25/78

740.3

25

85

2000

31.5

11.7

7.8

40.0

12.5

14.5

194

.1620

13.56

2.19

1871

363

16.09

26.02

2

1/25/78

740.3

25

85

2000

31.5

11.7

7.8

40.0

12.5

14.5

194

.0078

13.94

1.81

103

404

16.08

27.01

1

1/27/78

755.4

18

65

2000

12.6

4.6

5.8

40.0

17.0

10.0

162

.2158

12.66

2.46

2469

122

16.27

27.02

2

1/27/78

755.4

18

65

2000

12.6

4.6

5.8

40.0

17.0

10.0

162

.0074

13.21

1.93

133

141

16.23

85.4

49.1

6.3

221

32

190

1.0

1034

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER

DATA SOURCE CODE

TEST DATE

BAROMETER, MMHG

HUMIDITY, GRAINS/LB

TEMPERATURE, F

ENGINE SPEED, RPM

TORQUE, FT-LB

POWER, BHP*

FUEL RATE, LB/HR

IGNITION TIMING, DEG BTDC

MANIFOLD VACUUM, IN HG

THROTTLE ANGLE, DEG

INTAKE MAN. TEMP., F

CONCENTRATIONS, DRY BASIS

CO, %

CO2, %

O2, %

HC, PPMC

NOX, PPM

AIR/FUEL RATIO

EMISSION RATES, G/HR

CO

HC

NOX+

OIL TEMPERATURE, F

OIL PRESSURE, PSI

COOLANT TEMPERATURE, F

EXHAUST PRESSURE, IN. H2O

EXHAUST TEMPERATURE, F

* CORRECTED SAE J8168

+ CORRECTED FOR HUMIDITY

	28.01	28.02	29.01	29.02	30.01	30.02
TEST NUMBER	1	2	1	2	1	2
DATA SOURCE CODE	1/27/78	1/27/78	1/25/78	1/25/78	1/25/78	1/25/78
TEST DATE	755.4	755.4	740.3	740.3	740.3	740.3
BAROMETER, MMHG	18	18	25	25	25	25
HUMIDITY, GRAINS/LB	64	64	73	73	77	77
TEMPERATURE, F	2000	2000	2500	2500	2500	2500
ENGINE SPEED, RPM	7.0	7.0	125.0	125.0	112.5	112.5
TORQUE, FT-LB	2.6	2.6	58.0	58.0	52.2	52.2
POWER, BHP*	4.2	4.4	28.0	27.9	22.9	22.9
FUEL RATE, LB/HR	40.0	40.0	23.0	23.0	23.0	23.0
IGNITION TIMING, DEG BTDC	21.0	21.0	.6	.6	1.5	1.5
MANIFOLD VACUUM, IN HG	7.0	7.0	76.0	76.0	57.0	57.0
THROTTLE ANGLE, DEG	153	153	120	120	152	152
INTAKE MAN. TEMP., F						
CONCENTRATIONS, DRY BASIS						
CO, %	.2214	.0075	3.7075	3.7520	.3432	.0406
CO2, %	12.93	13.10	12.68	12.87	14.55	15.26
O2, %	1.89	1.65	.28	.12	1.09	.74
HC, PPMC	1062	87	1892	830	882	54
NOX, PPM	394	409	1558	1155	2905	2695
AIR/FUEL RATIO	16.00	16.05	13.32	13.30	15.38	15.35
EMISSION RATES, G/HR						
CO	63.7	2.3	5652.4	5651.5	474.2	54.9
HC	15.3	1.3	144.9	62.8	61.2	3.6
NOX+	14.7	16.1	316.6	231.9	535.1	485.7
OIL TEMPERATURE, F	216	216	223	223	246	246
OIL PRESSURE, PSI	32	32	35	35	33	33
COOLANT TEMPERATURE, F	190	190	188	188	188	188
EXHAUST PRESSURE, IN. H2O	1.0	.0	50.0	11.0	42.0	8.0
EXHAUST TEMPERATURE, F	936	922	1331	1274	1379	1355

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER

DATA SOURCE CODE

TEST DATE

BAROMETER, MMHG

HUMIDITY, GRAINS/LB

TEMPERATURE, F

ENGINE SPEED, RPM

TORQUE, FT-LB

POWER, BHP*

FUEL RATE, LB/HR

IGNITION TIMING, DEG BTDC

MANIFOLD VACUUM, IN HG

THROTTLE ANGLE, DEG

INTAKE MAN. TEMP., F

CONCENTRATIONS, DRY BASIS

CO, %

CO2, %

O2, %

HC, PPM

NOX, PPM

AIR/FUEL RATIO

EMISSION RATES, G/HR

CO

HC

NOX+

OIL TEMPERATURE, F

OIL PRESSURE, PSI

COOLANT TEMPERATURE, F

EXHAUST PRESSURE, IN. H2O

EXHAUST TEMPERATURE, F

31.01	31.02	32.01	32.02	33.01	33.02
1	2	1	2	1	2
1/25/78	1/25/78	1/25/78	1/25/78	1/25/78	1/25/78
740.3	740.3	740.3	740.3	745.0	745.0
25	25	25	25	25	25
82	82	82	82	76	76
2500	2500	2500	2500	2500	2500
93.8	93.8	75.0	75.0	50.0	50.0
43.5	43.5	34.8	34.8	23.1	23.1
19.4	19.4	16.0	16.1	12.4	12.4
26.0	26.0	35.0	35.0	42.0	42.0
3.5	3.5	5.5	5.5	10.5	10.5
39.5	39.5	32.5	32.5	23.0	23.0
168	168	180	180	137	137
.1941	.0152	.0744	.0076	.0928	.0076
14.28	14.34	12.91	13.04	13.73	13.97
.74	.41	2.04	1.92	2.31	2.00
965	49	733	48	1305	60
2435	2243	2508	2463	1341	1455
15.21	15.16	16.32	16.34	16.30	16.26
233.2	18.6	82.1	8.4	74.3	6.1
58.2	3.0	40.6	2.7	52.5	2.4
389.9	365.3	369.0	365.1	143.1	154.8
250	250	244	244	205	205
32	32	32	32	32	32
193	193	191	191	190	190
30.0	3.0	20.0	1.0	9.0	1.0
1333	1316	1240	1199	1144	1012

* CORRECTED SAE J8168

+ CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER

DATA SOURCE CODE

TEST DATE

BAROMETER, MMHG

HUMIDITY, GRAINS/LB

TEMPERATURE, F

ENGINE SPEED, RPM

TORQUE, FT-LB

POWER, BHP*

FUEL RATE, LB/HR

IGNITION TIMING, DEG BTDC

MANIFOLD VACUUM, IN HG

THROTTLE ANGLE, DEG

INTAKE MAN. TEMP., F

CONCENTRATIONS, DRY BASIS

CO, %

CO2, %

O2, %

HC, PPM

NOX, PPM

AIR/FUEL RATIO

EMISSION RATES, G/HR

CO

HC

NOX+

OIL TEMPERATURE, F

OIL PRESSURE, PSI

COOLANT TEMPERATURE, F

EXHAUST PRESSURE, IN. H2O

EXHAUST TEMPERATURE, F

* CORRECTED SAE J8168

+ CORRECTED FOR HUMIDITY

34.01	34.02	35.01	35.02	36.01	36.02
1	2	1	2	1	2
1/25/78	1/25/78	1/25/78	1/25/78	1/25/78	1/25/78
745.0	745.0	745.0	745.0	745.0	745.0
25	25	25	25	25	25
80	80	84	84	85	85
2500	2500	2500	2500	2500	2500
31.3	31.3	12.5	12.5	8.2	8.2
14.4	14.4	5.8	5.8	3.8	3.8
9.7	9.6	6.9	7.0	6.6	6.5
42.0	42.0	32.0	32.0	32.0	32.0
13.0	13.0	16.5	16.5	17.2	17.2
17.5	17.5	13.0	13.0	12.0	12.0
173	173	185	185	191	191
.1409	.0076	.2278	.0076	.2622	.0076
13.86	14.35	13.71	14.02	13.57	14.11
2.08	1.77	2.17	1.65	2.18	1.60
1391	67	1977	95	2409	94
531	582	177	189	133	150
16.06	16.03	16.01	15.96	15.96	15.92
87.5	4.6	101.0	3.4	111.0	3.1
43.4	2.0	44.0	2.2	51.2	2.0
43.9	46.8	10.5	11.4	7.5	8.3
227	227	226	226	223	223
32	32	32	32	32	32
190	190	190	190	190	190
4.0	.0	3.0	.0	2.0	.0
1134	1072	1093	1034	1083	1013

