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# Emissions From Heavy-Duty Engines Using The 1984 Transient Test Procedure Volume I—Gasoline

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# Emissions From Heavy-Duty Engines Using The 1984 Transient Test Procedure Volume I—Gasoline

by

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ABSTRACT

This volume of the two-volume report describes the heavy-duty, gasoline engine baseline emissions evaluations conducted at Southwest Research Institute. Initially, a facility was developed which was capable of complying with the requirements in the 1984 dynamometer transient procedure. Seventeen gasoline engines were then tested over the transient and the nine-mode emissions test procedures. Included were 1969 model year engines for HC baseline, 1972-73 engines for $NO_x$ baseline, and 1978-79 engines for correlation purposes. Emissions measured were hydrocarbons, carbon monoxide, and oxides of nitrogen on all engines.

## FOREWORD

This project was initiated by the Standards Development and Support Branch, Environmental Protection Agency, 2565 Plymouth Road, Ann Arbor, Michigan 48105. The effort on which this two-volume report is based was performed by the Department of Emissions Research, Southwest Research Institute, 6220 Culebra Road, San Antonio, Texas 78284. This project, authorized by Contract 68-03-2603, began on September 26, 1977 and was completed on July 1, 1981.

The SwRI Project Leader was Mr. Sherrill Martin. Mr. Charles Urban assisted in supervising the gasoline engine, $NO_x$ baseline phase of this project. Mr. Karl Springer was the Project Manager and was primarily responsible for the technical and fiscal negotiation of the initial project and subsequent modifications.

The initial Project Officer was Mr. Richard Nash of the Standards Development and Support Branch, Environmental Protection Agency. Subsequent Project Officers were Mr. Richard Burgeson, Mr. Timothy Cox, and Mr. Eugene Danielson. This project was identified within Southwest Research Institute as Project 05-5044-001.

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# I. SUMMARY

The major objective of this project was to obtain baseline emissions data on heavy-duty engines using the Transient Test Procedure.(1)* This involved developing the necessary dynamometer control and data acquisition systems and then utilizing these systems to evaluate engine emissions over the transient cycle. With the gasoline engines, emissions evaluations over the nine-mode procedure and at idle were also conducted.

The data generated in this project, along with data generated at the EPA, were utilized by the EPA to establish baseline values for HC, CO, and $NO_x$. These baseline emissions values, along with a summary of the source data, are given in EPA reports.(2,3)

Emissions data were generated on a total of seventeen gasoline engines, three of which were tested more than once. Nine of these seventeen engines were 1972-73 model-year engines which provided data for the $NO_x$ baseline determination. Of the other eight engines, five were 1969 model-year for HC and CO baseline, and three were 1978-79 model-year representative of the then current technology. In addition to the generation of data to be incorporated into the emissions baseline for heavy-duty gasoline engines, a number of the findings appear to be of importance. Several of these findings are included in this summary.

With the 1972-73 model-year engines, there did not appear to be any direct relationship between HC and CO emissions at idle and in the transient test. With CO, the two engines with the higher CO values at idle produced the lower amounts of CO in the transient tests. Also, with these 1972-73 engines, the methane emissions in the transient cycle were between four and eight percent of the total hydrocarbon emissions, with an overall average of six percent.

The relationship between some of the emissions in the transient and nine-mode tests appeared to be dependent on the model-year of the engine. This is illustrated by the following data summary:

| | Transient ÷ Nine-mode Values, in % | | | |
|---|---|---|---|---|
| Engines | HC | CO | $NO_x$ | Fuel |
| Avg. of nine 1972-73 | 83 | 225 | 91 | 95 |
| Avg. of three 1978-79 | 320 | 230 | 107 | 93 |

As shown, for the 1972-73 engines, the average CO emissions was twice as high in the transient tests than in the nine-mode tests, while HC and CO were

*Numbers in parentheses indicate references at the end of this report.

slightly lower. For the 1978-79 engines, CO was also twice as high, but HC was three times higher and $NO_x$ was slightly higher, in the transient tests than in the nine-mode tests. With the 1972-73 and the 1978-79 engines, the average fuel consumption was slightly lower in the transient tests. Of primary interest, however, was that the transient to nine-mode HC emissions ratio was lower for the 1972-73 engines and substantially higher for the 1978-79 engines. This is indicative that HC emissions in the nine-mode test does not accurately reflect the HC emissions produced under transient operation.

