

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):

$$M_{CO} = \frac{M_{EX}}{C_w} \left( \frac{CO}{100} \right) \left( \frac{MW_{CO}}{MW_{EX}} \right) 453.59237,$$

where  $MW_{CO}$  = molecular weight of CO (=28.01115),  
 $MW_{EX}$  = molecular weight of exhaust gas (=28.967).

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

$$M_{HC} = M_{EX} \left( \frac{HC}{10^6} \right) \left( \frac{MW_{HC}}{MW_{EX}} \right) 453.59237,$$

where  $MW_{HC}$  = molecular weight per carbon atom of HC,  
= 12.01115 + 1.00797x + 15.9994y.

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

$$M_{NO_x} = \frac{M_{EX}}{C_w} \left( \frac{NO_x}{10^6} \right) \left( \frac{MW_{NO_x}}{MW_{EX}} \right) (K_H) 453.59237,$$

where  $MW_{NO_x}$  = molecular weight of  $NO_2$  (=46.0028).

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

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

where N = engine speed (revolutions per minute),  
T = brake torque (foot-pounds),  
t = air temperature (°F).

### 3. DISCUSSION OF TEST RESULTS

Maximum corrected brake horsepower, maximum corrected torque and brake specific fuel consumption (bsfc) are plotted as a function of engine speed at wide-open-throttle (WOT) in figure 1. The engine produced maximum brake horsepower and torque similar to the values quoted in table 1. Maximum torque output and minimum bsfc were found at the same engine speed. The fuel injected engine, equipped with the Lambda-Sond system, maintained an air fuel ratio near stoichiometry throughout the entire operating range of the engine (figure 2). Maintaining the A/F ratio near stoichiometry allowed the 3-way catalyst to reduce effectively the three main emissions (HC, CO, NOx) by pct at all engine speeds (figures 3 to 5). Fuel rates were found to be nearly a linear function of power for all engine speeds (figure 6) and were repeatable for all speeds duplicated.

#### 4. CONCLUSIONS

The experimental work to obtain performance data for the Volvo 130 CID engine has been completed and are presented in the tables accompanying this report.

TABLE 1. MANUFACTURER'S ENGINE SPECIFICATIONS

Displacement, cu. in.....	130
Maximum horsepower, bhp @ 5,200 rpm.....	99
Maximum torque, lb-ft @ 2,500 rpm.....	114
Bore and stroke, in.....	3.62 x 3.15
Configuration.....	in-line 4 cylinder
Compression ratio.....	8.5:1
Firing order.....	1-3-4-2
Ignition timing at idle speed, ° BTDC @ 700 rpm....	12
Block material.....	cast iron
Head material.....	cast iron
Number of crankshaft main bearings.....	5
Number of compression rings/piston.....	2
Number of oil rings/piston.....	1
Cam drive type.....	belt and sprocket
Valve lift:	
Intake, in.....	0.417
Exhaust, in.....	0.417
Valve timing:	
Intake opens, °BTC.....	24
Intake closes, °ABC.....	60
Exhaust opens, °BBC.....	60
Exhaust closes, °ATC.....	24
Spark plug gap, in.....	0.028 - 0.032
Engine weight, lb.....	350
Crankcase emission control:	
Control method.....	positive crankcase ventilation
Point of discharge.....	intake manifold
Fuel injection type.....	continuous injection
Distributor specifications:*	
Centrifugal advance, begins, ° @ 515 rpm.....	0
Centrifugal advance, intermediate, ° @ 1,475 rpm.....	10
Centrifugal advance, full, ° @ 2,500 rpm.....	14.5
Vacuum advance, begins, ° @ 5-8 in. Hg.....	0
Vacuum advance, maximum, ° @ 10 in. Hg.....	10
Vacuum retard, begins, ° @ 4-6 in. Hg.....	0
Vacuum retard, maximum, ° @ 8 in. Hg.....	3.5 ± 1
Distributor number.....	0237003003

\*Distributor rpm and deg.

TABLE 2. FUEL SPECIFICATIONS

Fuel No.....	7619
Research octane No.....	91.5
Motor octane No.....	83.5
Specific gravity.....	0.7161
API gravity, deg.....	66.1
Distillation, °F:	
10 pct evaporated.....	128
50 pct       ".....	218
95 pct       ".....	404
100 pct      ".....	417
Reid vapor pressure, psig.....	9.5
FIA analysis, pct:	
Aromatics.....	6
Olefins.....	17
Paraffins.....	77
Sulfur, pct.....	0.024
Lead, g/gal.....	Trace
Hydrogen/carbon atomic ratio.....	2.040
Oxygen/carbon atomic ratio.....	0.000

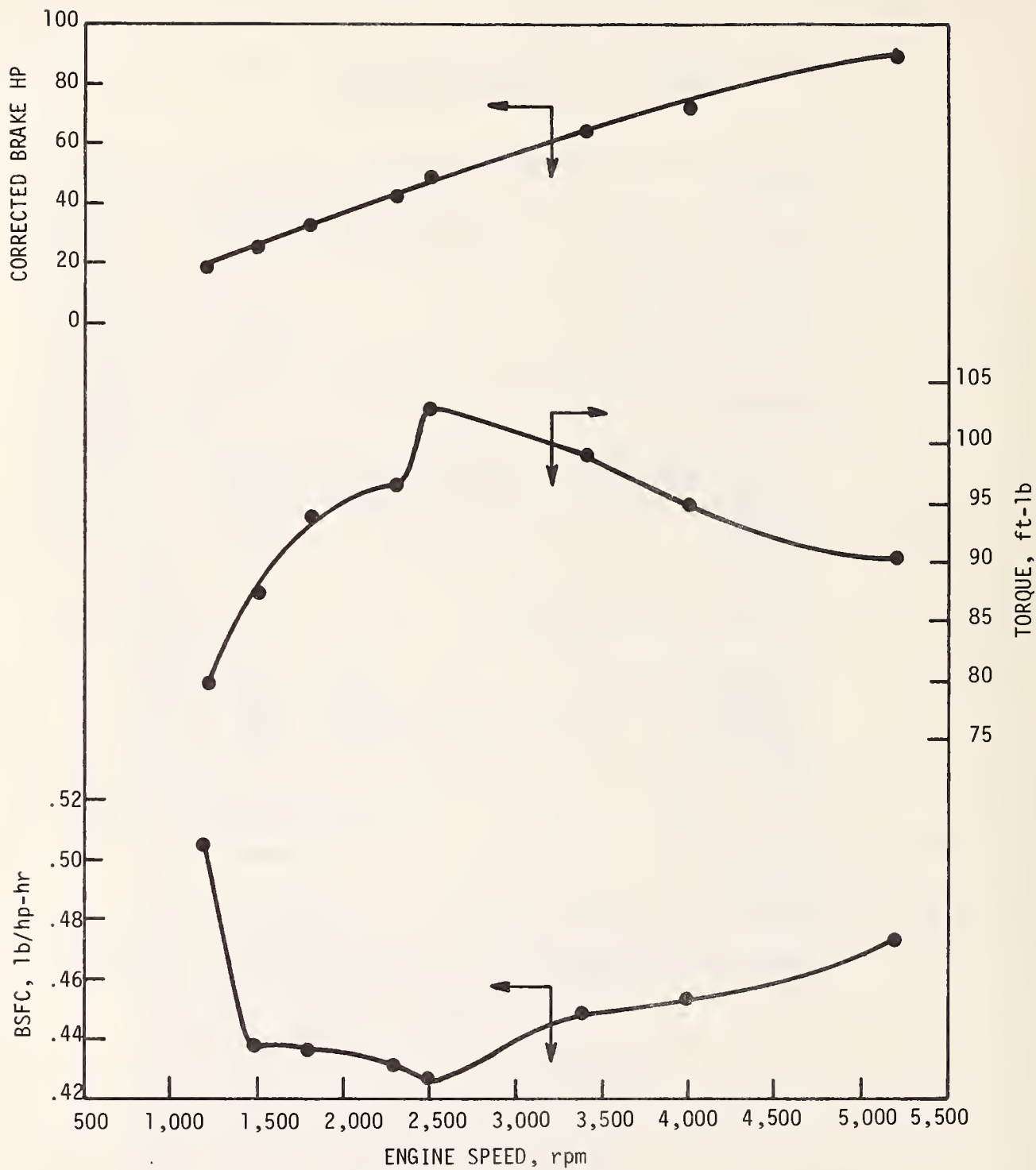


FIGURE 1. Brake Specific Fuel Consumption, Torque, and Brake Horsepower Versus Engine rpm at Wide-Open-Throttle--Volvo 130-CID Engine.

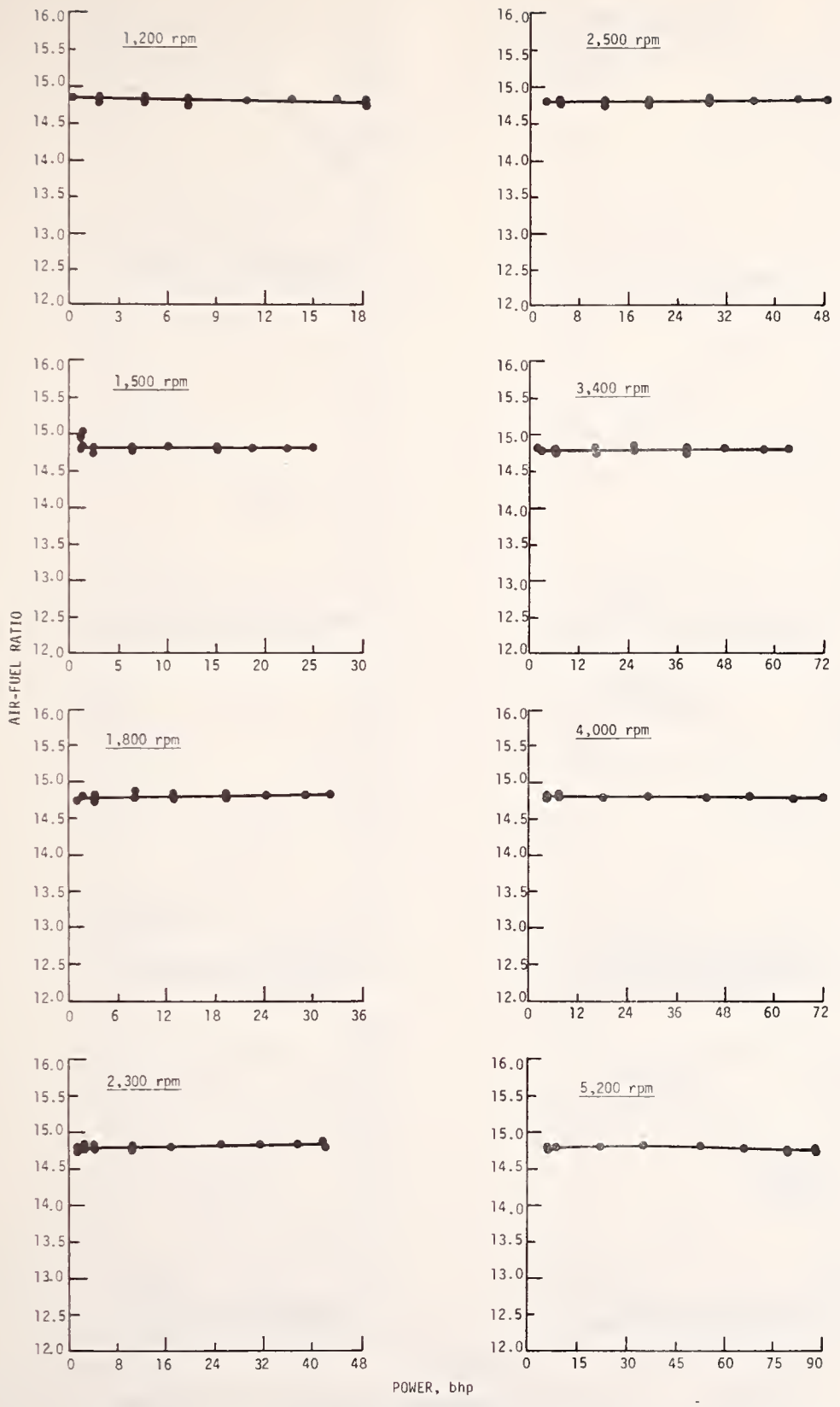


FIGURE 2. Air/Fuel Ratio Versus Power at Various Speed and Load Conditions--Volvo 130-CID Engine.