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER

DATA SOURCE CODE

TEST DATE

BAROMETER, MMHG

HUMIDITY, GRAINS/LB

TEMPERATURE, F

ENGINE SPEED, RPM

TORQUE, FT-LB

POWER, BHP*

FUEL RATE, LB/HR

IGNITION TIMING, DEG BTDC

MANIFOLD VACUUM, IN HG

THROTTLE ANGLE, DEG

INTAKE MAN. TEMP., F

CONCENTRATIONS, DRY BASIS

CO, %

CO2, %

O2, %

HC, PPMC

NOX, PPM

AIR/FUEL RATIO

EMISSION RATES, G/HR

CO

HC

NOX+

OIL TEMPERATURE, F

OIL PRESSURE, PSI

COOLANT TEMPERATURE, F

EXHAUST PRESSURE, IN. H2O

EXHAUST TEMPERATURE, F

* CORRECTED SAE J8168

+ CORRECTED FOR HUMIDITY

37.01	37.02	38.01	38.02	39.01	39.02
1	2	1	2	1	2
1/25/78	1/25/78	1/25/78	1/25/78	1/25/78	1/25/78
745.0	745.0	745.0	745.0	745.0	745.0
25	25	25	25	25	25
60	60	62	62	65	65
2800	2800	2800	2800	2800	2800
130.6	130.6	117.5	117.5	97.9	97.9
67.4	67.4	60.7	60.7	50.6	50.6
32.2	32.2	26.5	26.5	22.8	22.9
25.0	25.0	25.0	25.0	25.0	25.0
1.0	1.0	2.0	2.0	3.5	3.5
76.0	76.0	61.0	61.0	46.0	46.0
92	92	126	126	134	134
3.5588	3.8939	4.159	4.233	4.134	4.0078
12.28	12.11	14.05	14.68	14.48	14.52
.25	.10	.87	.63	1.09	1.06
1929	968	982	53	712	56
1794	1240	2930	2852	2468	2471
13.32	13.15	15.21	15.31	15.50	15.60
6448.7	7041.6	683.2	37.9	159.4	11.1
175.5	87.9	81.0	4.4	50.3	4.0
432.9	298.5	640.9	617.6	462.0	467.7
222	222	251	251	249	249
35	35	35	33	35	35
188	188	194	194	188	188
63.0	18.0	60.0	13.0	36.0	8.0
1355	1277	1418	1397	1375	1334

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER

DATA SOURCE CODE

TEST DATE

BAROMETER, MMHG

HUMIDITY, GRAINS/LB

TEMPERATURE, F

ENGINE SPEED, RPM

TORQUE, FT-LB

POWER, BHP*

FUEL RATE, LB/HR

IGNITION TIMING, DEG BTDC

MANIFOLD VACUUM, IN HG

THROTTLE ANGLE, DEG

INTAKE MAN. TEMP., F

CONCENTRATIONS, DRY BASIS

CO, %

CO2, %

O2, %

HC, PPMC

NOX, PPM

AIR/FUEL RATIO

EMISSION RATES, G/HR

CO

HC

NOX+

OIL TEMPERATURE, F

OIL PRESSURE, PSI

COOLANT TEMPERATURE, F

EXHAUST PRESSURE, IN. H2O

EXHAUST TEMPERATURE, F

40.01	40.02	41.01	41.02	42.01	42.02
1	2	1	2	1	2
1/25/78	1/25/78	1/25/78	1/25/78	1/25/78	1/25/78
745.0	745.0	745.0	745.0	745.0	745.0
25	25	25	25	25	25
65	65	64	64	63	63
2800	2800	2800	2800	2800	2800
78.4	78.4	52.2	52.2	32.7	32.7
40.5	40.5	27.0	27.0	16.9	16.9
18.5	18.4	14.1	14.0	11.2	11.2
40.0	40.0	35.0	35.0	45.0	45.0
6.0	6.0	10.5	10.5	13.0	13.0
34.0	34.0	25.0	25.0	19.0	19.0
145	145	143	143	139	139
.0757	.0077	.0932	.0076	.1306	.0075
14.04	14.29	13.86	13.91	13.69	13.90
2.03	1.86	2.13	1.90	2.35	2.11
658	55	1042	61	1090	67
2395	2415	1480	1522	596	569
16.20	16.17	16.20	16.19	16.31	16.31
89.4	9.0	84.4	6.9	94.9	5.5
39.0	3.2	47.4	2.8	39.8	2.4
376.5	374.1	178.6	184.7	57.6	55.1
236	236	222	227	220	220
35	35	35	35	35	35
190	190	191	191	191	191
30.0	4.0	15.0	.0	6.0	.0
1260	1220	1184	1126	1150	1049

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER	43.01	43.02	44.01	44.02	45.01	45.02
DATA SOURCE CODE	1	2	1	2	1	2
TEST DATE	1/25/78	1/25/78	1/25/78	1/25/78	1/26/78	1/26/78
BAROMETER, MMHG	745.0	745.0	745.0	745.0	749.4	749.4
HUMIDITY, GRAINS/LB	25	25	25	25	21	21
TEMPERATURE, F	63	63	63	63	74	74
ENGINE SPEED, RPM	2800	2800	2800	2800	3200	3200
TORQUE, FT-LB	13.1	13.1	8.3	8.3	124.8	124.8
POWER, BHP*	6.8	6.8	4.3	4.3	74.1	74.1
FUEL RATE, LB/HR	8.4	8.3	7.8	7.8	36.3	36.2
IGNITION TIMING, DEG BTDC	45.0	45.0	45.0	45.0	27.0	27.0
MANIFOLD VACUUM, IN HG	16.9	16.9	17.9	17.9	1.0	1.0
THROTTLE ANGLE, DEG	15.0	15.0	13.8	13.8	76.0	76.0
INTAKE MAN. TEMP., F	141	141	145	145	117	117
CONCENTRATIONS, DRY BASIS						
CO, %	.2157	.0075	.2414	.0074	3.8405	3.8299
CO2, %	13.36	13.86	13.18	13.43	12.47	12.63
O2, %	2.38	2.05	2.39	2.09	.17	.06
HC, PPMC	1296	76	2064	81	1763	875
NOX, PPM	174	207	135	155	1576	1219
AIR/FUEL RATIO	16.28	16.26	16.20	16.33	13.20	13.21
EMISSION RATES, G/HR						
CO	119.4	4.1	124.6	3.9	7637.5	7575.1
HC	36.1	2.1	53.5	2.1	176.1	86.9
NOX+	12.8	15.0	9.3	10.8	411.0	316.2
OIL TEMPERATURE, F	213	213	210	210	243	243
OIL PRESSURE, PSI	35	35	39	39	35	35
COOLANT TEMPERATURE, F	191	191	190	190	192	192
EXHAUST PRESSURE, IN. H2O	4.0	.0	2.0	.0	79.0	39.0
EXHAUST TEMPERATURE, F	1127	1020	1116	1000	1383	1317

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER

DATA SOURCE CODE

TEST DATE

BAROMETER, MMHG

HUMIDITY, GRAINS/LB

TEMPERATURE, F

ENGINE SPEED, RPM

TORQUE, FT-LB

POWER, BHP*

FUEL RATE, LB/HR

IGNITION TIMING, DEG BTDC

MANIFOLD VACUUM, IN HG

THROTTLE ANGLE, DEG

INTAKE MAN. TEMP., F

CONCENTRATIONS, DRY BASIS

CO, %

CO2, %

O2, %

HC, PPM

NOX, PPM

AIR/FUEL RATIO

EMISSION RATES, G/HR

CO

HC

NOX+

OIL TEMPERATURE, F

OIL PRESSURE, PSI

COOLANT TEMPERATURE, F

EXHAUST PRESSURE, IN. H2O

EXHAUST TEMPERATURE, F

* CORRECTED SAE J8168

+ CORRECTED FOR HUMIDITY

46.01	47.01	46.02	47.01	47.02	48.01	48.02
1	1	2	1	2	1	2
1/26/78	1/26/78	1/26/78	1/26/78	1/26/78	1/26/78	1/26/78
749.4	749.4	749.4	749.4	749.4	749.4	749.4
21	21	21	21	21	21	21
75	73	75	73	73	72	72
3200	3200	3200	3200	3200	3200	3200
113.3	93.6	113.3	93.6	93.6	74.9	74.9
67.2	55.5	67.2	55.5	55.5	44.5	44.5
29.6	25.7	29.5	25.7	25.7	20.9	20.9
27.0	30.0	27.0	30.0	30.0	44.0	44.0
2.0	4.0	2.0	4.0	4.0	6.4	6.4
63.0	48.0	63.0	48.0	48.0	35.5	35.5
130	137	130	137	137	147	147
3607	.1135	.0223	.1135	.0079	.0745	.0078
14.47	14.58	14.81	14.58	14.89	13.93	14.01
.97	1.03	.79	1.03	.77	1.63	1.48
790	725	50	725	49	707	52
2742	2430	2717	2430	2456	2755	2780
15.31	15.45	15.41	15.45	15.39	15.93	15.94
646.7	178.7	40.0	178.7	12.2	99.8	10.4
71.1	57.3	4.5	57.3	3.8	47.6	3.5
644.7	501.7	640.6	501.7	501.3	484.1	490.3
251	248	251	248	248	244	244
35	35	35	35	35	35	35
191	194	191	194	194	191	191
73.0	54.0	30.0	54.0	18.0	37.0	9.0
1445	1397	1407	1397	1341	1291	1251