Another significant finding was the importance of conducting extensive tune-ups, component checks and diagnostic testing on in-use engines prior to acceptance for testing. Some example findings were incorrect components on the engines, grossly incorrect adjustment of idle-mixture, and defective components.

## II. INTRODUCTION

This two-volume report describes the program to evaluate emissions from heavy-duty gasoline and diesel engines used in vehicles over 8,500 pounds GVW. These emissions evaluations involved the use of the 1984 Transient Test Procedure. This volume, Volume 1, reports the results of evaluations conducted on gasoline engines. The second volume covers evaluations of diesel engines.

### A. Project Objective

The primary objective of this project was to obtain baseline emissions data on heavy-duty engines using the Transient Test Procedure. Meeting the objective, initially, required the development of appropriate dynamometer control and data analyses systems.

### B. Emissions Test Procedures

With the gasoline engines, nine-mode and transient test procedures were utilized in this project. At the time this project was initiated, the Transient Test Procedure was in draft form and the ability to run this transient test remained to be demonstrated. This transient test cycle involves relatively rapid, simultaneous changes in engine speed and power output.

### C. Engines Evaluated

Three groups of gasoline engines were evaluated in this project. These were 1969 model-year engines for HC and CO baseline, 1972-73 engines for $NO_x$ baseline, and 1978-79 engines for correlation purposes. A total of twenty-one engine test series were conducted involving a total of seventeen different engines. Nine of the seventeen engines were 1972-73 model-year, for use in the $NO_x$ baseline. At the start of this project, most of the engines received had been removed from the vehicle prior to shipment to this laboratory. As the project progresses, most of the engines were removed from the vehicle at this laboratory.

### D. Engine Testing

The test plan underwent changes as the project progressed, with finalization occurring during the evaluations of the $NO_x$ baseline engines. During the latter part of the project, a test series on an engine consisted of checking the engine prior to removal from the vehicle, performing an extensive tune-up after mounting on the test stand, and then conducting duplicate transient, nine-mode and idle evaluations.

E. Project Reviews and Modifications

A number of meetings, discussions and reviews were held, with the Project Officer and cognizant individuals from the EPA and/or engine manufacturers, during the course of this project. All of the changes which occurred were subsequently incorporated into a revised Scope of Work during the conductance of the gasoline engine, $NO_x$ baseline evaluations. Copies of the revised and the initial Scopes of Work are included in Appendices A-1 and A-2.

## III. OPERATIONAL EQUIPMENT

Conductance of the transient evaluations required the development and application of some advanced dynamometer control systems. In addition, environmental controls were subsequently required. This section describes the equipment and controls utilized in this project. Illustrative views of the systems are given in Figure 1.

### A. Dynamometer and Controls

The overall control scheme for the transient tests consists of two independent closed-loop systems. The speed is controlled by the dynamometer, and the torque by the engine. An alternate control scheme was briefly considered, but it was concluded that such a scheme could not lead to stable operation below the peak torque speed of the engine, particularly on cold-start tests.

The dynamometer system consists of an Eaton Dynamatic Model E-2000, with proprietary quick-unload circuitry. This dynamometer has a motoring capacity of 150 kW (200 hp) and an absorption capacity of 373 kW (500 hp). The quick-unload circuitry was necessary to speed up the ordinarily sluggish response of this type of dynamometer. Although this dynamometer can absorb power at speeds of up to 5000 rpm, the motoring speed was a maximum of 3500 rpm. The EPA ran comparison tests to determine whether this limitation had an effect on emissions and concluded that any such effect was insignificant.