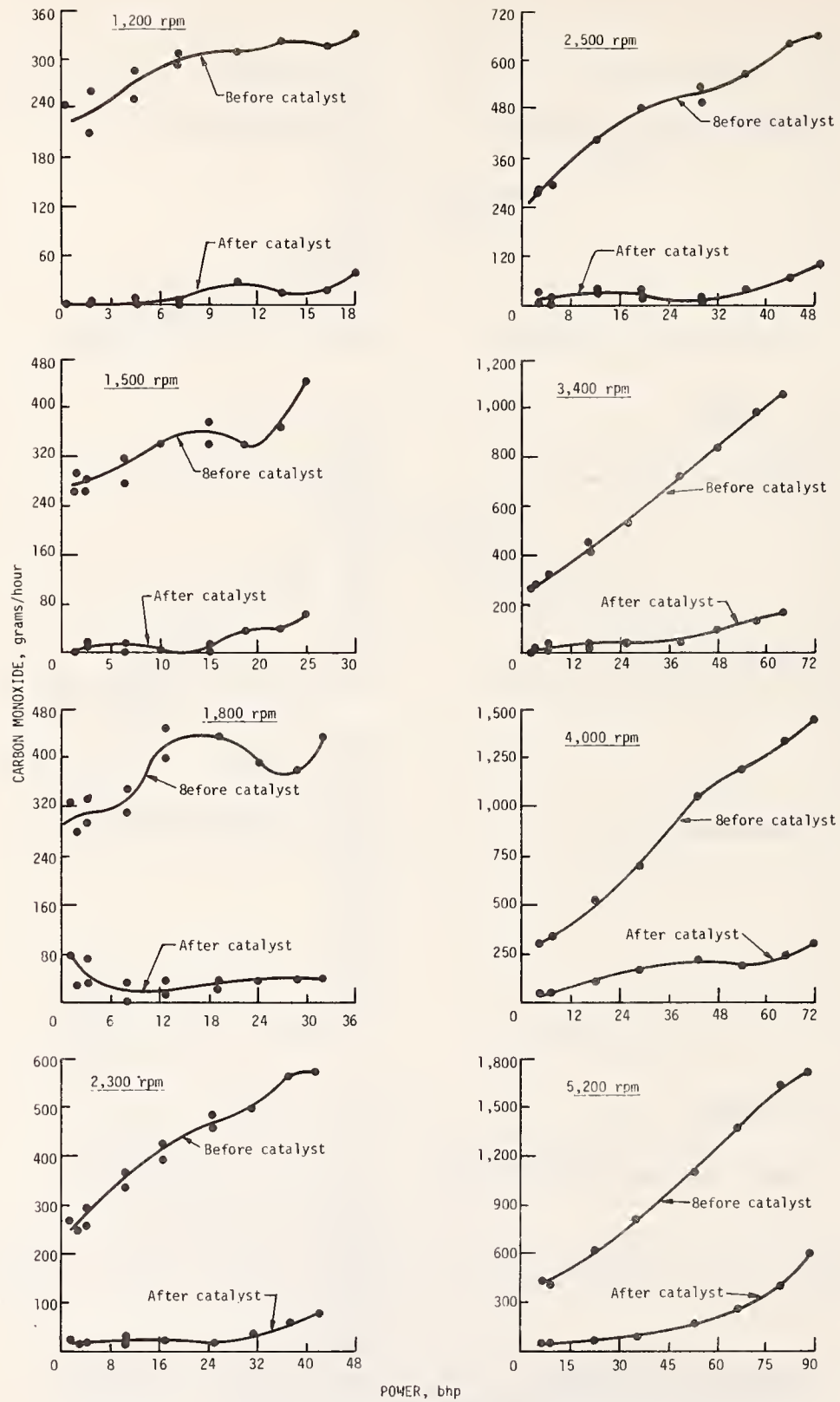


FIGURE 3. Carbon Monoxide Emissions Versus Power at Various Speed and Load Conditions--Volvo 130-CID Engine.



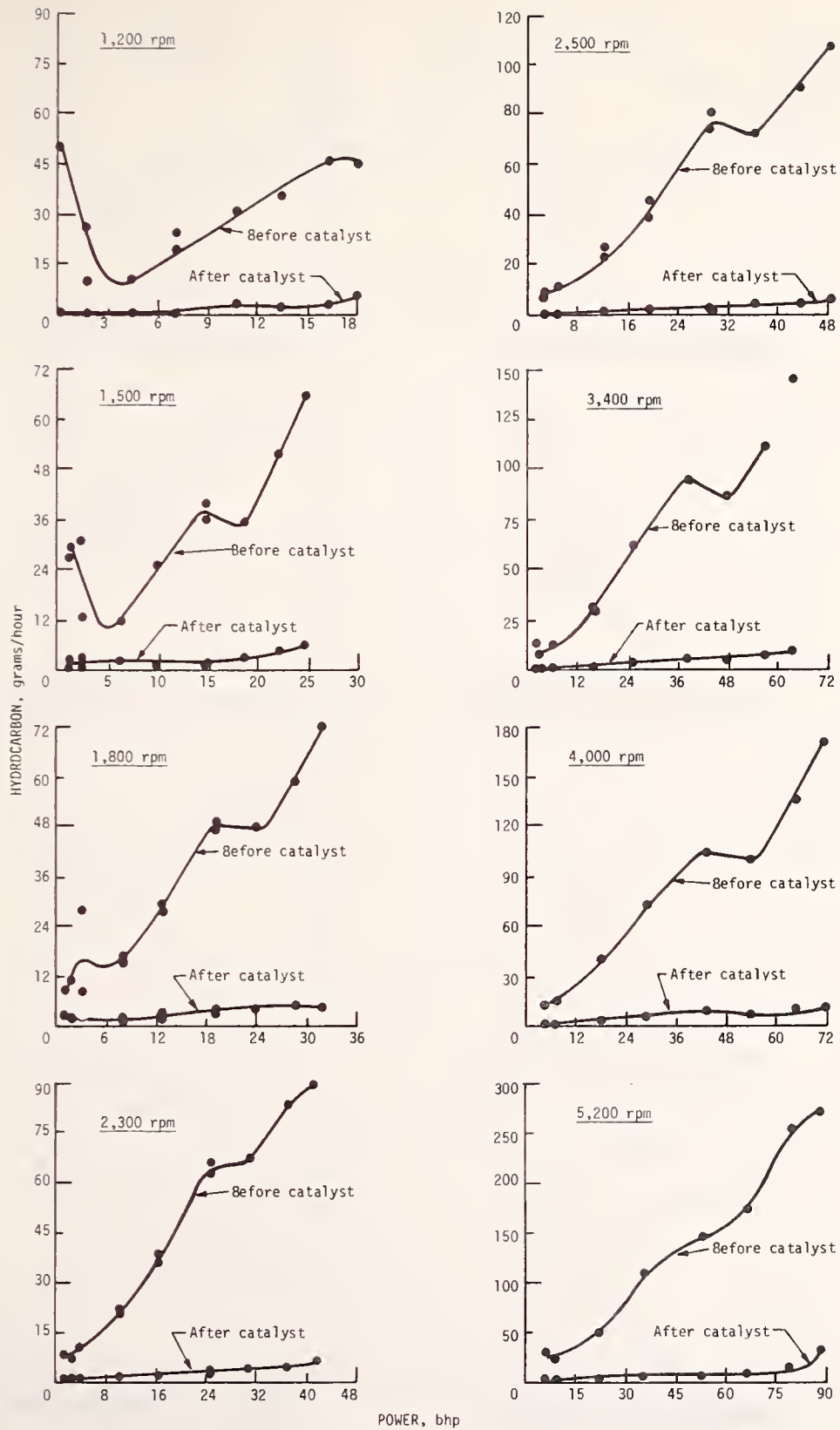


FIGURE 4. Hydrocarbon Emissions Versus Power at Various Speed and Load Conditions--Volvo 130-CID Engine.

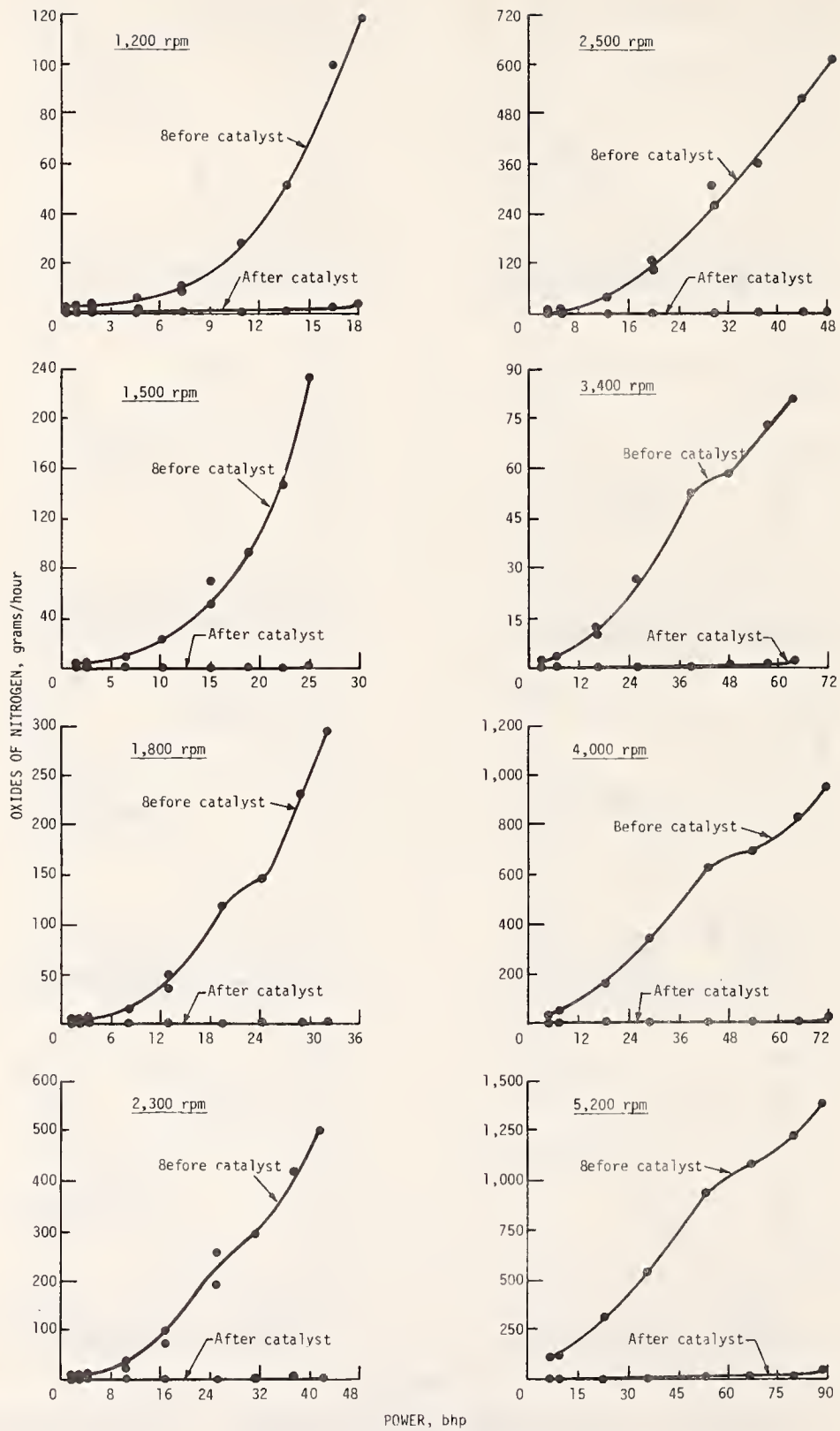


FIGURE 5. Oxides of Nitrogen Emissions Versus Power at Various Speed and Load Conditions--Volvo 130-CID Engine.