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER

DATA SOURCE CODE

TEST DATE

BAROMETER, MMHG

HUMIDITY, GRAINS/LB

TEMPERATURE, F

ENGINE SPEED, RPM

TORQUE, FT-LB

POWER, BHP*

FUEL RATE, LB/HR

IGNITION TIMING, DEG BTDC

MANIFOLD VACUUM, IN HG

THROTTLE ANGLE, DEG

INTAKE MAN. TEMP., F

CONCENTRATIONS, DRY BASIS

CO, %

CO2, %

O2, %

HC, PPMC

NOX, PPM

AIR/FUEL RATIO

EMISSION RATES, G/HR

CO

HC

NOX+

OIL TEMPERATURE, F

OIL PRESSURE, PSI

COOLANT TEMPERATURE, F

EXHAUST PRESSURE, IN. H2O

EXHAUST TEMPERATURE, F

49.01	49.02	50.01	50.02	51.01	51.02
1	2	1	2	1	2
1/26/78	1/26/78	1/26/78	1/26/78	1/26/78	1/26/78
749.4	749.4	749.4	749.4	749.4	749.4
21	21	21	21	21	21
71	71	71	71	70	70
3200	3200	3200	3200	3200	3200
49.9	49.9	31.2	31.2	12.5	12.5
29.6	29.6	18.5	18.5	7.4	7.4
16.1	16.1	12.6	12.6	9.8	9.8
47.0	47.0	47.0	47.0	47.0	47.0
11.5	11.5	14.0	14.0	16.8	16.8
26.0	26.0	21.0	21.0	17.0	17.0
145	145	142	142	141	141
.0988	.0076	.1409	.0075	.1907	.0075
13.89	14.05	13.00	12.83	12.64	12.87
1.32	1.13	2.18	2.00	2.21	2.03
1102	59	787	52	713	54
1924	1920	670	698	245	258
15.64	15.66	16.29	16.36	16.32	16.36
102.0	7.9	121.4	6.6	130.4	5.1
57.1	3.1	34.1	2.3	24.5	1.9
260.5	259.8	75.7	80.7	22.0	23.1
238	238	231	231	224	224
35	35	35	35	35	35
192	192	191	191	191	191
21.0	2.0	12.0	.0	7.0	.0
1246	1163	1191	1113	1175	1062

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER 52.01 1

DATA SOURCE CODE 2

TEST DATE 1/26/78

BAROMETER, MMHG 749.4

HUMIDITY, GRAINS/LB 21

TEMPERATURE, F 69

ENGINE SPEED, RPM 3200

TORQUE, FT-LB 8.2

POWER, BHP* 4.9

FUEL RATE, LB/HR 9.0

IGNITION TIMING, DEG BTDC 47.0

MANIFOLD VACUUM, IN HG 17.5

THROTTLE ANGLE, DEG 15.0

INTAKE MAN. TEMP., F 143

CONCENTRATIONS, DRY BASIS

CO, % .2164

CO2, % 12.59

O2, % 2.30

HC, PPM 967

NOX, PPM 178

AIR/FUEL RATIO 16.35

EMISSION RATES, G/HR

CO 136.2

HC 30.6

NOX+ 14.7

OIL TEMPERATURE, F 220

OIL PRESSURE, PSI 35

COOLANT TEMPERATURE, F 190

EXHAUST PRESSURE, IN. H2O 4.0

EXHAUST TEMPERATURE, F 1165

* CORRECTED SAE J8168

+ CORRECTED FOR HUMIDITY

53.01 1
1/26/78
749.4
21
70
3800
122.5
86.3
42.7
31.0
1.5
76.0
89

52.02 2
1/26/78
749.4
21
69
3200
8.2
4.9
9.0
47.0
17.5
15.0
143

53.02 2
1/26/78
749.4
21
70
3800
122.5
86.3
42.6
31.0
1.5
76.0
89

54.01 1
1/26/78
749.4
21
76
3800
110.3
77.7
36.3
31.0
2.0
66.0
128

3.6651
11.98
.17
1772
1791

.0075
13.18
2.02
56
204

3.6929
12.05
.05
740
1355

.7511
13.56
.75
510
2748

13.21

13.21

8940.2
217.1
572.9

4.6
1.7
16.5

8983.9
90.4
432.3

1714.0
58.5
822.3

211
37
191
102.0
1437

220
35
190
.0
1039

1714.0
58.5
822.3

259
35
191
100.0
1519

54.02 2
1/26/78
749.4
21
76
3800
110.3
77.7
36.4
31.0
2.0
66.0
128

53.01 1
1/26/78
749.4
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70
3800
122.5
86.3
42.6
31.0
1.5
76.0
89

52.02 2
1/26/78
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3200
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4.9
9.0
47.0
17.5
15.0
143

53.02 2
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749.4
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3800
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86.3
42.6
31.0
1.5
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54.01 1
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110.3
77.7
36.4
31.0
2.0
66.0
128

53.01 1
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3800
122.5
86.3
42.7
31.0
1.5
76.0
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52.02 2
1/26/78
749.4
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3200
8.2
4.9
9.0
47.0
17.5
15.0
143

53.02 2
1/26/78
749.4
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122.5
86.3
42.6
31.0
1.5
76.0
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54.01 1
1/26/78
749.4
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3800
110.3
77.7
36.4
31.0
2.0
66.0
128

53.01 1
1/26/78
749.4
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3800
122.5
86.3
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31.0
1.5
76.0
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52.02 2
1/26/78
749.4
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3200
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47.0
17.5
15.0
143

53.02 2
1/26/78
749.4
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3800
122.5
86.3
42.6
31.0
1.5
76.0
89

54.01 1
1/26/78
749.4
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76
3800
110.3
77.7
36.4
31.0
2.0
66.0
128

53.01 1
1/26/78
749.4
21
70
3800
122.5
86.3
42.6
31.0
1.5
76.0
89

52.02 2
1/26/78
749.4
21
69
3200
8.2
4.9
9.0
47.0
17.5
15.0
143

53.02 2
1/26/78
749.4
21
70
3800
122.5
86.3
42.6
31.0
1.5
76.0
89

54.01 1
1/26/78
749.4
21
76
3800
110.3
77.7
36.4
31.0
2.0
66.0
128

53.01 1
1/26/78
749.4
21
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3800
122.5
86.3
42.6
31.0
1.5
76.0
89

52.02 2
1/26/78
749.4
21
69
3200
8.2
4.9
9.0
47.0
17.5
15.0
143

53.02 2
1/26/78
749.4
21
70
3800
122.5
86.3
42.6
31.0
1.5
76.0
89

54.01 1
1/26/78
749.4
21
76
3800
110.3
77.7
36.4
31.0
2.0
66.0
128

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER	55.01	55.02	56.01	56.02	57.01	57.02
DATA SOURCE CODE	1	2	1	2	1	2
TEST DATE	1/26/78	1/26/78	1/26/78	1/26/78	1/26/78	1/26/78
BAROMETER, MMHG	749.4	749.4	749.4	749.4	749.4	749.4
HUMIDITY, GRAINS/LB	21	21	21	21	21	21
TEMPERATURE, F	76	76	73	73	71	71
ENGINE SPEED, RPM	3800	3800	3800	3800	3800	3800
TORQUE, FT-LB	91.9	91.9	73.5	73.5	49.0	49.0
POWER, BHP*	64.8	64.8	51.8	51.8	34.5	34.5
FUEL RATE, LB/HR	31.3	31.3	25.6	25.5	19.3	19.3
IGNITION TIMING, DEG BTDC	31.0	31.0	45.0	45.0	51.0	51.0
MANIFOLD VACUUM, IN HG	3.2	3.2	6.9	6.9	11.0	11.0
THROTTLE ANGLE, DEG	58.0	58.0	41.0	41.0	30.0	30.0
INTAKE MAN. TEMP., F	145	145	152	152	150	150
CONCENTRATIONS, DRY BASIS						
CO, %	.1178	.0085	.0841	.0079	.1051	.0078
CO2, %	13.16	13.31	13.17	13.71	13.57	13.89
O2, %	1.40	1.32	1.44	1.37	1.44	1.29
HC, PPMC	310	32	578	37	778	44
NOX, PPM	2427	2470	2864	2841	2491	2414
AIR/FUEL RATIO	15.84	15.87	15.87	15.88	15.79	15.80
EMISSION RATES, G/HR						
CO	250.6	18.1	146.1	13.2	133.0	9.7
HC	33.1	3.4	50.4	3.1	49.4	2.8
NOX+	676.9	688.4	652.2	626.2	413.5	396.5
OIL TEMPERATURE, F	263	263	258	258	253	253
OIL PRESSURE, PSI	35	35	35	35	35	35
COOLANT TEMPERATURE, F	193	193	193	193	192	192
EXHAUST PRESSURE, IN. H2O	80.0	37.0	51.0	22.0	28.0	10.0
EXHAUST TEMPERATURE, F	1486	1422	1356	1306	1301	1225