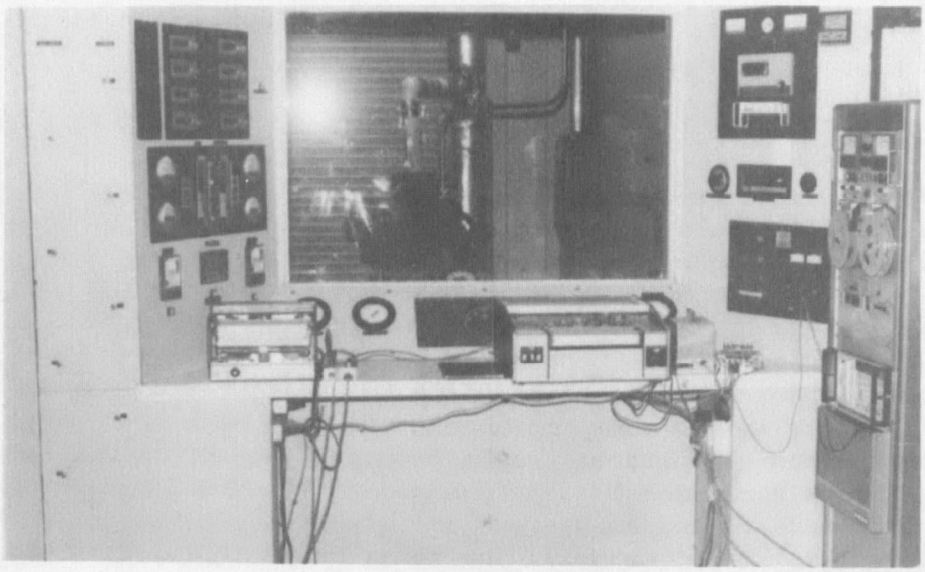
To provide transient command signals, a Remex paper tape reader and a Northern Ampower Corporation digital programmer provide continuous analog output, redirected at one second intervals. This system was available and was found to be adequate for use in this application.

Speed control feedback is provided by a D.C. tachometer which is directly driven by the dynamometer.

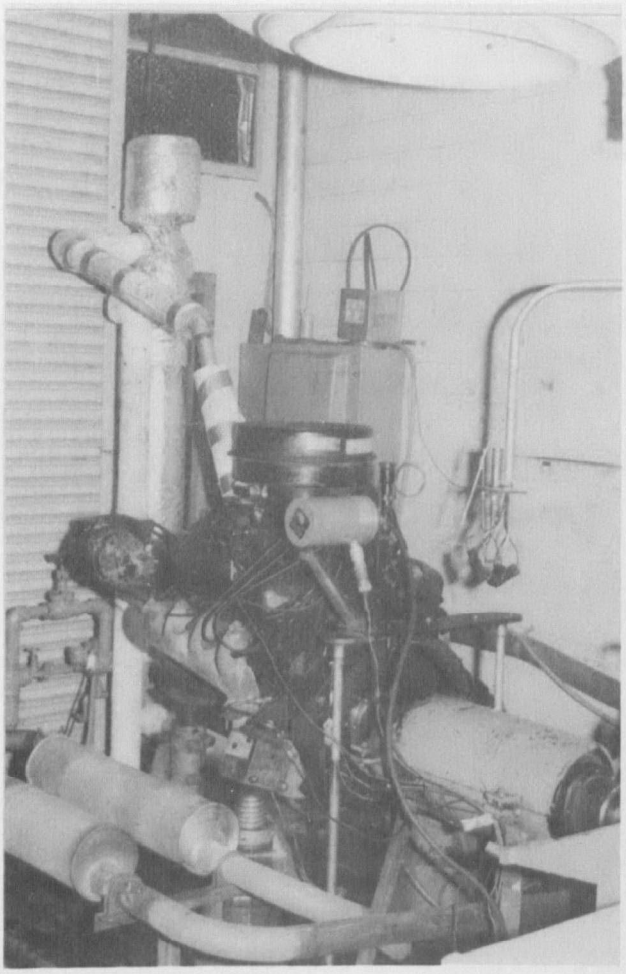
The torque control loop consists of the following main elements:

- Analog command signal
- Servo amplifier
- Servomotor attached to throttle
- Driveshaft torquemeter
- Strain gage conditioner