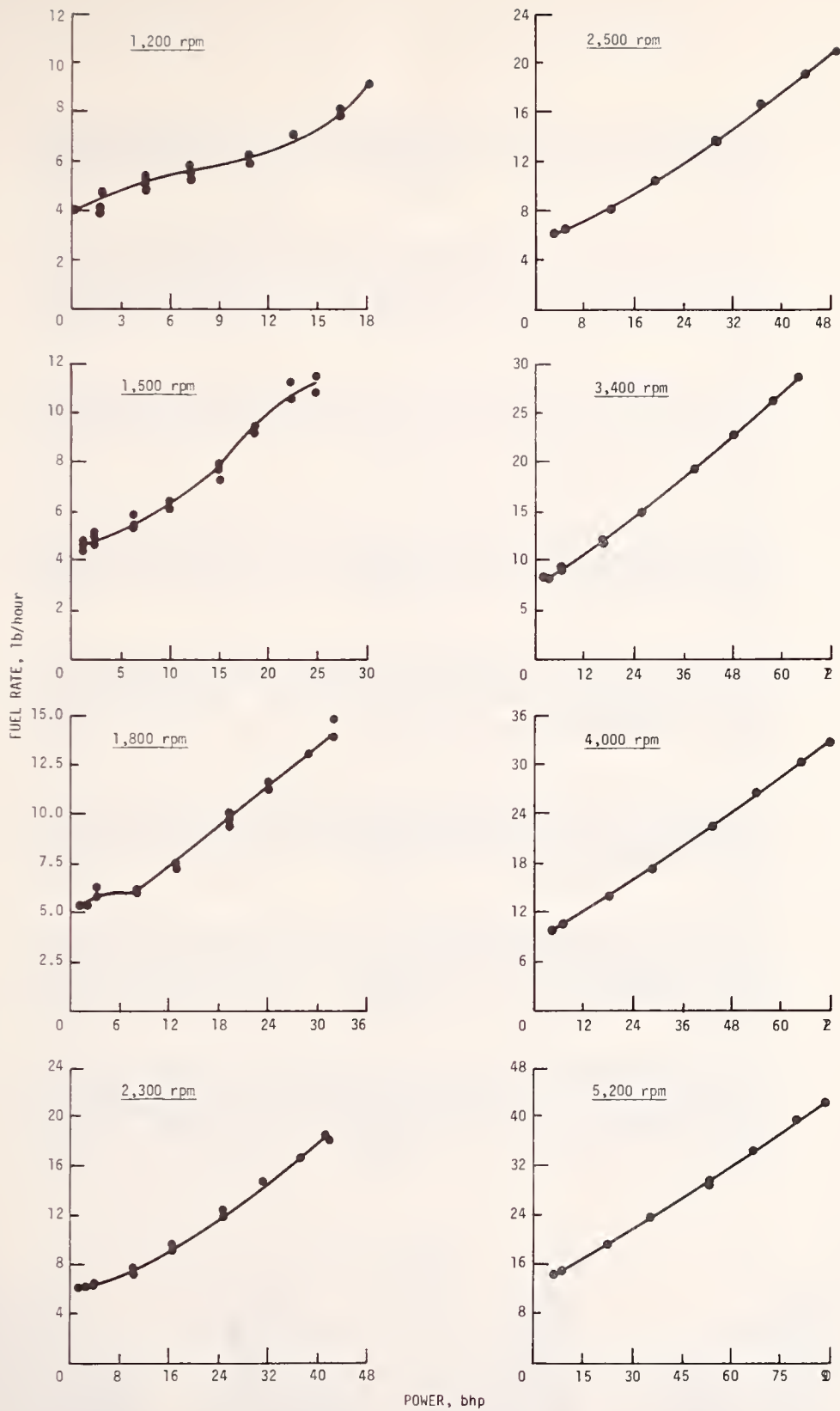


FIGURE 6. Fuel Rate Versus Power at Various Speed and Load Conditions--Volvo 130-CID Engine.

ENGINE: VOLVO 130 CID  
 FUEL CODE: 7619

	1.1	2.1	2.2	3.1	3.2	4.1	4.2
TEST NUMBER	8/29/77	8/29/77	8/29/77	8/29/77	8/29/77	8/30/77	8/30/77
TEST DATE	746.8	746.8	746.8	746.8	746.8	745.2	745.2
BAROMETER, MMHG	67	67	67	67	70	75	75
HUMIDITY, GRAINS/LB	80	80	80	80	81	79	79
TEMPERATURE, F	900	900	900	900	900	750	750
ENGINE SPEED, RPM	2.2	15.1	15.2	30.3	30.2	9.7	9.8
TORQUE, FT-LB	.4	2.6	2.6	5.2	5.2	1.4	1.4
POWER, BHP*	3.0	3.6	3.9	4.6	4.5	3.0	2.5
FUEL RATE, LB/HR	3.0	2.0	2.0	7.0	7.0	2.0	2.0
IGNITION TIMING, DEG BTDC	3.0	8.6	8.6	7.3	7.4	9.9	10.2
MANIFOLD VACUUM, IN HG	12.3	2.2	2.2	3.2	3.2	4	4
THROTTLE ANGLE, DEG	.0	99	98	98	98	101	101
INTAKE MAN. TEMP., F	100	99	98	98	98	101	101
CONCENTRATIONS, DRY BASIS							
CO, %	.9152	.8552	.0034	.8631	.0017	.8679	.0088
CO2, %	12.79	13.42	14.35	13.38	14.35	13.17	14.35
O2, %	1.58	.77	.16	.83	.18	.95	.03
HC, PPMC	6143	629	70	1010	66	2190	135
NOX, PPM	38	79	22	129	39	52	1
AIR/FUEL RATIO	14.83	14.88	14.92	14.88	14.93	14.84	14.81
EMISSION RATES, G/HR							
CO	165.2	185.9	.8	243.3	.5	159.5	1.3
HC	55.7	6.9	.8	14.3	.9	20.2	1.0
NOX+	1.1	2.7	.8	5.8	1.7	1.6	.0
OIL TEMPERATURE, F	155	155	155	158	159	160	159
OIL PRESSURE, PSI	34	34	34	33	33	26	27
COOLANT TEMPERATURE, F	179	182	184	185	185	185	184
EXHAUST PRESSURE, IN. H2O	4.0	5.0	1.0	6.0	2.0	3.0	.0
EXHAUST TEMPERATURE, F	735	837	817	841	831	700	727

\* CORRECTED SAE J8168  
 + CORRECTED FOR HUMIDITY

ENGINE: VOLVO 130 CID  
 FUEL CODE: 7619

	5.1	5.2	6.1	6.2	7.1	7.2	8.1	8.2
TEST NUMBER	8/30/77	8/30/77	8/30/77	8/30/77	8/30/77	8/30/77	8/30/77	8/30/77
TEST DATE	745.2	745.2	745.2	745.2	745.2	745.2	745.2	745.2
BAROMETER, MMHG	75	75	73	73	73	73	73	73
HUMIDITY, GRAINS/LB	79	80	80	80	80	80	80	80
TEMPERATURE, F	1200	1200	1200	1200	1200	1200	1200	1200
ENGINE SPEED, RPM	79.5	79.5	71.7	71.7	59.4	59.4	47.6	47.5
TORQUE, FT-LB	18.2	18.2	16.4	16.4	13.6	13.6	10.9	10.9
POWER, BHP*	9.2	9.2	8.1	7.9	7.1	7.1	6.0	6.3
FUEL RATE, LB/HR	12.5	12.5	17.0	17.0	15.5	15.5	20.0	20.0
IGNITION TIMING, DEG 8TDC	.6	.6	2.6	2.9	5.2	5.0	8.2	7.9
MANIFOLD VACUUM, IN HG	79.2	79.2	12.8	12.8	8.5	8.5	4.8	4.8
THROTTLE ANGLE, DEG	96	94	93	93	94	95	96	96
INTAKE MAN. TEMP., F								
CONCENTRATIONS, DRY BASIS								
CO, %	.5991	.0721	.6408	.0384	.7512	.0363	.8572	.0707
CO2, %	13.64	14.35	13.51	14.36	13.48	14.37	13.33	14.28
O2, %	.51	.07	.66	.06	.72	.06	.82	.07
HC, PPMC	1644	215	1856	152	1653	117	1715	121
NOX, PPM	1295	35	1231	31	730	11	479	7
AIR/FUEL RATIO	14.76	14.81	14.82	14.82	14.81	14.83	14.81	14.81
EMISSION RATES, G/HR								
CO	331.9	39.9	317.2	18.4	323.2	15.7	310.6	26.9
HC	45.8	6.0	46.1	3.7	35.7	2.5	31.2	2.3
NOX+	118.1	3.2	99.5	2.5	51.3	.8	28.3	.4
OIL TEMPERATURE, F	163	180	183	183	182	180	178	177
OIL PRESSURE, PSI	41	39	35	36	37	36	38	37
COOLANT TEMPERATURE, F	191	192	190	189	189	189	188	187
EXHAUST PRESSURE, IN. H2O	7.0	3.0	6.0	2.0	5.0	1.0	4.0	1.0
EXHAUST TEMPERATURE, F	1010	1053	993	1015	973	989	907	942

\* CORRECTED SAE J8168  
 + CORRECTED FOR HUMIDITY

ENGINE: VOLVO 130 CID

FUEL CODE: 7619

TEST NUMBER

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

	9.1	9.2	10.1	10.2	11.1	11.2	13.1	13.2
	8/30/77	8/30/77	8/30/77	8/30/77	8/30/77	8/30/77	8/30/77	8/30/77
TEST NUMBER	745.2	745.2	745.2	745.2	745.2	745.2	745.2	745.2
TEST DATE	73	73	73	73	73	73	73	73
BAROMETER, MMHG	80	80	80	80	80	80	81	81
HUMIDITY, GRAINS/LB	1200	1200	1200	1200	1200	1200	1500	1500
TEMPERATURE, F	31.6	31.6	19.7	19.7	7.7	7.8	87.1	87.1
ENGINE SPEED, RPM	7.2	7.2	4.5	4.5	1.8	1.8	24.9	24.9
TORQUE, FT-LB	5.9	5.2	5.1	4.9	4.0	4.1	11.5	10.9
POWER, BHP*	15.0	15.0	7.0	7.0	6.0	6.0	19.0	19.0
FUEL RATE, LB/HR	9.8	9.8	10.6	10.4	13.0	13.1	.7	.7
IGNITION TIMING, DEG BTDC	4.0	4.0	3.5	3.5	2.0	2.0	79.4	79.4
MANIFOLD VACUUM, IN HG	97	98	98	99	101	101	96	96
THROTTLE ANGLE, DEG								
INTAKE MAN. TEMP., F								

CONCENTRATIONS, DRY BASIS

CO, %	.8262	.0199	.8196	.0296	.8766	.0041	.6355	.0966
CO2, %	13.42	14.33	13.43	14.26	13.25	14.30	13.50	14.15
O2, %	.73	.06	.63	.06	.88	.09	.61	.07
HC, PPMC	1080	61	718	61	2186	41	1877	182
NOX, PPM	184	4	118	2	84	5	2046	32

AIR/FUEL RATIO

	14.83	14.84	14.80	14.84	14.79	14.87	14.81	14.80
--	-------	-------	-------	-------	-------	-------	-------	-------

EMISSION RATES, G/HR

CO	293.8	6.3	252.1	8.8	210.3	1.0	444.9	63.6
HC	19.3	1.0	11.1	.9	26.3	.5	66.0	6.0
NOX+	10.7	.2	5.9	.1	3.3	.2	234.1	3.4

OIL TEMPERATURE, F

OIL PRESSURE, PSI

COOLANT TEMPERATURE, F

EXHAUST PRESSURE, IN. H2O

EXHAUST TEMPERATURE, F

OIL TEMPERATURE, F	176	176	173	174	174	173	190	188
OIL PRESSURE, PSI	39	39	39	39	39	40	45	43
COOLANT TEMPERATURE, F	187	187	188	188	186	186	195	195
EXHAUST PRESSURE, IN. H2O	3.0	1.0	2.0	.0	2.0	.0	12.0	4.0
EXHAUST TEMPERATURE, F	902	928	950	940	902	934	1099	1152