* CORRECTED SAE J8168

+ CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER

DATA SOURCE CODE

TEST DATE

BAROMETER, MMHG

HUMIDITY, GRAINS/LB

TEMPERATURE, F

ENGINE SPEED, RPM

TORQUE, FT-LB

POWER, BHP*

FUEL RATE, LB/HR

IGNITION TIMING, DEG BTDC

MANIFOLD VACUUM, IN HG

THROTTLE ANGLE, DEG

INTAKE MAN. TEMP., F

CONCENTRATIONS, DRY BASIS

CO, %

CO2, %

O2, %

HC, PPMC

NOX, PPM

AIR/FUEL RATIO

EMISSION RATES, G/HR

CO

HC

NOX+

OIL TEMPERATURE, F

OIL PRESSURE, PSI

COOLANT TEMPERATURE, F

EXHAUST PRESSURE, IN. H2O

EXHAUST TEMPERATURE, F

58.01

2

1/26/78

749.4

21

71

3800

30.6

21.6

15.1

51.0

14.5

24.0

149

1588

13.82

1.22

880

1246

15.54

7.4

2.3

150.2

244

35

191

14.0

1246

58.02

2

1/26/78

749.4

21

71

3800

30.6

21.6

15.1

51.0

14.5

24.0

149

1588

14.14

.99

48

1188

15.53

7.4

2.3

150.2

244

35

191

3.0

1171

59.01

1

1/26/78

749.4

21

70

3800

12.3

8.7

13.1

51.0

17.6

18.0

148

2025

13.72

1.24

522

339

15.54

171.2

22.2

37.6

239

35

191

8.0

1216

59.02

2

1/26/78

749.4

21

70

3800

12.3

8.7

10.9

51.0

17.6

18.0

148

2076

13.86

1.03

40

358

15.55

147.6

21.2

30.1

239

35

191

.0

1116

60.01

1

1/26/78

749.4

21

70

3800

8.7

6.1

10.7

51.0

17.6

17.5

150

2102

13.50

1.31

601

327

15.59

147.6

21.2

30.1

235

35

191

9.0

1205

60.02

2

1/26/78

749.4

21

70

3800

8.7

6.1

10.6

51.0

17.6

17.5

150

2076

13.70

1.11

41

313

15.61

147.6

21.2

28.7

5.3

1.5

20.7

235

35

191

.0

1086

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER 1

DATA SOURCE CODE 1

TEST DATE 1/26/78

BAROMETER, MMHG 749.4

HUMIDITY, GRAINS/LB 37

TEMPERATURE, F 67

ENGINE SPEED, RPM 4400

TORQUE, FT-LB 109.7

POWER, BHP* 90.0

FUEL RATE, LB/HR 47.4

IGNITION TIMING, DEG BTDC 33.5

MANIFOLD VACUUM, IN HG 1.5

THROTTLE ANGLE, DEG 76.0

INTAKE MAN. TEMP., F 93

CONCENTRATIONS, DRY BASIS

CO, % 4.0852

CO2, % 12.23

O2, % .12

HC, PPHC 1698

NOX, PPM 1560

AIR/FUEL RATIO 13.07

EMISSION RATES, G/HR

CO 10617.3

HC 221.6

NOX+ 564.9

OIL TEMPERATURE, F 230

OIL PRESSURE, PSI 37

COOLANT TEMPERATURE, F 193

EXHAUST PRESSURE, IN. H2O 110.0

EXHAUST TEMPERATURE, F 1485

61.02	62.01	62.02	63.01	63.02
2	1	2	1	2
1/26/78	1/26/78	1/26/78	1/26/78	1/26/78
749.4	749.4	749.4	749.4	749.4
37	37	37	37	37
67	64	64	67	67
4400	4400	4400	4400	4400
109.7	98.7	98.7	82.3	82.3
90.0	81.0	81.0	67.5	67.5
47.5	38.7	38.8	34.2	34.2
33.5	33.5	33.5	33.5	33.5
1.5	2.5	2.5	3.5	3.5
76.0	65.0	65.0	58.0	58.0
93	105	105	139	139
3.1884	.4867	.0865	.1399	.0178
12.79	13.64	14.28	13.71	14.02
.06	.83	.42	.98	.88
506	394	24	260	19
1644	2614	2094	2371	2322
13.50	15.21	15.13	15.49	15.50
8537.9	1202.0	211.0	311.3	39.1
68.1	48.9	2.9	29.1	2.1
613.5	899.8	711.7	735.4	711.5
230	235	235	260	260
37	37	37	37	37
193	194	194	194	194
60.0	105.0	55.0	92.0	45.0
1466	1555	1546	1537	1480

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718	64.01	64.02	65.01	65.02	66.01	66.02
TEST NUMBER	1	2	1	2	1	2
DATA SOURCE CODE	1/26/78	1/26/78	1/26/78	1/26/78	1/26/78	1/26/78
TEST DATE	749.4	749.4	749.4	749.4	749.4	749.4
BAROMETER, MMHG	37	37	37	37	37	37
HUMIDITY, GRAINS/LB	67	67	66	66	65	65
TEMPERATURE, F	4400	4400	4400	4400	4400	4400
ENGINE SPEED, RPM	65.8	65.8	43.9	43.9	27.4	27.4
TORQUE, FT-LB	54.0	54.0	36.0	36.0	22.5	22.5
POWER, BHP*	27.5	27.6	21.3	21.3	17.4	17.4
FUEL RATE, LB/HR	39.0	39.0	52.0	52.0	52.0	52.0
IGNITION TIMING, DEG BTDC	6.6	6.6	11.2	11.2	14.5	14.5
MANIFOLD VACUUM, IN HG	44.0	44.0	32.0	32.0	26.0	26.0
THROTTLE ANGLE, DEG	156	156	153	153	153	153
INTAKE MAN. TEMP., F	.0895	.0079	.1114	.0078	.1442	.0077
CONCENTRATIONS, DRY BASIS	13.36	13.59	13.73	13.93	13.92	14.21
CO, %	1.64	1.61	1.35	1.22	1.05	.88
CO2, %	366	26	416	26	509	24
O2, %	2877	2886	2326	2328	1280	1267
HC, PPMC	16.03	16.07	15.75	15.75	15.47	15.46
NOX, PPM	165.0	14.5	154.6	10.8	160.2	8.5
AIR/FUEL RATIO	33.9	2.4	29.0	1.8	28.4	1.3
EMISSION RATES, G/HR	739.5	737.0	449.9	447.2	198.1	194.6
CO	262	262	256	256	250	250
HC	37	37	37	37	37	37
NOX+	193	193	193	193	192	192
OIL TEMPERATURE, F	67.0	28.0	42.0	12.0	26.0	5.0
OIL PRESSURE, PSI	1409	1352	1354	1288	1315	1227
COOLANT TEMPERATURE, F						
EXHAUST PRESSURE, IN. H2O						
EXHAUST TEMPERATURE, F						

* CORRECTED SAE J8168
+ CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER

DATA SOURCE CODE

TEST DATE

BAROMETER, MMHG

HUMIDITY, GRAINS/LB

TEMPERATURE, F

ENGINE SPEED, RPM

TORQUE, FT-LB

POWER, BHP*

FUEL RATE, LB/HR

IGNITION TIMING, DEG BTDC

MANIFOLD VACUUM, IN HG

THROTTLE ANGLE, DEG

INTAKE MAN. TEMP., F

CONCENTRATIONS, DRY BASIS

CO, %

CO2, %

O2, %

HC, PPMC

NOX, PPM

AIR/FUEL RATIO

EMISSION RATES, G/HR

CO

HC

NOX+

OIL TEMPERATURE, F

OIL PRESSURE, PSI

COOLANT TEMPERATURE, F

EXHAUST PRESSURE, IN. H2O

EXHAUST TEMPERATURE, F

67.01	67.02	68.01	68.02	69.01	69.02
1	2	1	2	1	2
1/26/78	1/26/78	1/26/78	1/26/78	1/26/78	1/26/78
749.4	749.4	749.4	749.4	749.4	749.4
37	37	37	37	37	37
65	65	65	65	60	60
4400	4400	4400	4400	650	650
12.9	12.9	11.5	11.5	2.6	2.6
10.6	10.6	9.4	9.4	3	3
13.8	13.8	13.9	13.9	1.6	1.6
52.0	52.0	52.0	52.0	14.0	14.0
16.6	16.6	17.0	17.0	19.0	19.0
22.0	22.0	21.5	21.5	0	0
153	153	155	155	116	116
.1890	.0075	.1809	.0075	.1226	.0088
14.28	14.54	14.38	14.57	13.16	14.14
.88	.62	.90	.72	1.84	.59
345	30	255	22	3952	310
483	519	544	528	47	35
15.30	15.24	15.33	15.31	15.65	15.19
162.3	6.5	155.2	6.5	12.9	.9
14.9	1.3	11.0	.9	20.8	1.6
57.8	62.1	65.0	63.1	.7	.5
244	244	243	243	158	158
37	37	37	37	20	20
191	191	191	191	190	190
18.0	1.0	16.0	.0	1.0	.0
1287	1185	1284	1174	480	540