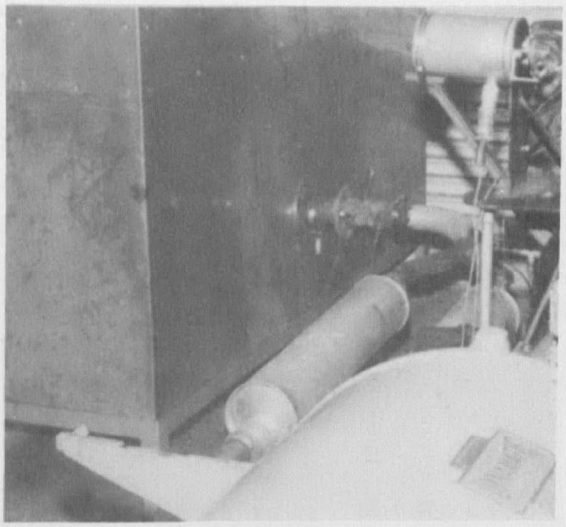
The analog command from the Northern Ampower programmer is fed to the torque command inputs of the servo amplifier. The signal from the strain gage conditioner goes into the torque feedback input. An error amplifier decides the direction and magnitude of the current to the throttle/servomotor. Two adjustments are available on the servo amplifier. The span control adjusts the torque command level appropriately for the engine begin tested. The gain



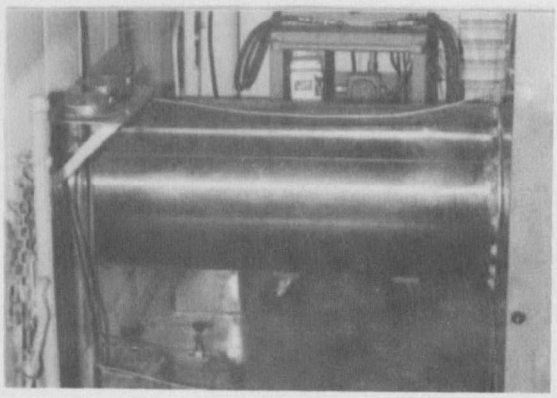
Control Console



Engine on Test Stand



Inlet to CVS Mixing Chamber



Outlet from CVS Mixing Chamber

Figure 1. Views of the transient procedure test facility.

control adjusts the responsiveness of the system. It is adjusted to the position at which minor oscillation begins at a couple of points in the cycle.

B. Environmental Controls

The gasoline test cell has two environmental control systems. The first is a wall-mounted air conditioner which insures that the test cell is the proper temperature for an overnight cold soak. Beginning with the first $NO_x$ baseline engine, the Project Officer requested that humidity, as well as temperature, be controlled during the test. To accomplish this, a second system was constructed which provided conditioned air directly to the test cell. Filtered air from outside the building is passed through a chilled water spray chamber to establish the proper absolute humidity level. The air then passes through a demistor followed by an electrically heated reheat section to establish a 25°C (77°F) temperature. Temperature and dewpoint are monitored as closely as practical to the engine inlet. Humidity control requirement was 10.7±2.1 grams of water per kilogram (75±15 grains of water per pound) of dry air. Generally, the actual control of humidity was significantly better than these limits.

C. Exhaust Dilution System

The CVS system used was essentially a scaled-up version of the system used for emissions testing of light-duty vehicles.[5] Nominal CVS flow rate utilized was 40 $m^3$/min (1400 CFM). This CVS flow is that necessary to prevent water condensation in the bags for the high speed and power Los Angeles driving segment, without over diluting the exhaust during the New York Non-Freeway segment of the cycle.

## IV. EMISSIONS SAMPLING AND ANALYSES

The test cycles included in this project involved transient, nine-mode and idle operation. Although these cycles remained essentially unchanged throughout this project, some significant changes did occur in the emissions sampling and measurement. These changes are identified and discussed in this section of the report.

### A. Transient Evaluations

At the time this project was initiated, the transient test procedure was still under development. The recommended practice, intended to go into effect for 1983 engines, existed only in draft form. Initial tests were performed under the guidelines in the original Scope of Work.