\* CORRECTED SAE J8168  
+ CORRECTED FOR HUMIDITY

ENGINE: VOLVO 130 CID  
 FUEL CODE: 7619

TEST NUMBER	14.1	14.2	15.1	15.2	16.1	16.2	17.1	17.2
TEST DATE	8/31/77	8/31/77	8/31/77	8/31/77	8/31/77	8/31/77	8/31/77	8/31/77
BAROMETER, MMHG	742.5	742.5	742.5	742.5	742.5	742.5	742.5	742.5
HUMIDITY, GRAINS/LB	72	72	72	72	79	79	79	79
TEMPERATURE, F	80	81	81	81	81	81	81	81
ENGINE SPEED, RPM	1500	1500	1500	1500	1500	1500	1500	1500
TORQUE, FT-LB	77.6	77.9	65.2	65.2	52.2	52.3	34.9	34.9
POWER, 8HP*	22.3	22.4	18.7	18.7	15.0	15.0	10.0	10.1
FUEL RATE, LB/HR	11.2	10.6	9.2	9.5	7.3	7.3	6.4	6.1
IGNITION TIMING, DEG 8TDC	15.0	15.0	16.5	16.5	24.0	24.0	27.0	27.0
MANIFOLD VACUUM, IN HG	2.2	2.4	4.9	4.8	8.9	8.7	12.1	12.3
THROTTLE ANGLE, DEG	18.9	18.9	11.6	11.4	6.8	6.9	4.5	4.5
INTAKE MAN. TEMP., F	92	92	92	93	94	94	99	98
CONCENTRATIONS, DRY BASIS								
CO, %	.5412	.0620	.6099	.0618	.7721	.0323	.8804	.0157
CO2, %	13.76	14.43	13.72	14.44	13.51	14.47	13.39	14.43
O2, %	.51	.01	.51	.01	.67	-.01	.79	.03
HC, PPMC	1521	156	1266	104	1626	90	1283	77
NOX, PPN	1330	16	1025	13	934	10	356	4
AIR/FUEL RATIO	14.80	14.78	14.79	14.78	14.78	14.78	14.82	14.81
EMISSION RATES, G/HR								
CO	368.7	39.6	340.6	35.4	342.3	14.3	342.8	5.8
HC	52.0	5.0	35.5	3.0	36.2	2.0	25.1	1.4
NOX+	147.2	1.7	93.0	1.2	69.5	.7	23.3	.3
OIL TEMPERATURE, F	170	175	177	178	177	176	165	170
OIL PRESSURE, PSI	44	43	43	43	44	44	47	46
COOLANT TEMPERATURE, F	195	195	194	193	191	191	187	191
EXHAUST PRESSURE, IN. H2O	10.0	3.0	8.0	2.0	6.0	1.0	4.0	.0
EXHAUST TEMPERATURE, F	1113	1137	1092	1096	987	1024	877	937

\* CORRECTED SAE J8168  
 + CORRECTED FOR HUMIDITY

ENGINE: VOLVO 130 CID

FUEL CODE: 7619

TEST NUMBER

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

	18.1	18.2	19.1	19.2	20.1	20.2	21.1	21.2
	8/31/77	8/31/77	8/31/77	8/31/77	8/31/77	8/31/77	8/31/77	8/31/77
TEST NUMBER	742.5	742.5	742.5	742.5	743.2	743.2	743.2	743.2
BAROMETER, MMHG	79	79	81	81	81	81	81	81
HUMIDITY, GRAINS/LB	81	81	81	82	82	83	83	83
TEMPERATURE, F	1500	1500	1500	1500	1500	1500	1800	1800
ENGINE SPEED, RPM	22.3	22.3	8.4	8.4	4.2	4.2	92.9	92.8
TORQUE, FT-LB	6.4	6.4	2.4	2.4	1.2	1.2	32.1	32.1
POWER, BHP*	5.3	5.4	4.9	4.6	4.5	4.2	14.8	14.0
FUEL RATE, LB/HR	18.0	18.0	10.0	10.0	10.0	10.0	20.0	20.0
IGNITION TIMING, DEG BTDC	12.6	12.8	14.6	16.0	15.7	15.5	.8	.8
MANIFOLD VACUUM, IN HG	4.3	4.3	3.2	3.3	2.6	2.6	79.4	79.4
THROTTLE ANGLE, DEG	98	99	100	101	103	103	98	97
INTAKE MAN. TEMP., F								

CONCENTRATIONS, DRY BASIS

CO, %	.8693	.0510	.8960	.0729	.9571	.0118	.4866	.0487
CO2, %	13.48	14.44	13.55	14.36	13.21	14.41	13.76	14.40
O2, %	.66	.01	.62	.08	1.14	.01	.47	.01
HC, PPMC	671	67	872	60	1950	60	1597	105
NOX, PPM	150	4	85	2	76	4	1939	22

AIR/FUEL RATIO

	14.80	14.79	14.74	14.83	14.95	14.81	14.81	14.79
--	-------	-------	-------	-------	-------	-------	-------	-------

EMISSION RATES, G/HR

CO	278.8	16.7	265.3	20.2	265.1	3.0	436.8	41.1
HC	10.8	1.1	13.0	.8	27.1	.8	72.0	4.5
NOX+	8.1	.2	4.3	.1	3.5	.2	294.3	3.1

OIL TEMPERATURE, F

	170	171	171	171	170	170	178	182
--	-----	-----	-----	-----	-----	-----	-----	-----

OIL PRESSURE, PSI

	46	46	46	46	47	47	48	48
--	----	----	----	----	----	----	----	----

COOLANT TEMPERATURE, F

	192	192	192	192	189	189	198	198
--	-----	-----	-----	-----	-----	-----	-----	-----

EXHAUST PRESSURE, IN. H2O

	4.0	.0	3.0	.0	3.0	.0	17.0	5.0
--	-----	----	-----	----	-----	----	------	-----

EXHAUST TEMPERATURE, F

	927	951	942	935	910	946	1192	1220
--	-----	-----	-----	-----	-----	-----	------	------

\* CORRECTED SAE J8168  
+ CORRECTED FOR HUMIDITY



ENGINE: VOLVO 130 CID  
 FUEL CODE: 7619

	22.1	22.2	23.1	23.2	24.1	24.2	25.1	25.2
TEST NUMBER	8/31/77	8/31/77	8/31/77	8/31/77	8/31/77	8/31/77	8/31/77	8/31/77
TEST DATE	743.2	743.2	743.2	743.2	743.0	742.2	743.0	743.0
BAROMETER, MMHG	81	81	81	81	81	81	81	81
HUMIDITY, GRAINS/LB	83	83	83	83	83	83	83	83
TEMPERATURE, F	1800	1800	1800	1800	1800	1800	1800	1800
ENGINE SPEED, RPM	83.8	83.8	70.0	69.9	56.0	56.0	37.1	37.1
TORQUE, FT-LB	29.0	29.0	24.2	24.2	19.3	19.4	12.8	12.8
POWER, BHP*	13.0	13.1	11.6	11.3	10.0	9.7	7.5	7.2
FUEL RATE, LB/HR	21.0	21.0	22.0	22.0	28.0	28.0	30.0	30.0
IGNITION TIMING, DEG BTDC	2.7	2.5	5.2	5.6	8.4	8.3	12.3	12.2
MANIFOLD VACUUM, IN HG	20.0	20.5	13.4	13.4	9.4	9.3	6.2	6.2
THROTTLE ANGLE, DEG	96	96	96	96	94	95	97	98
INTAKE MAN. TEMP., F								

CONCENTRATIONS, DRY BASIS

CO, %	.4849	.0515	.5621	.0530	.7217	.0655	.9898	.0855
CO2, %	13.75	14.36	13.67	14.35	13.41	14.29	13.23	14.21
O2, %	.46	.01	.50	.01	.61	.00	.71	.01
HC, PPMC	1487	120	1356	112	1606	129	1209	131
NOX, PPM	1735	20	1231	17	1150	16	651	8

AIR/FUEL RATIO

	14.81	14.78	14.80	14.79	14.77	14.77	14.74	14.76
--	-------	-------	-------	-------	-------	-------	-------	-------

EMISSION RATES, G/HR

CO	383.4	40.9	394.8	36.2	438.1	38.3	450.4	37.4
HC	59.0	4.8	47.8	3.8	49.0	3.8	27.6	2.9
NOX+	231.9	2.7	146.2	2.0	118.0	1.6	50.1	.6

OIL TEMPERATURE, F	189	190	191	190	164	171	177	180
OIL PRESSURE, PSI	47	46	46	47	50	49	49	48
COOLANT TEMPERATURE, F	197	198	197	196	194	195	195	194
EXHAUST PRESSURE, IN. H2O	14.0	4.0	12.0	3.0	9.0	2.0	6.0	1.0
EXHAUST TEMPERATURE, F	1172	1191	1143	1148	1056	1088	979	1021

\* CORRECTED SAE J8168  
 + CORRECTED FOR HUMIDITY

ENGINE: VOLVO 130 CID  
 FUEL CODE: 7619

TEST DATE	26.1	26.2	27.1	27.2	28.1	28.2	29.1	29.2
TEST NUMBER	8/31/77	8/31/77	8/31/77	8/31/77	8/31/77	8/31/77	8/31/77	8/31/77
BAROMETER, MMHG	743.0	743.0	743.0	743.0	743.0	743.0	743.0	743.0
HUMIDITY, GRAINS/LB	81	81	81	81	81	81	81	81
TEMPERATURE, F	84	84	84	84	84	84	85	85
ENGINE SPEED, RPM	1800	1800	1800	1800	1800	1800	2300	2300
TORQUE, FT-LB	23.2	23.2	9.1	9.1	3.2	3.0	94.0	95.3
POWER, BHP*	8.0	8.0	3.2	3.2	1.1	1.1	41.6	42.2
FUEL RATE, LB/HR	6.0	6.1	5.9	6.3	5.5	5.4	18.5	18.2
IGNITION TIMING, DEG 8TDC	29.0	29.0	16.0	16.0	13.5	13.5	28.0	28.0
MANIFOLD VACUUM, IN HG	14.8	14.9	14.8	15.1	16.5	16.4	1.0	1.0
THROTTLE ANGLE, DEG	4.6	4.6	4.2	4.2	3.6	3.6	79.9	79.9
INTAKE MAN. TEMP., F	99	101	102	103	103	104	98	98
CONCENTRATIONS, DRY BASIS								
CO, %	.9733	.0900	.9481	.1914	.9929	.2380	.5083	.0715
CO2, %	13.33	14.44	13.53	14.36	13.49	14.36	13.85	14.53
O2, %	.73	.01	.54	.01	.62	.02	.53	.02
HC, PPMC	849	99	450	109	503	126	1590	110
NOX, PPM	243	4	102	3	86	3	2630	15
AIR/FUEL RATIO	14.78	14.77	14.70	14.72	14.73	14.71	14.87	14.79
EMISSION RATES, G/HR								
CO	351.7	32.9	334.0	72.4	330.4	77.2	573.1	78.5
HC	15.4	1.8	8.0	2.1	8.4	2.1	90.0	6.1
NOX+	14.9	.2	6.1	.2	4.8	.2	501.4	2.8
OIL TEMPERATURE, F	180	179	177	171	174	175	191	197
OIL PRESSURE, PSI	49	49	49	50	49	49	50	50
COOLANT TEMPERATURE, F	192	192	193	193	194	194	201	200
EXHAUST PRESSURE, IN. H2O	4.0	.0	4.0	.0	4.0	.0	27.0	9.0
EXHAUST TEMPERATURE, F	928	960	985	940	979	955	1285	1315

\* CORRECTED SAE J8168  
 + CORRECTED FOR HUMIDITY

ENGINE: VOLVO 130 CID

FUEL CODE: 7619

	30.1	30.2	31.1	31.2	32.1	32.2	33.1	33.2
TEST NUMBER	8/31/77	8/31/77	8/31/77	8/31/77	8/31/77	8/31/77	8/31/77	8/31/77
BAROMETER, MMHG	743.0	743.0	743.0	743.0	743.0	743.0	743.0	743.0
HUMIDITY, GRAINS/LB	81	81	81	81	81	81	81	81
TEMPERATURE, F	85	86	86	86	86	86	86	86
ENGINE SPEED, RPM	2300	2300	2300	2300	2300	2300	2300	2300
TORQUE, FT-LB	84.4	84.4	70.5	70.6	56.3	56.2	37.5	37.5
POWER, BHP*	37.4	37.4	31.2	31.3	24.9	24.9	16.6	16.6
FUEL RATE, LB/HR	16.8	16.7	14.7	14.8	12.3	12.2	9.5	9.5
IGNITION TIMING, DEG 8TDC	22.0	22.0	27.0	27.0	36.0	36.0	37.0	37.0
MANIFOLD VACUUM, IN HG	2.8	2.8	5.5	5.5	9.2	9.2	12.8	12.9
THROTTLE ANGLE, DEG	23.1	23.2	16.0	16.0	11.4	11.4	8.2	8.1
INTAKE MAN. TEMP., F	98	98	98	98	99	99	99	99