* CORRECTED SAE J8168
+ CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER

DATA SOURCE CODE

TEST DATE

BAROMETER, MMHG

HUMIDITY, GRAINS/LB

TEMPERATURE, F

ENGINE SPEED, RPM

TORQUE, FT-LB

POWER, BHP*

FUEL RATE, LB/HR

IGNITION TIMING, DEG BTDC

MANIFOLD VACUUM, IN HG

THROTTLE ANGLE, DEG

INTAKE MAN. TEMP., F

CONCENTRATIONS, DRY BASIS

CO, %

CO₂, %

O₂, %

HC, PPMC

NOX, PPM

AIR/FUEL RATIO

EMISSION RATES, G/HR

CO

HC

NOX+

OIL TEMPERATURE, F

OIL PRESSURE, PSI

COOLANT TEMPERATURE, F

EXHAUST PRESSURE, IN. H₂O

EXHAUST TEMPERATURE, F

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

70.01	70.02	71.01	71.02	72.01	72.02
1	2	1	2	1	2
1/26/78	1/26/78	1/26/78	1/26/78	1/26/78	1/26/78
749.4	749.4	749.4	749.4	749.4	749.4
37	37	37	37	37	37
61	61	60	60	61	61
650	650	650	650	550	550
10.0	10.0	15.0	15.0	13.9	13.9
1.2	1.2	1.8	1.8	1.4	1.4
1.9	1.9	2.1	2.0	1.3	1.6
14.0	14.0	14.0	14.0	14.0	14.0
18.0	18.0	17.5	17.5	17.5	17.5
1.0	1.0	1.2	1.2	.0	.0
112	112	108	108	108	108
6474	5291	7664	8070	1.2914	1.1396
13.73	14.28	14.07	14.28	14.02	14.35
.49	.27	.45	.38	.33	.30
4314	4024	4059	4132	4662	4587
79	41	94	66	72	53
14.42	14.37	14.38	14.32	14.04	14.10
76.3	58.9	95.6	96.3	92.5	106.4
25.5	22.5	25.4	24.8	16.8	21.5
1.3	.6	1.6	1.1	.7	.7
166	166	166	166	169	169
20	20	20	20	16	16
190	190	190	190	190	190
1.0	.0	1.0	.0	1.0	.0
510	499	520	416	469	367

ENGINE: PONTIAC 151-C1D

FUEL CODE: 7718

TEST NUMBER 73.01
 DATA SOURCE CODE 1
 TEST DATE 1/27/78
 BAROMETER, MMHG 755.4
 HUMIDITY, GRAINS/LB 30
 TEMPERATURE, F 67
 ENGINE SPEED, RPM 1000
 TORQUE, FT-LB 80.7
 POWER, BHP* 14.8
 FUEL RATE, LB/HR 7.2
 IGNITION TIMING, DEG BTDC 20.0
 MANIFOLD VACUUM, IN HG 4.0
 THROTTLE ANGLE, DEG 20.0
 INTAKE MAN. TEMP., F 125

CONCENTRATIONS, DRY BASIS

CO, % .0819
 CO2, % 12.26
 O2, % 2.70
 HC, PPM 1863
 NOX, PPM 1313

AIR/FUEL RATIO 16.71

EMISSION RATES, G/HR

CO 42.5
 HC 48.5
 NOX+ 92.5

OIL TEMPERATURE, F 191
 OIL PRESSURE, PSI 28
 COOLANT TEMPERATURE, F 189
 EXHAUST PRESSURE, IN. H2O 3.0
 EXHAUST TEMPERATURE, F 919

73.02

2

1/27/78

755.4

30

67

1000

80.7

14.8

7.1

20.0

4.0

20.0

125

.0076

12.84

2.37

103

1319

16.66

3.8

2.6

89.1

191

28

189

.0

755

74.01

1

1/27/78

755.4

30

67

1000

64.6

11.8

5.8

29.0

6.0

14.5

134

.0840

12.39

2.87

2452

713

16.72

34.7

50.9

40.1

199

27

192

.0

877

74.02

2

1/27/78

755.4

30

67

1000

64.6

11.8

5.8

29.0

6.0

14.5

134

.0075

12.66

2.47

112

735

16.74

3.1

2.3

41.1

199

27

192

.0

857

75.01

1

1/27/78

755.4

30

67

1000

26.9

4.9

3.5

23.0

16.5

5.0

132

.1251

13.07

1.71

2237

582

15.77

29.5

26.5

18.7

198

27

191

1.0

794

75.02

2

1/27/78

755.4

30

67

1000

26.9

4.9

3.5

23.0

16.5

5.0

132

.0076

13.52

1.15

125

557

15.65

1.8

1.5

17.7

198

27

191

.0

777

* CORRECTED SAE J8168
 + CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER 76.01 1

DATA SOURCE CODE 2

TEST DATE 1/27/78

BAROMETER, MMHG 755.4

HUMIDITY, GRAINS/LB 30

TEMPERATURE, F 65

ENGINE SPEED, RPM 1000

TORQUE, FT-LB 10.8

POWER, BHP* 2.0

FUEL RATE, LB/HR 2.9

IGNITION TIMING, DEG BTDC 14.0

MANIFOLD VACUUM, IN HG 19.0

THROTTLE ANGLE, DEG 3.5

INTAKE MAN. TEMP., F 124

CONCENTRATIONS, DRY BASIS

CO, % 1582

CO2, % 13.82

O2, % 13.31

HC, PPMC 1659

NOX, PPM 137

AIR/FUEL RATIO 15.48

EMISSION RATES, G/HR

CO 29.2

HC 15.4

NOX+ 3.4

OIL TEMPERATURE, F 192

OIL PRESSURE, PSI 27

COOLANT TEMPERATURE, F 191

EXHAUST PRESSURE, IN. H2O 1.0

EXHAUST TEMPERATURE, F 742

* CORRECTED SAE J8168

+ CORRECTED FOR HUMIDITY

76.02	77.01	77.02	80.01	80.02
2	1	2	1	2
1/27/78	1/27/78	1/27/78	1/27/78	1/27/78
755.4	755.4	755.4	755.4	755.4
30	30	30	30	30
65	65	65	67	67
1000	1000	1000	1500	1500
10.8	4.2	4.2	28.1	28.1
2.0	.8	.8	7.7	7.7
2.9	2.7	2.7	5.5	5.5
14.0	14.0	14.0	37.0	37.0
19.0	20.5	20.5	14.0	14.0
3.5	2.5	2.5	10.0	10.0
124	120	120	154	154
.0075	.2882	.0076	.1132	.0074
14.11	13.84	14.30	12.90	13.32
.84	.98	.52	2.11	1.75
129	1674	157	2429	127
143	92	92	249	247
15.39	15.18	15.15	16.05	16.09
1.4	48.5	1.3	42.2	2.7
1.2	14.1	1.3	45.5	2.4
3.7	2.1	2.1	12.6	12.4
192	190	190	214	214
27	27	27	30	30
191	188	188	192	192
.0	.0	.0	4.0	.0
669	720	620	955	946

ENGINE: PONTIAC 151-CID

	82.01	82.02	83.01	83.02	85.01	85.02
FUEL CODE: 7718						
TEST NUMBER	1	2	1	2	1	2
DATA SOURCE CODE						
TEST DATE	1/27/78	1/27/78	1/27/78	1/27/78	1/27/78	1/27/78
BAROMETER, MMHG	755.4	755.4	755.4	755.4	755.4	755.4
HUMIDITY, GRAINS/LB	30	30	18	18	18	18
TEMPERATURE, F	65	65	66	66	66	66
ENGINE SPEED, RPM	1500	1500	2000	2000	2000	2000
TORQUE, FT-LB	5.9	5.9	94.5	94.5	31.5	31.5
POWER, BHP*	1.6	1.6	34.5	34.5	11.5	11.5
FUEL RATE, LB/HR	3.6	3.6	15.8	15.7	7.9	7.9
IGNITION TIMING, DEG BTDC	28.0	28.0	22.0	22.0	40.0	40.0
MANIFOLD VACUUM, IN HG	21.0	21.0	3.5	3.5	12.5	12.5
THROTTLE ANGLE, DEG	5.0	5.0	35.0	35.0	14.5	14.5
INTAKE MAN. TEMP., F	131	131	147	147	159	159
CONCENTRATIONS, DRY BASIS						
CO, %	.1693	.0075	.0855	.0076	.1363	.0074
CO2, %	13.24	13.56	13.15	13.42	12.70	13.06
O2, %	2.07	1.69	1.41	1.16	2.46	2.08
HC, PPMC	1089	95	2155	60	2064	102
NOX, PPM	181	189	1899	1946	268	297
AIR/FUEL RATIO	16.12	16.03	15.63	15.72	16.37	16.37
EMISSION RATES, G/HR						
CO	40.3	1.8	90.5	8.1	74.9	4.0
HC	13.0	1.1	114.6	3.2	57.0	2.8
NOX+	5.9	6.1	260.7	266.6	19.1	21.0
OIL TEMPERATURE, F	202	202	222	222	228	228
OIL PRESSURE, PSI	30	30	30	30	32	32
COOLANT TEMPERATURE, F	190	190	189	189	189	189
EXHAUST PRESSURE, IN. H2O	1.0	.0	22.0	5.0	5.0	.0
EXHAUST TEMPERATURE, F	850	724	1247	1191	1077	1059