CONCENTRATIONS, DRY BASIS

CO, %	.5514	.0599	.5554	.0417	.6488	.0282	.6788	.0441
CO2, %	13.77	14.43	13.76	14.41	13.60	14.41	13.60	14.44
O2, %	.52	.03	.54	.02	.63	.02	.57	.02
HC, PPMC	1627	82	1510	83	1762	92	1322	64
NOX, PPM	2420	21	1941	18	2023	19	1015	12

AIR/FUEL RATIO

	14.83	14.80	14.83	14.80	14.83	14.80	14.78	14.80
--	-------	-------	-------	-------	-------	-------	-------	-------

EMISSION RATES, G/HR

CO	562.7	60.4	497.0	37.2	483.8	20.8	392.0	25.4
HC	83.4	4.2	67.9	3.7	66.0	3.4	38.3	1.8
NOX+	417.5	3.6	293.7	2.8	255.1	2.4	99.1	1.2
OIL TEMPERATURE, F	201	202	202	202	207	205	204	204
OIL PRESSURE, PSI	50	50	50	50	50	50	51	51
COOLANT TEMPERATURE, F	200	200	198	198	195	195	194	192
EXHAUST PRESSURE, IN. H2O	23.0	8.0	19.0	6.0	14.0	4.0	9.0	2.0
EXHAUST TEMPERATURE, F	1257	1287	1228	1249	1141	1171	1071	1094

\* CORRECTED SAE J816B  
+ CORRECTED FOR HUMIDITY

ENGINE: VOLVO 130 CID  
 FUEL CODE: 7619

TEST NUMBER	34.1 8/31/77	34.2 8/31/77	35.1 8/31/77	35.2 8/31/77	36.1 8/31/77	36.2 8/31/77	37.1 9/ 1/77	37.2 9/ 1/77
BAROMETER, MMHG	743.0	743.0	743.0	743.0	743.0	743.0	747.1	747.1
HUMIDITY, GRAINS/LB	81	81	81	81	86	86	72	72
TEMPERATURE, F	86	86	86	85	86	86	79	80
ENGINE SPEED, RPM	2300	2300	2300	2300	2300	2300	2500	2500
TORQUE, FT-LB	23.5	23.5	8.9	9.0	3.3	3.3	103.0	102.9
POWER, 8HP*	10.4	10.4	4.0	4.0	1.5	1.5	48.9	48.9
FUEL RATE, L8/HR	7.6	7.7	6.3	6.2	6.0	6.0	20.8	20.9
IGNITION TIMING, DEG 8TDC	36.5	36.5	30.0	30.0	24.0	24.0	28.0	28.0
MANIFOLD VACUUM, IN HG	15.6	15.7	17.8	17.6	18.0	18.1	1.1	1.1
THROTTLE ANGLE, DEG	6.2	6.1	4.6	4.6	4.0	4.0	80.0	80.0
INTAKE MAN. TEMP., F	101	101	102	103	104	104	89	90
CONCENTRATIONS, DRY BASIS								
CO, %	.8006	.0684	.7706	.0558	.7390	.0662	.5273	.0776
CO2, %	13.46	14.32	13.50	14.32	13.55	14.28	13.71	14.38
O2, %	.60	.01	.54	.01	.47	.01	.45	.06
HC, PPMC	916	81	544	65	434	57	1690	97
NOX, PPM	462	12	155	5	115	4	2984	15
AIR/FUEL RATIO	14.77	14.78	14.77	14.79	14.75	14.79	14.81	14.81
EMISSION RATES, G/HR								
CO	367.4	31.7	293.5	20.8	269.1	24.1	664.7	98.3
HC	21.1	1.9	10.4	1.2	7.9	1.0	107.0	6.2
NOX+	35.9	.9	10.0	.3	7.3	.3	609.6	3.1
OIL TEMPERATURE, F	196	194	192	191	194	193	203	207
OIL PRESSURE, PSI	51	51	51	52	52	52	52	51
COOLANT TEMPERATURE, F	190	189	189	189	189	189	198	199
EXHAUST PRESSURE, IN. H2O	7.0	1.0	5.0	.0	5.0	.0	32.0	12.0
EXHAUST TEMPERATURE, F	1002	1034	980	990	1022	1009	1321	1364

\* CORRECTED SAE J816B  
 + CORRECTED FOR HUMIDITY

ENGINE: VOLVO 130 CID

FUEL CODE: 7619

TEST NUMBER	38.1	38.2	39.1	39.2	40.1	40.2	41.1	41.2
TEST DATE	9/ 1/77	9/ 1/77	9/ 1/77	9/ 1/77	9/ 1/77	9/ 1/77	9/ 1/77	9/ 1/77
BAROMETER, MMHG	747.1	747.1	747.1	747.1	747.1	747.1	747.1	747.1
HUMIDITY, GRAINS/L8	72	72	72	72	72	72	72	75
TEMPERATURE, F	80	80	80	80	80	80	80	80
ENGINE SPEED, RPM	2500	2500	2500	2500	2500	2500	2500	2500
TORQUE, FT-L8	92.7	92.5	77.2	77.2	61.8	61.9	41.3	41.2
POWER, SHP*	44.0	43.9	36.7	36.7	29.4	29.4	19.6	19.6
FUEL RATE, LB/HR	19.0	19.1	16.7	16.6	13.8	13.6	10.6	10.6
IGNITION TIMING, DEG 8TDC	28.0	28.0	29.0	29.0	37.0	37.0	38.0	38.0
MANIFOLD VACUUM, IN HG	2.9	2.8	5.5	5.6	9.0	9.1	13.1	13.1
THROTTLE ANGLE, DEG	27.6	26.2	17.7	17.6	12.6	12.5	8.8	8.8
INTAKE MAN. TEMP., F	91	91	91	91	91	91	92	92

CONCENTRATIONS, DRY BASIS

CO, %	.5572	.0569	.5596	.0377	.6415	.0193	.7628	.0543
CO2, %	13.67	14.37	13.68	14.37	13.55	14.38	13.49	14.36
O2, %	.46	.05	.46	.05	.54	.04	.54	.04
HC, PPMC	1574	78	1437	98	1783	78	1219	77
NOX, PPM	2774	16	2197	13	2270	13	1237	13

AIR/FUEL RATIO

	14.80	14.82	14.79	14.82	14.78	14.82	14.74	14.81
--	-------	-------	-------	-------	-------	-------	-------	-------

EMISSION RATES, G/HR

CO	643.3	65.8	567.7	37.9	535.1	15.9	486.7	34.6
HC	91.3	4.6	73.2	4.9	74.7	3.2	39.1	2.5
NOX*	519.0	3.1	361.2	2.2	306.8	1.7	127.9	1.3
OIL TEMPERATURE, F	213	224	217	213	216	215	217	214
OIL PRESSURE, PSI	51	50	50	51	51	51	52	52
COOLANT TEMPERATURE, F	199	199	197	196	195	195	192	192
EXHAUST PRESSURE, IN. H2O	29.0	10.0	22.0	8.0	16.0	5.0	10.0	2.0
EXHAUST TEMPERATURE, F	1306	1340	1277	1300	1191	1223	1099	1141

\* CORRECTED SAE J8168  
+ CORRECTED FOR HUMIDITY

ENGINE: VOLVO 130 CID  
 FUEL CODE: 7619

	42.1	42.2	43.1	43.2	44.1	44.2	45.1	45.2
TEST NUMBER	9/ 1/77	9/ 1/77	9/ 1/77	9/ 1/77	9/ 1/77	9/ 1/77	9/ 1/77	9/ 1/77
TEST DATE	747.1	747.1	747.1	747.1	747.1	747.1	747.5	747.5
BAROMETER, MMHG	77	75	75	75	75	75	78	78
HUMIDITY, GRAINS/LB	80	80	80	80	80	81	81	81
TEMPERATURE, F	2500	2500	2500	2500	2500	2500	3400	3400
ENGINE SPEED, RPM	25.7	25.7	10.4	10.4	5.6	5.6	98.7	98.9
TORQUE, FT-LB	12.2	12.2	4.9	4.9	2.7	2.6	63.8	64.0
POWER, BHP*	8.2	8.3	6.3	6.3	6.2	6.2	28.7	28.7
FUEL RATE, LB/HR	31.0	31.0	33.0	33.0	26.0	26.0	32.0	32.0
IGNITION TIMING, DEG BTDC	16.0	16.0	18.7	18.5	18.6	18.5	1.5	1.5
MANIFOLD VACUUM, IN HG	6.6	6.6	4.5	4.5	4.2	4.3	79.0	79.0
THROTTLE ANGLE, DEG	93	93	95	95	96	96	91	91
INTAKE MAN. TEMP., F								

CONCENTRATIONS, DRY BASIS

CO, %	.8228	.0754	.7919	.0518	.7421	.0862	.6111	.0992
CO2, %	13.44	14.35	13.51	14.32	13.55	14.30	13.63	14.35
O2, %	.56	.03	.56	.03	.51	.03	.49	.05
HC, PPMC	919	73	630	52	404	50	1670	112
NOX, PPM	504	9	176	4	123	4	2781	66

AIR/FUEL RATIO

	14.74	14.79	14.77	14.81	14.78	14.79	14.79	14.79
--	-------	-------	-------	-------	-------	-------	-------	-------

EMISSION RATES, G/HR

CO	407.6	37.5	301.1	19.7	277.0	32.1	1062.0	171.8
HC	22.9	1.8	12.0	1.0	7.6	.9	145.8	9.8
NOX+	41.4	.7	11.0	.3	7.6	.2	807.6	19.2

OIL TEMPERATURE, F	212	211	209	207	206	206	176	200
OIL PRESSURE, PSI	52	52	53	53	53	53	56	54
COOLANT TEMPERATURE, F	189	189	188	188	189	189	201	202
EXHAUST PRESSURE, IN. H2O	7.0	1.0	5.0	1.0	5.0	1.0	56.0	24.0
EXHAUST TEMPERATURE, F	1037	1072	997	1021	1029	1033	1431	1495

\* CORRECTED SAE J8168  
 + CORRECTED FOR HUMIDITY

ENGINE: VOLVO 130 CID  
 FUEL CODE: 7619

TEST NUMBER	46.1	46.2	47.1	47.2	48.1	48.2	49.1	49.2
TEST DATE	9/ 1/77	9/ 1/77	9/ 1/77	9/ 1/77	9/ 1/77	9/ 1/77	9/ 1/77	9/ 1/77
BAROMETER, MMHG	747.5	747.5	747.5	747.5	746.3	746.3	746.3	746.3
HUMIDITY, GRAINS/LB	76	76	76	76	83	83	83	83
TEMPERATURE, F	81	82	83	83	83	83	83	83
ENGINE SPEED, RPM	3400	3400	3400	3400	3400	3400	3400	3400
TORQUE, FT-LB	89.0	88.9	74.1	74.1	59.5	59.6	39.5	39.5
POWER, BHP*	57.6	57.6	48.0	48.0	38.7	38.7	25.7	25.7
FUEL RATE, LB/HR	26.2	26.0	22.8	22.8	19.2	19.2	14.8	14.8
IGNITION TIMING, DEG BTDC	32.0	32.0	33.0	33.0	41.0	41.0	41.0	41.0
MANIFOLD VACUUM, IN HG	3.6	3.6	6.6	6.6	9.5	9.5	13.5	13.5
THROTTLE ANGLE, DEG	29.5	29.5	20.8	20.8	16.0	16.0	11.5	11.6
INTAKE MAN. TEMP., F	92	92	93	93	92	92	94	94