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER 1

DATA SOURCE CODE 2

TEST DATE 1/27/78

BAROMETER, MMHG 755.4

HUMIDITY, GRAINS/LB 18

TEMPERATURE, F 64

ENGINE SPEED, RPM 2500

TORQUE, FT-LB 93.8

POWER, BHP* 42.8

FUEL RATE, LB/HR 19.6

IGNITION TIMING, DEG BTDC 26.0

MANIFOLD VACUUM, IN HG 3.8

THROTTLE ANGLE, DEG 39.0

INTAKE MAN. TEMP., F 134

CONCENTRATIONS, DRY BASIS

CO, % .0951

CO2, % 13.40

O2, % 1.12

HC, PPMC 827

NOX, PPM 2102

AIR/FUEL RATIO 15.56

EMISSION RATES, G/HR

CO 124.2

HC 54.2

NOX+ 355.9

OIL TEMPERATURE, F 225

OIL PRESSURE, PSI 34

COOLANT TEMPERATURE, F 191

EXHAUST PRESSURE, IN. H2O 33.0

EXHAUST TEMPERATURE, F 1322

* CORRECTED SAE J8168

+ CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER

DATA SOURCE CODE

TEST DATE

BAROMETER, MMHG

HUMIDITY, GRAINS/LB

TEMPERATURE, F

ENGINE SPEED, RPM

TORQUE, FT-LB

POWER, BHP*

FUEL RATE, LB/HR

IGNITION TIMING, DEG BTDC

MANIFOLD VACUUM, IN HG

THROTTLE ANGLE, DEG

INTAKE MAN. TEMP., F

CONCENTRATIONS, DRY BASIS

CO, %

CO2, %

O2, %

HC, PPMC

NOX, PPM

AIR/FUEL RATIO

EMISSION RATES, G/HR

CO

HC

NOX+

OIL TEMPERATURE, F

OIL PRESSURE, PSI

COOLANT TEMPERATURE, F

EXHAUST PRESSURE, IN. H2O

EXHAUST TEMPERATURE, F

91.01	91.02	92.01	92.02	93.01	93.02
1	2	1	2	1	2
1/27/78	1/27/78	1/27/78	1/27/78	1/27/78	1/27/78
755.4	755.4	755.4	755.4	755.4	755.4
18	18	18	18	18	18
64	64	64	64	64	64
2500	2500	2500	2500	2800	2800
12.5	12.5	8.2	8.2	97.9	97.9
5.7	5.7	3.7	3.7	50.1	50.1
7.4	7.4	6.7	6.8	22.9	22.9
42.0	42.0	42.0	42.0	25.0	25.0
16.5	16.5	17.5	17.5	3.6	3.6
14.0	14.0	12.0	12.0	44.0	44.0
154	154	152	152	132	136
.2262	.0073	.2809	.0073	.1480	.0077
12.63	12.87	12.27	13.05	13.69	13.91
2.02	1.90	2.77	2.10	.94	.76
1979	85	2931	120	890	55
159	165	95	116	2318	2407
16.00	16.25	16.45	16.37	15.39	15.42
116.5	3.8	132.7	3.5	220.0	11.4
51.2	2.2	69.6	2.8	66.4	4.1
10.6	11.2	5.8	7.1	446.8	463.0
228	228	224	224	233	233
34	34	34	34	35	35
190	190	190	190	193	193
3.0	.0	2.0	.0	44.0	17.0
1101	1037	1092	1019	1377	1300

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER 1

DATA SOURCE CODE 2

TEST DATE 1/27/78

BAROMETER, MMHG 755.4

HUMIDITY, GRAINS/LB 18

TEMPERATURE, F 65

ENGINE SPEED, RPM 2800

TORQUE, FT-LB 78.4

POWER, BHP* 40.1

FUEL RATE, LB/HR 18.4

IGNITION TIMING, DEG BTDC 40.0

MANIFOLD VACUUM, IN HG 6.5

THROTTLE ANGLE, DEG 33.0

INTAKE MAN. TEMP., F 149

CONCENTRATIONS, DRY BASIS

CO, % 1001

CO2, % 13.17

O2, % 1.63

HC, PPMC 820

NOX, PPM 2650

AIR/FUEL RATIO 15.97

EMISSION RATES, G/HR

CO 124.3

HC 51.1

NOX+ 426.7

OIL TEMPERATURE, F 248

OIL PRESSURE, PSI 35

COOLANT TEMPERATURE, F 192

EXHAUST PRESSURE, IN. H2O 29.0

EXHAUST TEMPERATURE, F 1280

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

	94.02	95.01	95.02	96.01	96.02
TEST NUMBER	2	1	2	1	2
DATA SOURCE CODE	2	1	2	1	2
TEST DATE	1/27/78	1/27/78	1/27/78	1/27/78	1/27/78
BAROMETER, MMHG	755.4	755.4	755.4	755.4	755.4
HUMIDITY, GRAINS/LB	18	18	18	18	18
TEMPERATURE, F	65	65	65	65	65
ENGINE SPEED, RPM	2800	2800	2800	2800	2800
TORQUE, FT-LB	78.4	32.7	32.7	13.1	13.1
POWER, BHP*	40.1	16.7	16.7	6.7	6.7
FUEL RATE, LB/HR	18.3	11.0	11.0	8.0	8.0
IGNITION TIMING, DEG BTDC	40.0	45.0	45.0	45.0	45.0
MANIFOLD VACUUM, IN HG	6.5	13.5	13.5	17.0	17.0
THROTTLE ANGLE, DEG	33.0	19.0	19.0	14.0	14.0
INTAKE MAN. TEMP., F	149	149	149	152	152
CONCENTRATIONS, DRY BASIS					
CO, %	.0076	.1702	.0074	.2487	.0073
CO2, %	13.34	12.66	13.25	13.19	13.68
O2, %	1.40	2.42	2.25	2.42	2.06
HC, PPMC	57	790	48	1320	70
NOX, PPM	2654	523	542	158	179
AIR/FUEL RATIO	15.93	16.50	16.49	16.30	16.28
EMISSION RATES, G/HR					
CO	9.4	131.1	5.5	133.1	3.9
HC	3.5	30.6	1.8	35.5	1.9
NOX+	426.1	52.2	52.7	11.0	12.3
OIL TEMPERATURE, F	248	244	244	235	235
OIL PRESSURE, PSI	35	35	35	35	35
COOLANT TEMPERATURE, F	192	190	190	189	189
EXHAUST PRESSURE, IN. H2O	9.0	9.0	2.0	4.0	.0
EXHAUST TEMPERATURE, F	1250	1182	1110	1150	1072

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

	97.01	97.02	98.01	98.02	99.01	99.02
TEST NUMBER	1	2	1	2	1	2
DATA SOURCE CODE						
TEST DATE	1/27/78	1/27/78	1/30/78	1/30/78	1/30/78	1/30/78
BAROMETER, MMHG	755.4	755.4	752.4	752.4	752.4	752.4
HUMIDITY, GRAINS/LB	18	18	29	29	29	29
TEMPERATURE, F	65	65	78	78	75	75
ENGINE SPEED, RPM	2800	2800	3200	3200	3200	3200
TORQUE, FT-LB	8.3	8.3	93.6	93.6	74.9	74.9
POWER, BHP*	4.2	4.2	55.3	55.3	44.2	44.2
FUEL RATE, LB/HR	7.4	7.4	25.3	25.3	20.8	20.8
IGNITION TIMING, DEG BTDC	45.0	45.0	30.0	30.0	44.0	44.0
MANIFOLD VACUUM, IN HG	17.5	17.5	3.0	3.0	6.4	6.4
THROTTLE ANGLE, DEG	13.0	13.0	47.0	47.0	36.0	36.0
INTAKE MAN. TEMP., F	157	157	161	161	165	165
CONCENTRATIONS, DRY BASIS						
CO, %	2709	.0074	.2130	.0084	.0819	.0076
CO2, %	13.35	13.99	14.95	15.07	13.99	14.19
O2, %	2.47	2.06	.75	.68	1.59	1.50
HC, PPMC	1921	85	923	44	695	50
NOX, PPM	129	143	2370	2363	2677	2608
AIR/FUEL RATIO	16.24	16.25	15.19	15.32	15.90	15.93
EMISSION RATES, G/HR						
CO	131.8	3.5	319.6	12.7	109.0	10.1
HC	46.9	2.0	69.6	3.3	46.4	3.4
NOX+	8.1	8.9	481.4	484.2	481.8	467.1
OIL TEMPERATURE, F	229	229	250	250	241	241
OIL PRESSURE, PSI	34	34	35	35	35	35
COOLANT TEMPERATURE, F	190	190	190	190	191	191
EXHAUST PRESSURE, IN. H2O	2.0	.0	52.0	23.0	36.0	13.0
EXHAUST TEMPERATURE, F	1139	1048	1409	1372	1298	1237

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER

DATA SOURCE CODE

TEST DATE

BAROMETER, MMHG

HUMIDITY, GRAINS/LB

TEMPERATURE, F

ENGINE SPEED, RPM

TORQUE, FT-LB

POWER, BHP*

FUEL RATE, LB/HR

IGNITION TIMING, DEG BTDC

MANIFOLD VACUUM, IN HG

THROTTLE ANGLE, DEG

INTAKE MAN. TEMP., F

CONCENTRATIONS, DRY BASIS

CO, %

CO2, %

O2, %

HC, PPM

NOX, PPM

AIR/FUEL RATIO

EMISSION RATES, G/HR

CO

HC

NOX+

OIL TEMPERATURE, F

OIL PRESSURE, PSI

COOLANT TEMPERATURE, F

EXHAUST PRESSURE, IN. H2O

EXHAUST TEMPERATURE, F

* CORRECTED SAE J8168

+ CORRECTED FOR HUMIDITY

100.01	100.02	101.01	101.92	102.01	102.02
1	2	1	2	1	2
1/30/78	1/30/78	1/30/78	1/30/78	1/30/78	1/30/78
752.4	752.4	752.4	752.4	752.4	752.4
29	29	29	29	29	29
74	74	73	73	73	73
3200	3200	3200	3200	3200	3200
31.2	31.2	12.5	12.5	8.2	8.2
18.4	18.4	7.4	7.4	4.8	4.8
12.4	12.4	9.5	9.4	8.8	8.8
47.0	47.0	47.0	47.0	47.0	47.0
14.0	14.0	17.0	17.0	17.6	17.6
21.0	21.0	16.0	16.0	15.0	15.0
158	158	158	158	158	158
.1417	.0073	.2069	.0073	.2196	.0073
14.02	14.02	13.61	13.83	13.39	13.67
1.82	1.61	1.86	1.65	1.92	1.70
817	49	872	52	968	52
628	662	207	233	166	188
15.94	15.95	15.94	15.98	15.98	16.03
111.4	5.9	127.5	4.5	127.7	4.2
32.2	1.9	27.0	1.6	28.3	1.5
66.9	71.5	17.3	19.3	13.0	14.7
231	231	220	220	216	216
35	35	35	35	35	35
192	192	191	191	191	191
12.0	4.0	5.0	.0	2.0	.0
1198	1132	1164	1050	1159	1026