CONCENTRATIONS, DRY BASIS

CO, %	.6230	.0868	.6108	.0686	.6227	.0420	.5921	.0522
CO2, %	13.66	14.36	13.68	14.37	13.48	14.23	13.77	14.70
O2, %	.49	.04	.46	.04	.54	.01	.59	.04
HC, PPMC	1405	94	1255	69	1618	94	1377	79
NOX, PPM	2761	38	2542	29	2608	14	1719	9

AIR/FUEL RATIO

AIR/FUEL RATIO	14.81	14.79	14.80	14.80	14.82	14.79	14.86	14.81
----------------	-------	-------	-------	-------	-------	-------	-------	-------

EMISSION RATES, G/HR

CO	990.0	136.5	843.9	94.6	726.3	48.9	532.3	46.6
HC	112.1	7.4	87.1	4.7	94.8	5.5	62.2	3.6
NOX*	727.3	9.9	582.3	6.6	521.7	2.9	265.0	1.4

OIL TEMPERATURE, F

OIL TEMPERATURE, F	210	213	215	215	188	200	204	206
OIL PRESSURE, PSI	53	53	53	53	55	54	54	54
COOLANT TEMPERATURE, F	200	202	201	201	198	198	195	196
EXHAUST PRESSURE, IN. H2O	43.0	20.0	34.0	15.0	25.0	10.0	17.0	5.0
EXHAUST TEMPERATURE, F	1412	1463	1389	1423	1306	1345	1243	1273

\* CORRECTED SAE J8168  
 + CORRECTED FOR HUMIDITY

ENGINE: VOLVO 130 CID

FUEL CODE: 7619

TEST NUMBER

TEST DATE

BAROMETER, MMHG

HUMIDITY, GRAINS/LB

TEMPERATURE, F

ENGINE SPEED, RPM

TORQUE, FT-LB

POWER, SHP\*

FUEL RATE, LB/HR

IGNITION TIMING, DEG 8TDC

MANIFOLD VACUUM, IN HG

THROTTLE ANGLE, DEG

INTAKE MAN. TEMP., F

	50.1	50.2	51.1	51.2	52.1	52.2	53.1	53.2
	9/ 1/77	9/ 1/77	9/ 1/77	9/ 1/77	9/ 1/77	9/ 1/77	9/ 1/77	9/ 1/77
	746.3	746.3	746.3	746.3	746.3	746.3	746.3	746.3
	83	83	80	80	80	80	80	80
	83	83	83	83	83	83	84	85
	3400	3400	3400	3400	3400	3400	4000	4000
	24.6	24.6	9.7	9.7	4.6	4.6	93.9	94.1
	16.0	16.0	6.3	6.3	3.0	3.0	71.9	72.1
	11.7	11.7	9.1	9.0	8.1	8.1	32.9	32.7
	41.0	41.0	43.0	43.0	42.0	42.0	33.0	33.0
	16.3	16.2	18.7	18.7	19.6	19.7	1.9	1.9
	9.0	9.0	6.5	6.5	5.3	5.4	79.0	79.1
	96	96	97	98	99	99	95	95

CONCENTRATIONS, DRY BASIS

CO, %	.6456	.0594	.5942	.0829	.5689	.0320	.7270	.1526
CO2, %	13.98	14.67	14.07	14.67	14.07	14.68	13.87	14.66
O2, %	.43	.03	.36	.03	.41	.03	.54	.06
HC, PPMC	866	52	444	44	298	29	1715	111
NOX, PPM	970	6	348	6	225	4	2838	61

AIR/FUEL RATIO

	14.76	14.80	14.75	14.79	14.81	14.82	14.76	14.77
--	-------	-------	-------	-------	-------	-------	-------	-------

EMISSION RATES, G/HR

CO	453.9	42.0	325.2	45.0	277.5	15.6	1460.9	300.0
HC	30.6	1.9	12.2	1.2	7.3	.7	173.1	11.0
NOX+	116.9	.8	32.1	.5	18.5	.3	961.9	20.2

OIL TEMPERATURE, F

OIL PRESSURE, PSI

COOLANT TEMPERATURE, F

EXHAUST PRESSURE, IN. H2O

EXHAUST TEMPERATURE, F

	206	203	202	201	200	199	213	222
	54	54	55	55	55	55	55	54
	195	195	194	194	194	194	203	204
	12.0	3.0	8.0	2.0	6.0	1.0	69.0	32.0
	1189	1199	1156	1132	1142	1111	1468	1544

\* CORRECTED SAE J8168

+ CORRECTED FOR HUMIDITY



ENGINE: VOLVO 130 CID

FUEL CODE: 7619

TEST NUMBER

TEST DATE

BAROMETER, MMHG

HUMIDITY, GRAINS/LB

TEMPERATURE, F

ENGINE SPEED, RPM

TORQUE, FT-LB

POWER, BHP\*

FUEL RATE, LB/HR

IGNITION TIMING, DEG 8TDC

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

54.1	9/ 1/77	55.1	9/ 1/77	56.1	9/ 1/77	57.1	9/ 1/77	57.2	9/ 1/77
746.3	746.3	746.3	746.3	746.3	746.3	746.3	746.3	746.3	746.3
80	80	80	80	80	80	80	80	80	80
85	86	84	84	84	84	85	85	85	85
4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
84.7	84.7	70.6	70.5	56.5	56.5	37.6	37.6	37.7	37.7
64.9	64.9	54.0	54.0	43.3	43.3	28.8	28.8	28.8	28.8
30.4	30.2	26.6	26.5	22.4	22.3	17.2	17.2	17.3	17.3
37.0	37.0	37.0	37.0	45.0	45.0	45.0	45.0	45.0	45.0
3.6	3.7	6.5	6.5	9.5	9.5	13.4	13.4	13.4	13.4
33.5	33.5	23.5	23.5	18.2	18.2	13.6	13.6	13.6	13.6
96	96	96	96	97	97	98	98	98	98
.7287	.1330	.7428	.1166	.7815	.1547	.6689	.6689	.1539	.1539
13.86	14.66	13.90	14.70	13.85	14.66	13.89	13.89	14.64	14.64
.49	.02	.49	.05	.55	.04	.52	.52	.03	.03
1480	109	1249	80	1534	127	1393	1393	106	106
2665	45	2556	31	2745	21	1970	1970	13	13
14.75	14.76	14.77	14.79	14.76	14.76	14.78	14.78	14.76	14.76
1336.3	241.1	1207.7	185.9	1067.3	207.7	708.5	708.5	159.8	159.8
136.3	10.0	102.0	6.4	105.2	8.5	74.1	74.1	5.5	5.5
824.5	13.9	701.1	8.4	632.4	4.7	352.1	352.1	2.3	2.3
228	231	232	230	230	229	225	225	222	222
54	53	54	54	54	54	55	55	55	55
204	204	201	201	200	200	197	197	197	197
58.0	27.0	43.0	20.0	36.0	13.0	23.0	23.0	7.0	7.0
1466	1525	1432	1478	1366	1406	1302	1302	1330	1330

\* CORRECTED SAE J8168

+ CORRECTED FOR HUMIDITY

ENGINE: VOLVO 130 CID  
 FUEL CODE: 7619

TEST NUMBER	58.1 9/ 1/77	58.2 9/ 1/77	59.1 9/ 1/77	59.2 9/ 1/77	60.1 9/ 1/77	60.2 9/ 1/77	61.1 9/ 2/77	61.2 9/ 2/77
BAROMETER, MMHG	746.3	746.3	746.3	746.3	746.3	746.3	748.0	748.0
HUMIDITY, GRAINS/L8	89	89	89	89	89	89	75	75
TEMPERATURE, F	84	85	85	84	84	85	80	80
ENGINE SPEED, RPM	4000	4000	4000	4000	4000	4000	5200	5200
TORQUE, FT-L8	23.6	23.6	9.5	8.9	5.4	5.5	89.7	90.4
POWER, 8HP*	18.1	18.1	7.3	6.9	4.2	4.2	88.6	89.3
FUEL RATE, L8/HR	13.9	13.8	10.5	10.4	9.7	9.7	42.2	42.3
IGNITION TIMING, DEG 8TDC	45.0	45.0	44.0	44.0	44.0	44.0	40.0	40.0
MANIFOLD VACUUM, IN HG	16.0	16.0	18.6	18.7	19.2	19.2	2.9	2.9
THROTTLE ANGLE, DEG	10.9	10.9	8.0	8.0	7.2	7.2	79.2	79.2
INTAKE MAN. TEMP., F	98	99	99	99	100	100	88	88
CONCENTRATIONS, DRY BASIS								
CO, %	.6237	.1233	.5269	.0765	.5190	.0750	.6725	.2387
CO2, %	14.00	14.61	14.18	14.67	14.23	14.70	13.90	14.63
O2, %	.44	.03	.34	.04	.33	.05	.51	.01
HC, PPMC	947	72	454	38	406	31	2135	253
NOX, PPM	1113	8	479	6	350	5	3324	127
AIR/FUEL RATIO	14.77	14.77	14.77	14.80	14.77	14.81	14.75	14.70
EMISSION RATES, G/HR								
CO	530.6	102.4	338.8	48.1	307.7	43.9	1734.8	603.4
HC	40.5	3.0	14.7	1.2	12.1	.9	276.6	32.2
NOX+	167.0	1.1	54.3	.6	36.6	.5	1410.3	52.8
OIL TEMPERATURE, F	218	217	213	211	210	209	247	267
OIL PNT PRESSURE, PSI	56	56	57	57	57	57	56	53
COOLANT TEMPERATURE, F	192	192	189	189	189	189	204	204
EXHAUST PRESSURE, IN. H2O	17.0	4.0	10.0	2.0	10.0	2.0	88.0	55.0
EXHAUST TEMPERATURE, F	1246	1261	1216	1174	1202	1158	1570	1646

\* CORRECTED SAE J8168  
 + CORRECTED FOR HUMIDITY

ENGINE: VOLVO 130 CID  
 FUEL CODE: 7619

TEST NUMBER	62.1	62.2	63.1	63.2	64.1	64.2	65.1	65.2
TEST DATE	9/ 2/77	9/ 2/77	9/ 2/77	9/ 2/77	9/ 2/77	9/ 2/77	9/ 2/77	9/ 2/77
BAROMETER, MMHG	748.0	748.0	748.0	748.0	748.0	748.0	748.4	748.4
HUMIDITY, GRAINS/LB	75	75	75	75	75	75	73	73
TEMPERATURE, F	83	83	84	85	86	86	83	84
ENGINE SPEED, RPM	5200	5200	5200	5200	5200	5200	5200	5200
TORQUE, FT-LB	81.0	81.0	67.6	67.5	53.8	53.8	35.9	35.9
POWER, BHP*	80.2	80.2	67.0	67.0	53.5	53.5	35.5	35.5
FUEL RATE, LB/HR	39.4	39.3	34.2	34.2	29.0	29.4	23.5	23.3
IGNITION TIMING, DEG BTDC	40.0	40.0	45.0	45.0	48.0	48.0	48.0	48.0
MANIFOLD VACUUM, IN HG	4.5	4.6	7.3	7.3	10.2	10.2	13.4	13.5
THROTTLE ANGLE, DEG	38.0	38.0	27.8	28.0	22.6	22.6	17.7	17.6
INTAKE MAN. TEMP., F	96	96	98	98	99	99	94	95

CONCENTRATIONS, DRY BASIS

CO, %	.6890	.1694	.6644	.1245	.6265	.0936	.5654	.0590
CO2, %	13.78	14.55	13.80	14.49	13.82	14.53	13.99	14.70
O2, %	.46	.01	.49	.01	.49	.01	.48	.03
HC, PPMC	2137	132	1674	87	1655	62	1512	83
NOX, PPM	3133	91	3176	86	3239	74	2320	36

AIR/FUEL RATIO

	14.70	14.74	14.78	14.76	14.80	14.78	14.80	14.80
--	-------	-------	-------	-------	-------	-------	-------	-------

EMISSION RATES, G/HR

CO	1671.8	399.4	1403.9	256.2	1122.8	165.7	802.4	82.9
HC	260.4	15.6	177.6	9.0	149.0	5.5	107.8	5.9
NOX+	1250.0	35.4	1103.4	28.9	954.6	21.6	537.0	8.2

OIL TEMPERATURE, F	247	267	276	279	279	279	222	250
OIL PRESSURE, PSI	57	54	53	53	53	53	60	57
COOLANT TEMPERATURE, F	197	203	204	204	202	202	196	200
EXHAUST PRESSURE, IN. H2O	72.0	45.0	53.0	33.0	38.0	24.0	41.0	14.0
EXHAUST TEMPERATURE, F	1535	1603	1507	1562	1459	1507	1393	1435

\* CORRECTED SAE J8168  
 + CORRECTED FOR HUMIDITY

ENGINE: VOLVO 130 CID

FUEL CODE: 7619

TEST NUMBER

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

	66.1	66.2	67.1	67.2	68.1	68.2	69.1	69.2
	9/ 2/77	9/ 2/77	9/ 2/77	9/ 2/77	9/ 2/77	9/ 2/77	9/ 2/77	9/ 2/77
BAROMETER, MMHG	748.4	748.4	748.4	748.4	748.4	748.4	747.6	747.6
HUMIDITY, GRAINS/LB	78	78	78	78	78	78	80	80
TEMPERATURE, F	84	85	86	86	86	86	84	84
ENGINE SPEED, RPM	5200	5200	5200	5200	5200	5200	900	900
TORQUE, FT-LB	22.7	22.6	8.9	8.9	6.6	6.6	.8	.8
POWER, BHP*	22.5	22.5	8.9	8.9	6.5	6.5	.1	.1
FUEL RATE, LB/HR	19.0	19.0	14.7	14.9	14.2	14.2	3.2	3.2
IGNITION TIMING, DEG BTDC	48.0	48.0	49.0	49.0	49.0	49.0	3.0	3.0
MANIFOLD VACUUM, IN HG	16.0	16.1	18.6	18.4	19.2	18.6	12.2	12.2
THROTTLE ANGLE, DEG	14.7	14.7	11.6	11.6	10.8	10.8	.6	.6
INTAKE MAN. TEMP., F	98	99	102	102	102	102	106	105

CONCENTRATIONS, DRY BASIS

CO, %	.5420	.0585	.4501	.0521	.5013	.0541	.9287	.0070
CO2, %	14.07	14.66	14.16	14.67	14.16	14.66	12.57	14.51
O2, %	.40	.01	.32	.01	.30	.01	2.01	.06
HC, PPMC	844	51	495	40	681	42	10221	177
NOX, PPM	1601	12	776	7	726	7	37	4

AIR/FUEL RATIO

AIR/FUEL RATIO	14.80	14.79	14.80	14.79	14.74	14.79	14.70	14.83
----------------	-------	-------	-------	-------	-------	-------	-------	-------

EMISSION RATES, G/HR

CO	623.3	68.3	400.8	47.7	427.6	47.0	178.5	1.3
HC	48.7	3.0	22.1	1.9	29.2	1.8	98.7	1.7
NOX+	307.5	2.4	115.4	1.0	103.5	1.1	1.2	.1

OIL TEMPERATURE, F

OIL PRESSURE, PSI

COOLANT TEMPERATURE, F

EXHAUST PRESSURE, IN. H2O

EXHAUST TEMPERATURE, F

OIL TEMPERATURE, F	266	269	266	266	265	266	156	156
OIL PRESSURE, PSI	55	55	55	55	56	56	35	35
COOLANT TEMPERATURE, F	199	200	198	198	197	197	176	177
EXHAUST PRESSURE, IN. H2O	30.0	30.0	19.0	27.0	17.0	6.0	4.0	.0
EXHAUST TEMPERATURE, F	1369	1381	1315	1306	1301	1292	733	868

\* CORRECTED SAE J8168

+ CORRECTED FOR HUMIDITY

ENGINE: VOLVO 130 CID  
 FUEL CODE: 7619

	70.1	70.2	71.1	71.2	72.1	72.2	74.1	74.2
	9/ 2/77	9/ 2/77	9/ 2/77	9/ 2/77	9/ 2/77	9/ 2/77	9/ 2/77	9/ 2/77
TEST NUMBER	747.6	747.6	747.6	747.6	747.6	747.6	747.6	747.6
BAROMETER, MMHG	80	80	80	80	80	80	82	82
HUMIDITY, GRAINS/LB	84	84	84	84	84	84	87	87
TEMPERATURE, F	900	900	900	900	900	900	1200	1200
ENGINE SPEED, RPM	15.2	15.2	30.2	30.1	7.0	7.0	31.6	31.6
TORQUE, FT-LB	2.6	2.6	5.2	5.2	1.0	1.0	7.3	7.3
POWER, BHP*	4.1	4.2	4.4	4.5	3.0	3.0	5.6	5.5
FUEL RATE, LB/HR	3.5	3.5	10.0	10.0	2.5	2.5	16.0	16.0
IGNITION TIMING, DEG BTDC	8.5	8.4	7.2	7.2	10.0	10.0	9.4	9.6
MANIFOLD VACUUM, IN HG	2.7	2.7	3.6	3.6	.6	.6	4.3	4.2
THROTTLE ANGLE, DEG	104	103	102	102	104	105	104	104
INTAKE MAN. TEMP., F								
CONCENTRATIONS, DRY BASIS								
CO, %	.8929	.0049	.8819	.0050	.8685	.0056	.9157	.0088
CO2, %	13.43	14.41	13.39	14.42	12.97	14.49	13.54	14.59
O2, %	.81	.23	.87	.20	1.61	.06	.73	.03
HC, PPMC	750	107	1078	98	7468	90	1465	43
NOX, PPM	71	35	110	51	45	8	159	14
AIR/FUEL RATIO	14.88	14.96	14.89	14.94	14.74	14.84	14.75	14.83
EMISSION RATES, G/HR								
CO	223.7	1.3	239.1	1.4	158.1	1.0	308.8	2.9
HC	9.4	1.4	14.7	1.3	68.3	.8	24.8	.7
NOX+	3.0	1.5	5.0	2.3	1.4	.3	9.1	.8
OIL TEMPERATURE, F	156	156	159	159	161	159	197	192
OIL PRESSURE, PSI	35	35	34	33	27	28	30	32
COOLANT TEMPERATURE, F	180	182	183	183	182	179	190	186
EXHAUST PRESSURE, IN. H2O	5.0	.0	5.0	.0	3.0	.0	3.0	.0
EXHAUST TEMPERATURE, F	838	784	835	796	718	799	950	967

\* CORRECTED SAE J8168  
 + CORRECTED FOR HUMIDITY

ENGINE: VOLVO 130 CID

FUEL CODE: 7619

TEST NUMBER

TEST DATE

BAROMETER, MMHG

HUMIDITY, GRAINS/LB

TEMPERATURE, F

ENGINE SPEED, RPM

TORQUE, FT-LB

POWER, SHP\*

FUEL RATE, LB/HR

IGNITION TIMING, DEG 8TDC

MANIFOLD VACUUM, IN HG

THROTTLE ANGLE, DEG

INTAKE MAN. TEMP., F

75.1	76.1	76.2	77.1	77.2	78.1	78.2
9/ 2/77	9/ 2/77	9/ 2/77	9/ 2/77	9/ 2/77	9/ 6/77	9/ 6/77
747.6	747.6	747.6	747.6	747.6	743.9	743.9
82	82	82	82	82	72	72
86	87	87	87	87	80	80
1200	1200	1200	1200	1200	1500	1500
19.7	8.2	8.3	1.0	1.2	52.3	52.1
4.5	1.9	1.9	.2	.3	15.0	14.9
5.4	4.7	4.7	4.0	4.1	7.9	7.8
10.0	6.0	6.0	6.0	6.0	20.0	20.0
10.1	11.5	11.7	13.9	13.8	8.9	9.1
3.9	2.9	2.9	1.8	1.7	7.1	7.0
105	105	105	106	107	93	92

CONCENTRATIONS, DRY BASIS

.8887	.9122	.0123	1.0101	.0123	.7900	.0068
13.61	13.62	14.58	12.82	14.41	14.05	15.20
.64	.65	.06	1.37	.04	.66	.06
657	697	46	4149	83	1668	66
97	72	23	48	5	663	9

AIR/FUEL RATIO

14.78	14.77	14.85	14.85	14.83	14.75	14.84
-------	-------	-------	-------	-------	-------	-------

EMISSION RATES, G/HR

287.8	261.2	3.5	244.3	3.0	376.6	3.2
10.7	10.0	.7	50.4	1.0	39.9	1.6
5.3	3.5	1.1	2.0	.2	51.3	.7

OIL TEMPERATURE, F

OIL PRESSURE, PSI

COOLANT TEMPERATURE, F

EXHAUST PRESSURE, IN. H2O

EXHAUST TEMPERATURE, F

187	176	174	171	171	155	162
34	37	39	39	40	48	47
185	184	184	182	181	185	188
3.0	2.0	.0	3.0	.0	6.0	.0
951	940	921	890	951	967	1030

\* CORRECTED SAE J8168  
+ CORRECTED FOR HUMIDITY

ENGINE: VOLVO 130 CID  
 FUEL CODE: 7619

TEST NUMBER	80.1	80.2	81.1	81.2	82.1	82.2	83.1	83.2
TEST DATE	9/ 6/77	9/ 6/77	9/ 6/77	9/ 6/77	9/ 6/77	9/ 6/77	9/ 6/77	9/ 6/77
BAROMETER, MMHG	743.9	743.9	743.9	743.9	743.9	743.9	743.9	743.9
HUMIDITY, GRAINS/LB	72	72	79	79	79	79	79	79
TEMPERATURE, F	80	81	81	81	81	81	81	81
ENGINE SPEED, RPM	1500	1500	1500	1500	1500	1500	1800	1800
TORQUE, FT-LB	22.3	22.2	8.5	8.5	4.9	4.9	55.9	55.8
POWER, 8HP*	6.4	6.4	2.4	2.4	1.4	1.4	19.2	19.2
FUEL RATE, LB/HR	5.8	5.9	5.1	5.1	4.7	4.6	9.4	9.4
IGNITION TIMING, DEG BTDC	16.0	16.0	10.0	10.0	10.0	10.0	30.0	30.0
MANIFOLD VACUUM, IN HG	12.7	13.0	14.7	14.6	15.7	15.5	9.4	9.5
THROTTLE ANGLE, DEG	4.3	4.3	3.3	3.3	2.6	2.5	8.4	8.4
INTAKE MAN TEMP., F	94	96	98	98	99	99	96	94
CONCENTRATIONS, DRY BASIS								
CO, %	.9139	.0099	.9352	.0405	1.0245	.0134	.7656	.0397
CO2, %	14.10	15.20	14.00	15.22	13.55	15.19	14.15	15.20
O2, %	.74	.06	.82	.06	1.33	.06	.69	.05
HC, PPHC	679	117	2043	178	2031	166	1665	97
NOX, PPM	130	3	88	2	72	2	1227	19
AIR/FUEL RATIO	14.83	14.83	14.74	14.82	15.03	14.83	14.80	14.82
EMISSION RATES, G/HR								
CO	319.6	3.5	284.6	12.3	294.3	3.7	434.3	22.5
HC	11.9	2.1	31.2	2.7	29.3	2.3	47.4	2.8
NOX+	7.4	.2	4.5	.1	3.5	.1	116.6	1.6
OIL TEMPERATURE, F	161	164	168	169	169	169	169	171
OIL PRESSURE, PSI	48	47	47	47	47	47	50	49
COOLANT TEMPERATURE, F	188	188	188	188	188	187	191	192
EXHAUST PRESSURE, IN. H2O	4.0	.0	4.0	.0	4.0	.0	8.0	1.0
EXHAUST TEMPERATURE, F	958	970	960	976	940	1001	1029	1063