ENGINE: PONTIAC 151-C1D

FUEL CODE: 7718

TEST NUMBER

DATA SOURCE CODE

TEST DATE

BAROMETER, MMHG

HUMIDITY, GRAINS/LB

TEMPERATURE, F

ENGINE SPEED, RPM

TORQUE, FT-LB

POWER, BHP*

FUEL RATE, LB/HR

IGNITION TIMING, DEG BTDC

MANIFOLD VACUUM, IN HG

THROTTLE ANGLE, DEG

INTAKE MAN. TEMP., F

CONCENTRATIONS, DRY BASIS

CO, %

CO2, %

O2, %

HC, PPMC

NOX, PPM

AIR/FUEL RATIO

EMISSION RATES, G/HR

CO

HC

NOX+

OIL TEMPERATURE, F

OIL PRESSURE, PSI

COOLANT TEMPERATURE, F

EXHAUST PRESSURE, IN. H2O

EXHAUST TEMPERATURE, F

104.01	105.01	105.02	106.01	106.02
1	1	2	1	2
1/30/78	1/30/78	1/30/78	1/30/78	1/30/78
752.4	752.4	752.4	752.4	752.4
29	29	29	29	29
75	75	75	74	74
3800	3800	3800	3800	3800
73.5	30.6	30.6	12.3	12.3
51.5	21.5	21.5	8.6	8.6
24.9	14.7	14.8	11.5	11.6
45.0	51.0	51.0	51.0	51.0
6.2	14.5	14.5	17.0	17.0
41.5	23.0	23.0	18.5	18.5
166	165	165	164	164
.0880	.1782	.0075	.2189	.0073
13.78	14.42	14.67	14.29	14.38
1.68	1.11	.96	1.21	1.06
528	871	41	568	32
2737	1194	1214	414	428
16.00	15.43	15.49	15.48	15.54
142.1	161.5	6.8	156.7	5.3
42.9	39.6	1.9	20.4	1.2
598.4	146.5	149.4	40.1	42.2
248	242	242	233	233
36	36	36	36	36
192	192	192	191	191
50.0	15.0	4.0	7.0	1.0
1349	1249	1181	1220	1120

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718	107.01	107.02	109.01	109.02	110.01	110.02
TEST NUMBER	1	2	1	2	1	2
DATA SOURCE CODE	1/30/78	1/30/78	1/30/78	1/30/78	1/30/78	1/30/78
TEST DATE	752.4	752.4	752.4	752.4	752.4	752.4
BAROMETER, MMHG	29	29	29	29	29	29
HUMIDITY, GRAINS/LB	74	74	76	76	76	76
TEMPERATURE, F	3800	3800	4400	4400	4400	4400
ENGINE SPEED, RPM	8.7	8.7	65.8	65.8	27.4	27.4
TORQUE, FT-LB	6.1	6.1	53.4	53.4	22.2	22.2
POWER, BHP*	10.6	10.6	27.8	27.8	17.3	17.3
FUEL RATE, LB/HR	51.0	51.0	49.0	49.0	52.0	52.0
IGNITION TIMING, DEG BTDC	17.5	17.5	6.5	6.5	14.5	14.5
MANIFOLD VACUUM, IN HG	17.0	17.0	44.5	44.5	26.0	26.0
THROTTLE ANGLE, DEG	169	169	171	171	173	173
INTAKE MAN. TEMP., F						
CONCENTRATIONS, DRY BASIS						
CO, %	.2166	.0074	.0980	.0077	.1619	.0075
CO2, %	14.05	14.23	13.74	14.07	14.57	14.90
O2, %	1.29	1.09	1.48	1.45	.95	.76
HC, PPMC	498	35	342	25	495	26
NOX, PPM	296	297	2780	2775	1323	1354
AIR/FUEL RATIO	15.56	15.57	15.87	15.92	15.36	15.35
EMISSION RATES, G/HR						
CO	144.9	5.0	177.1	13.8	171.5	7.9
HC	16.7	1.2	31.1	2.3	26.3	1.4
NOX+	26.8	27.1	679.9	670.3	189.7	192.4
OIL TEMPERATURE, F	229	229	260	260	254	254
OIL PRESSURE, PSI	36	36	36	36	36	36
COOLANT TEMPERATURE, F	191	191	193	193	193	193
EXHAUST PRESSURE, IN. H2O	4.0	.0	62.0	26.0	20.0	6.0
EXHAUST TEMPERATURE, F	1214	1087	1420	1375	1321	1269

* CORRECTED SAE J816B
 + CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER 111.01
 DATA SOURCE CODE 1
 TEST DATE 1/30/78
 BAROMETER, MMHG 752.4
 HUMIDITY, GRAINS/LB 55
 TEMPERATURE, F 75
 ENGINE SPEED, RPM 4400
 TORQUE, FT-LB 12.9
 POWER, BHP* 10.4
 FUEL RATE, LB/HR 14.0
 IGNITION TIMING, DEG BTDC 52.0
 MANIFOLD VACUUM, IN HG 17.0
 THROTTLE ANGLE, DEG 21.5
 INTAKE MAN. TEMP., F 173
 CONCENTRATIONS, DRY BASIS
 CO, % .2528
 CO2, % 14.90
 O2, % .79
 HC, PPMC 377
 NOX, PPM 553

AIR/FUEL RATIO 15.17

EMISSION RATES, G/HR

CO 210.0
 HC 15.7
 NOX+ 69.3

OIL TEMPERATURE, F 246
 OIL PRESSURE, PSI 36
 COOLANT TEMPERATURE, F 193
 EXHAUST PRESSURE, IN. H2O 11.0
 EXHAUST TEMPERATURE, F 1290

111.02 2
 1/30/78
 752.4
 29
 75
 4400
 12.9
 10.5
 14.0
 52.0
 17.0
 21.5
 173

.0084
 15.13
 .53
 21
 521

15.17

7.0
 .9
 59.1

246
 36
 193
 .0
 1195

112.01 1
 1/30/78
 752.4
 29
 75
 4400
 11.5
 9.3
 13.3
 52.0
 17.5
 21.0
 173

.2651
 14.64
 .70
 420
 429

15.13

212.6
 16.9
 46.6

244
 36
 193
 10.0
 1281

112.02 2
 1/30/78
 752.4
 29
 75
 4400
 11.5
 9.3
 13.3
 52.0
 17.5
 21.0
 173

.0130
 15.12
 .52
 19
 394

15.16

10.3
 .7
 42.3

244
 36
 193
 .0
 1185

113.01 1
 1/30/78
 752.4
 36
 74
 4650
 109.0
 93.5
 49.4
 35.0
 1.5
 76.0
 96

4.6600
 11.19
 .18
 1718
 1097

12.77

12977.1
 240.3
 424.9

231
 36
 193
 120.0
 1470

113.02 2
 1/30/78
 752.4
 36
 74
 4650
 109.0
 93.5
 49.2
 35.0
 1.5
 76.0
 96

4.3254
 11.55
 .11
 920
 1115

12.95

12035.2
 128.6
 431.7

231
 36
 193
 75.0
 1381

* CORRECTED SAE J816B
 + CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER	115.01	117.01	117.02	118.01	118.02
DATA SOURCE CODE	1	1	2	1	2
TEST DATE	2/ 2/78	2/ 2/78	2/ 2/78	2/ 2/78	2/ 2/78
BAROMETER, MMHG	753.1	753.1	753.1	753.1	753.1
HUMIDITY, GRAINS/LB	15	15	15	15	15
TEMPERATURE, F	63	63	63	64	64
ENGINE SPEED, RPM	1000	2000	2000	2000	2000
TORQUE, FT-LB	64.0	50.4	50.4	12.6	12.6
POWER, BHP*	11.7	18.5	18.5	4.6	4.6
FUEL RATE, LB/HR	5.7	9.8	9.8	5.5	5.5
IGNITION TIMING, DEG BTDC	30.0	40.0	40.0	40.0	40.0
MANIFOLD VACUUM, IN HG	7.0	10.0	10.0	18.0	18.0
THROTTLE ANGLE, DEG	12.5	19.0	19.0	9.5	9.5
INTAKE MAN. TEMP., F	121	140	140	150	150
CONCENTRATIONS, DRY BASIS					
CO, %	.0621	.0963	.0007	.2208	.0007
CO2, %	13.67	13.42	13.73	13.52	14.09
O2, %	2.19	2.59	2.29	2.38	1.90
HC, PPMC	2462	1503	79	2312	98
NOX, PPM	1012	687	744	134	157
AIR/FUEL RATIO	16.10	16.49	16.47	16.14	16.13
EMISSION RATES, G/HR					
CO	22.8	62.7	.5	79.0	.2
HC	45.3	49.1	2.5	41.6	1.8
NOX+	47.5	57.3	61.4	6.1	7.1
OIL TEMPERATURE, F	193	210	210	217	217
OIL PRESSURE, PSI	28	32	32	32	32
COOLANT TEMPERATURE, F	190	189	189	190	190
EXHAUST PRESSURE, IN. H2O	2.0	8.0	1.0	2.0	.0
EXHAUST TEMPERATURE, F	812	1072	970	1013	972