\* CORRECTED SAE J8168  
 + CORRECTED FOR HUMIDITY

ENGINE: VOLVO 130 CID  
 FUEL CODE: 7619

TEST NUMBER	84.1	84.2	85.1	85.2	86.1	86.2	87.1	87.2
TEST DATE	9/ 6/77	9/ 6/77	9/ 6/77	9/ 6/77	9/ 6/77	9/ 6/77	9/ 6/77	9/ 6/77
BAROMETER, MMHG	743.9	743.9	743.9	743.9	743.9	743.9	743.9	743.9
HUMIDITY, GRAINS/L8	79	79	75	75	75	75	75	75
TEMPERATURE, F	81	81	80	81	81	81	81	81
ENGINE SPEED, RPM	1800	1800	1800	1800	1800	1800	1800	1800
TORQUE, FT-L8	37.1	37.1	23.4	23.3	9.1	9.3	5.5	5.4
POWER, BHP*	12.8	12.8	8.0	8.0	3.1	3.2	1.9	1.9
FUEL RATE, L8/HR	7.3	7.4	6.1	6.1	5.8	5.8	5.4	5.3
IGNITION TIMING, DEG BTDC	29.0	29.0	28.5	28.5	13.0	13.0	14.0	14.0
MANIFOLD VACUUM, IN HG	13.0	12.9	15.1	15.3	15.7	15.7	16.4	16.4
THROTTLE ANGLE, DEG	5.9	5.8	4.3	4.3	3.9	4.0	3.4	3.4
INTAKE MAN. TEMP., F	95	95	96	97	98	99	99	99

CONCENTRATIONS, DRY BASIS

CO, %	.9070	.0300	.8497	.0048	.8514	.0898	.8673	.0911
CO2, %	14.09	15.26	14.07	15.27	14.19	15.22	14.20	15.25
O2, %	.77	.05	.78	.06	.67	.05	.61	.05
HC, PPMC	1303	69	888	47	1591	106	652	95
NOX, PPM	474	9	190	33	94	3	79	3

AIR/FUEL RATIO

	14.80	14.83	14.86	14.85	14.72	14.80	14.77	14.79
--	-------	-------	-------	-------	-------	-------	-------	-------

EMISSION RATES, G/HR

CO	401.7	13.3	312.2	1.8	292.7	30.9	281.5	29.2
HC	29.0	1.5	16.4	.9	27.5	1.8	10.6	1.5
NOX+	35.2	.7	11.5	2.0	5.3	.2	4.3	.2

OIL TEMPERATURE, F	175	174	165	168	171	174	175	175
OIL PRESSURE, PSI	49	49	50	50	49	49	49	49
COOLANT TEMPERATURE, F	189	189	187	189	191	191	191	191
EXHAUST PRESSURE, IN. H2O	6.0	.0	4.0	.0	4.0	.0	4.0	.0
EXHAUST TEMPERATURE, F	968	1012	931	962	1003	978	1007	976

\* CORRECTED SAE J8168  
 + CORRECTED FOR HUMIDITY



ENGINE: VOLVO 130 CID

FUEL CODE: 7619

TEST NUMBER

TEST DATE

BAROMETER, MMHG

HUMIDITY, GRAINS/LB

TEMPERATURE, F

ENGINE SPEED, RPM

TORQUE, FT-LB

POWER, BHP\*

FUEL RATE, LB/HR

IGNITION TIMING, DEG 8TDC

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

88.1	88.2	89.1	89.2	90.1	90.2	91.1	91.2
9/ 6/77	9/ 6/77	9/ 6/77	9/ 6/77	9/ 6/77	9/ 6/77	9/ 6/77	9/ 6/77
743.9	743.9	743.9	743.9	743.9	743.9	743.9	743.9
75	75	75	75	75	82	82	82
81	81	82	82	82	82	82	82
2300	2300	2300	2300	2300	2300	2300	2300
56.4	56.4	37.6	37.6	23.5	23.5	9.2	9.1
24.8	24.8	16.5	16.6	10.3	10.4	4.1	4.0
11.8	11.8	9.1	9.1	7.2	7.2	6.1	6.0
35.0	35.0	35.0	35.0	35.0	35.0	24.0	24.0
9.9	9.9	13.7	13.7	16.3	16.4	18.0	18.1
10.4	10.4	7.3	7.3	5.4	5.4	4.1	4.1
96	94	95	95	96	97	99	99
.6435	.0230	.7832	.0432	.7757	.0364	.6969	.0557
14.35	15.26	14.16	15.10	14.17	15.07	14.30	15.07
.62	.05	.64	.04	.59	.05	.49	.06
1750	67	1317	64	999	59	563	54
1627	17	786	14	314	10	101	5
14.82	14.83	14.78	14.82	14.76	14.82	14.77	14.82
458.9	16.3	427.1	23.5	336.5	15.8	255.3	20.2
62.7	2.4	36.1	1.8	21.8	1.3	10.3	1.0
191.3	2.0	70.7	1.3	22.4	.7	6.3	.3
188	201	195	195	191	189	186	186
52	51	51	51	51	51	52	52
194	194	192	191	189	189	189	189
12.0	3.0	8.0	1.0	6.0	.0	5.0	.0
1117	1156	1053	1081	999	1018	1009	992

ENGINE: VOLVO 130 CID  
 FUEL CODE, 7619

	92.1	92.2	93.1	93.2	94.1	94.2	95.1	95.2
TEST NUMBER	9/ 6/77	9/ 6/77	9/ 6/77	9/ 6/77	9/ 6/77	9/ 6/77	9/ 6/77	9/ 6/77
BAROMETER, MMHG	743.9	743.9	743.9	743.9	743.9	743.9	743.9	743.9
HUMIDITY, GRAINS/L8	82	82	82	82	82	82	82	82
TEMPERATURE, F	82	82	82	82	82	82	82	82
ENGINE SPEED, RPM	2300	2300	2500	2500	2500	2500	2500	2500
TORQUE, FT-L8	5.9	5.9	62.1	62.0	41.2	41.2	25.9	26.0
POWER, 8HP*	2.6	2.6	29.7	29.7	19.8	19.7	12.4	12.4
FUEL RATE, LB/HR	6.0	6.0	13.6	13.7	10.4	10.5	8.2	8.2
IGNITION TIMING, DEG 8TDC	20.0	20.0	37.0	37.0	38.0	38.0	37.0	37.0
MANIFOLD VACUUM, IN HG	18.0	18.0	9.1	9.1	13.1	13.1	15.9	15.9
THROTTLE ANGLE, DEG	3.9	4.0	12.4	12.3	8.7	8.7	6.5	6.4
INTAKE MAN TEMP., F	99	99	95	94	95	95	96	96
CONCENTRATIONS, DRY BASIS								
CO, %	.6799	.0441	.6067	.0099	.7667	.0259	.8214	.0625
CO2, %	14.34	15.07	14.18	15.09	14.12	15.10	14.12	15.06
O2, %	.46	.06	.66	.04	.64	.05	.61	.06
HC, PPMC	391	50	1979	39	1448	65	1095	66
NOX, PPM	.84	4	1845	13	980	8	444	9
AIR/FUEL RATIO	14.78	14.83	14.84	14.83	14.78	14.83	14.76	14.82
EMISSION RATES, G/HR								
CO	246.7	15.9	498.7	8.1	480.9	16.3	403.2	30.9
HC	7.1	.9	81.7	1.6	45.6	2.0	27.0	1.6
NOX+	5.2	.2	258.4	1.8	104.7	.8	37.1	.8
OIL TEMPERATURE, F	185	185	209	204	202	203	200	200
OIL PRESSURE, PSI	52	52	52	52	52	52	52	52
COOLANT TEMPERATURE, F	189	190	195	195	192	192	190	189
EXHAUST PRESSURE, IN. H2O	5.0	.0	16.0	3.0	10.0	1.0	7.0	1.0
EXHAUST TEMPERATURE, F	1040	1006	1168	1213	1096	1138	1045	1069

\* CORRECTED SAE J816B  
 + CORRECTED FOR HUMIDITY

ENGINE: VOLVO 130 CID  
 FUEL CODE, 7619

	96.1	96.2	97.1	97.2	100.1	100.2	101.1	101.2
TEST NUMBER	96.1	96.2	97.1	97.2	100.1	100.2	101.1	101.2
TEST DATE	9/ 6/77	9/ 6/77	9/ 6/77	9/ 6/77	9/ 2/77	9/ 2/77	9/ 2/77	9/ 2/77
BAROMETER, MMHG	743.9	743.9	743.9	743.9	747.6	747.6	747.6	747.6
HUMIDITY, GRAINS/LB	82	82	82	82	82	82	82	82
TEMPERATURE, F	82	82	82	82	87	87	87	87
ENGINE SPEED, RPM	2500	2500	2500	2500	3400	3400	3400	3400
TORQUE, FT-LB	10.6	9.9	6.1	6.0	25.1	25.1	9.7	9.7
POWER, 8HP*	5.1	4.7	2.9	2.9	16.3	16.4	6.3	6.3
FUEL RATE, LB/HR	6.4	6.4	6.2	6.1	12.1	12.0	9.2	9.3
IGNITION TIMING, DEG BTDC	34.0	34.0	28.0	28.0	43.0	43.0	41.0	41.0
MANIFOLD VACUUM, IN HG	18.3	18.5	18.7	18.7	16.0	16.0	18.6	18.5
THROTTLE ANGLE, DEG	4.5	4.4	4.1	4.2	9.2	9.2	6.6	6.6
INTAKE MAN. TEMP., F	99	99	99	99	99	99	100	101

CONCENTRATIONS, DRY BASIS

CO, %	.7670	.0056	.7628	.0207	.5676	.0354	.5747	.0314
CO2, %	14.15	15.08	14.21	15.13	13.89	14.56	13.94	14.60
O2, %	.60	.03	.56	.03	.41	.02	.39	.02
HC, PPM	586	33	493	46	802	39	458	36
NOX, PPM	150	12	103	3	821	9	305	5

AIR/FUEL RATIO

AIR/FUEL RATIO	14.81	14.83	14.80	14.82	14.78	14.81	14.78	14.81
----------------	-------	-------	-------	-------	-------	-------	-------	-------

EMISSION RATES, G/HR

CO	294.7	2.1	284.8	7.6	415.2	25.7	319.0	17.6
HC	11.3	.6	9.2	.9	29.5	1.4	12.8	1.0
NOX*	9.8	.8	6.6	.2	102.2	1.1	28.8	.5

OIL TEMPERATURE, F	199	199	199	201	205	204	203	201
OIL PRESSURE, PSI	52	53	53	53	54	54	54	54
COOLANT TEMPERATURE, F	189	188	189	189	194	194	194	193
EXHAUST PRESSURE, IN. H2O	5.0	.0	5.0	.0	13.0	3.0	9.0	1.0
EXHAUST TEMPERATURE, F	1011	1015	1039	1027	1213	1208	1180	1141

\* CORRECTED SAE J8168  
 + CORRECTED FOR HUMIDITY

ENGINE: VOLVO 130 CID

FUEL CODE: 7619

TEST NUMBER

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

102.1  
9/ 2/77  
747.6  
82  
87  
3400  
3.5  
2.3  
8.2  
42.0  
19.5  
5.4  
102

102.2  
9/ 2/77  
747.6  
82  
87  
3400  
3.5  
2.3  
8.2  
42.0  
19.6  
5.5  
102

CONCENTRATIONS, DRY BASIS

CO, % .5364  
CO2, % 13.98  
O2, % .46  
HC, PPMC 529  
NOX, PPM 195

.0098  
14.60  
.02  
17  
4

AIR/FUEL RATIO

14.83

14.82

EMISSION RATES, G/HR

CO 265.6  
HC 13.2  
NOX+ 16.4

4.9  
.4  
.4

OIL TEMPERATURE, F

OIL PRESSURE, PSI

COOLANT TEMPERATURE, F

EXHAUST PRESSURE, IN. H2O

EXHAUST TEMPERATURE, F

200  
55  
192  
7.0  
1167

200  
55  
192  
1.0  
1120

\* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

HE18.5

.A34

no. DOT-TSC-

~~NHTSA 78 19~~

BORROWER

---

---

---

---

---

---

---

---

---

---

**Form DOT F 172**  
FORMERLY FORM D



**U. S. DEPARTMENT OF TRANSPORTATION**  
**TRANSPORTATION SYSTEMS CENTER**  
 KENDALL SQUARE, CAMBRIDGE, MA. 02142  
 OFFICIAL BUSINESS  
 PENALTY FOR PRIVATE USE, \$300



**POSTAGE AND FEES PAID**

**U. S. DEPARTMENT OF TRANSPORTATION**

513