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER

DATA SOURCE CODE

TEST DATE

BAROMETER, MMHG

HUMIDITY, GRAINS/LB

TEMPERATURE, F

ENGINE SPEED, RPM

TORQUE, FT-LB

POWER, BHP*

FUEL RATE, LB/HR

IGNITION TIMING, DEG BTDC

MANIFOLD VACUUM, IN HG

THROTTLE ANGLE, DEG

INTAKE MAN. TEMP., F

CONCENTRATIONS, DRY BASIS

CO, %

CO2, %

O2, %

HC, PPMC

NOX, PPM

AIR/FUEL RATIO

EMISSION RATES, G/HR

CO

HC

NOX+

OIL TEMPERATURE, F

OIL PRESSURE, PSI

COOLANT TEMPERATURE, F

EXHAUST PRESSURE, IN. H2O

EXHAUST TEMPERATURE, F

119.01	119.02	121.01	121.02	122.01	122.02
1	2	1	2	1	2
2/ 2/78	2/ 2/78	2/ 2/78	2/ 2/78	2/ 2/78	2/ 2/78
753.1	753.1	753.1	753.1	753.1	753.1
15	15	15	15	15	15
64	64	65	65	66	66
2000	2000	3200	3200	3800	3800
7.0	7.0	49.9	49.9	91.9	91.9
2.6	2.6	29.2	29.2	63.9	63.9
4.4	4.4	15.6	15.5	30.4	30.3
40.0	40.0	47.0	47.0	31.0	31.0
21.5	21.5	11.5	11.5	3.2	3.2
7.0	7.0	25.0	25.0	56.0	56.0
147	147	148	148	143	143
2124	.0008	1155	.0009	1511	.0013
13.87	14.28	13.64	13.92	13.50	13.77
1.94	1.68	1.36	1.09	1.60	1.31
1061	73	1133	57	389	29
425	419	1847	1944	2812	2841
15.96	15.97	15.66	15.64	15.95	15.84
59.7	.2	117.2	.9	302.7	2.6
15.0	1.0	57.7	2.9	39.2	2.8
15.3	15.0	240.2	250.8	722.2	722.5
212	212	242	242	255	255
32	32	35	35	35	35
190	190	193	193	191	191
1.0	.0	18.0	3.0	76.0	31.0
924	903	1250	1208	1462	1386

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER

DATA SOURCE CODE

TEST DATE

BAROMETER, MMHG

HUMIDITY, GRAINS/LB

TEMPERATURE, F

ENGINE SPEED, RPM

TORQUE, FT-LB

POWER, BHP*

FUEL RATE, LB/HR

IGNITION TIMING, DEG BTDC

MANIFOLD VACUUM, IN HG

THROTTLE ANGLE, DEG

INTAKE MAN. TEMP., F

CONCENTRATIONS, DRY BASIS

CO, %

CO2, %

O2, %

HC, PPMC

NOX, PPM

AIR/FUEL RATIO

EMISSION RATES, G/HR

CO

HC

NOX+

OIL TEMPERATURE, F

OIL PRESSURE, PSI

COOLANT TEMPERATURE, F

EXHAUST PRESSURE, IN. H2O

EXHAUST TEMPERATURE, F

* CORRECTED SAE J8168

+ CORRECTED FOR HUMIDITY

123.01	123.02	124.01	124.02	125.01	125.02
1	2	1	2	1	2
2/ 2/78	2/ 2/78	2/ 2/78	2/ 2/78	2/27/78	2/27/78
753.1	753.1	753.1	753.1	740.5	740.5
15	15	15	15	50	50
69	69	70	70	67	67
4400	4400	4400	4400	1000	1000
82.3	82.3	65.8	65.8	64.6	64.6
66.3	66.3	53.0	53.0	12.2	12.2
33.6	33.6	27.6	27.6	5.7	5.7
34.0	34.0	49.0	49.0	29.0	29.0
3.5	3.5	6.5	6.5	6.0	6.0
57.0	57.0	44.0	44.0	14.0	14.0
149	149	157	157	134	134
.2048	.0107	.0969	.0012	.0008	.0008
13.80	14.08	13.37	13.48	13.29	13.29
1.13	.93	1.72	1.70	1.59	1.59
280	26	264	25	74	74
2734	2620	2936	2924	996	996
15.57	15.54	16.09	16.15	16.01	16.02
443.5	23.1	179.3	2.2	.3	.3
30.4	2.8	24.5	2.3	1.4	1.4
759.0	724.3	696.3	692.5	56.6	56.6
274	274	279	279	199	199
35	35	35	35	30	30
195	195	194	194	192	192
92.0	41.0	64.0	25.0	1.0	1.0
1534	1505	1431	1386	857	857

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER

DATA SOURCE CODE

TEST DATE

BAROMETER, MMHG

HUMIDITY, GRAINS/LB

TEMPERATURE, F

ENGINE SPEED, RPM

TORQUE, FT-LB

POWER, BHP*

FUEL RATE, LB/HR

IGNITION TIMING, DEG BTDC

MANIFOLD VACUUM, IN HG

THROTTLE ANGLE, DEG

INTAKE MAN. TEMP., F

CONCENTRATIONS, DRY BASIS

CO, %

CO2, %

O2, %

HC, PPM

NOX, PPM

AIR/FUEL RATIO

EMISSION RATES, G/HR

CO

HC

NOX+

OIL TEMPERATURE, F

OIL PRESSURE, PSI

COOLANT TEMPERATURE, F

EXHAUST PRESSURE, IN. H2O

EXHAUST TEMPERATURE, F

126.01	126.02	127.01	127.02	128.01	128.02
1	2	1	2	1	2
2/27/78	2/27/78	2/27/78	2/27/78	2/27/78	2/27/78
740.5	740.5	740.5	740.5	740.5	740.5
50	50	50	50	50	50
83	83	77	77	79	79
1000	1000	1500	1500	1500	1500
43.0	43.0	84.7	84.7	67.8	67.8
8.1	8.1	24.0	24.0	19.3	19.3
4.5	4.5	10.8	10.7	9.2	9.2
35.0	35.0	21.0	21.0	26.0	26.0
12.5	12.5	3.5	3.5	5.0	5.0
7.5	7.5	28.0	28.0	23.0	23.0
172	172	158	158	181	181
.0102	.0102	.0102	.0010	.0102	.0011
13.95	14.49	13.13	13.23	12.59	12.75
.56	.12	1.86	1.73	2.63	2.41
2477	88	1086	49	1145	55
2397	1586	1375	1419	605	634
15.02	14.93	16.11	16.14	16.72	16.69
2.9	2.9	7.5	.8	6.7	.7
35.5	1.2	40.2	1.8	37.7	1.8
100.8	65.3	149.1	153.1	58.4	60.9
202	202	220	220	222	222
28	28	30	30	30	30
191	191	191	191	187	187
1.0	.0	10.0	1.0	8.0	1.0
803	779	1120	1027	1059	1002

* CORRECTED SAE J8168

+ CORRECTED FOR HUMIDITY

ENGINE: PONTIAC 151-CID

FUEL CODE: 7718

TEST NUMBER

DATA SOURCE CODE

TEST DATE

BAROMETER, MMHG

HUMIDITY, GRAINS/LB

TEMPERATURE, F

ENGINE SPEED, RPM

TORQUE, FT-LB

POWER, BHP*

FUEL RATE, LB/HR

IGNITION TIMING, DEG BTDC

MANIFOLD VACUUM, IN HG

THROTTLE ANGLE, DEG

INTAKE MAN. TEMP., F

CONCENTRATIONS, DRY BASIS

CO, %

CO2, %

O2, %

HC, PPMC

NOX, PPM

AIR/FUEL RATIO

EMISSION RATES, G/HR

CO

HC

NOX+

OIL TEMPERATURE, F

OIL PRESSURE, PSI

COOLANT TEMPERATURE, F

EXHAUST PRESSURE, IN. H2O

EXHAUST TEMPERATURE, F

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

129.01

1

2/27/78

740.5

50

81

2000

75.6

28.6

13.0

31.0

5.3

27.5

188

.0102

13.11

1.74

1051

1615

16.04

9.1

46.8

210.9

247

30

190

14.0

1174

129.02

2

2/27/78

740.5

50

81

2000

75.6

28.6

13.0

31.0

5.3

27.5

188

.0012

13.35

1.50

44

1676

15.97

1.0

1.9

216.6

247

30

190

1.0

1143

HE18.5

.A34

no. DOT-TSC-

NHTSA-79-4

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