The purpose of the transient tests is to provide a more realistic simulation of the on-the-road driving conditions during emission sampling, than the previous steady-state tests could provide. The transient test procedure, as enacted into law for the 1984 model year, is described in detail in Reference 1. The elements of the procedure, as conducted at SwRI during this baseline program, are described as follows:

- The engine is mapped for maximum available torque versus speed over the range of speeds encountered during the transeint test. This speed range is from 400 rpm (or 200 rpm below idle, whichever is higher) to 15 percent above rated speed. The mapping is accomplished in a single sweep from low speed to high speed, pausing 15 seconds at 100 rpm intervals. The torque is read during the last 5 seconds of the pause.

- The required cycle is determined, at one second intervals, in terms of rpm and torque.

- Practice runs are made to insure that the regression line tolerances are being met.

- After an overnight soak, a cold start transient test is run. Whereas the procedure calls for only a single emissions sample bag to be taken during the test for baseline purposes, four bags were taken, dividing the test into four subcycles. In this way, emission factors for various types of driving were obtained for future use in emission inventory and impact analysis.

- After a twenty-minute soak, the cycle is repeated for a hot-start test.

- The regression line data is analyzed to determine if the cycles were run within required tolerance.

- The emission data is analyzed and results for the cycle computed.

The following four gaseous emissions were measured:

- Hydrocarbons (HC)
- Carbon Monoxide (CO)
- Carbon Dioxide ($CO_2$)
- Oxides of Nitrogen ($NO_x$)

All emissions were measured from bagged samples.

At the start of this project, a statistical method for determination of cycle validation was not available. Therefore, the test cycles for Engines 1 through 6 were validated by examination of speed-torque traces recorded during the tests. Beginning with Engine 7, the test cycles were validated by the regression line analysis called for in the proposed regulations.[1] The only deviation from these proposed regulations as the tests progressed was in the regression analysis criteria; these were relaxed somewhat as a result of experience gained at the EPA.

B. Nine-Mode Evaluations

The 1979 nine-mode procedure was utilized with Engines 1 through 11. This procedure involved modes based on a percentage of maximum torques and continuous sampling of the undiluted exhaust. An individual bagged sampling procedure was utilized with Engines 13 through 22. Nine-modes tests were not conducted on Engine 12.

1. Continuous Sampling of Undiluted Exhaust

The 1979 nine-mode test procedure is fully described in the Federal Register.[6] Briefly, it involves running a sequence of nine modes twice, staying in each mode for one minute. Emissions are recorded continuously in each mode for one minute, but the emissions data are read only during the last ten seconds in each mode, except for cut-throttle. For cut-throttle, the emissions data are read during the last 50 seconds. The test sequence is conducted at a steady speed of 2000 rpm, except for the idle modes.

During the early part of the test program, there was a growing concern about the reliability of $NO_x$ measurements of raw exhaust by the methods then used. These concerns were described in a memorandum.[7] In view of these problems, the Project Officer directed that remaining nine-mode tests be carried out under a modified procedure which measured emissions by a dilute bag method. This procedure was already in use at the EPA.

2. Bagged Sampling of Diluted Exhaust

In accordance with a telephoned directive from the Project Officer, the use of bagged samples of diluted exhaust was incorporated into the

project, starting with Engine 13.[8] In a cursory comparative evaluation, this method produced $NO_x$ results which were essentially equivalent to those results produced by continuous sampling. The primary benefit of using bagged samples was that they could be conducted at a greatly reduced level of effort. Engine speed and load settings for each mode were the same as used in the previously described procedure involving continuous sampling.

A copy of the bagged sample nine-mode procedure is given in Appendix A-3 and is briefly described as follows:

- Go to Mode 1 and stabilize in one minute.
- Take bag sample for five minutes.
- Repeat stabilization and sampling for Modes 2 through 9.

The five minute modes enabled using the same bag sampling system as was utilized for the transient evaluations. A hand operated throttle was used in these nine-mode evaluations.

The modal emission concentrations were converted to mass emissions using a standard single bag computer program. The composite nine-mode results were then calculated using these modal mass emissions, the time per mode, the modal power output, and the modal weighting factor.

3. Idle Tests

Emissions were measured at idle on all gasoline engines evaluated. Through Engine 15, these evaluations included the standard idle speed and a no-load speed of 2500 rpm. Subsequent to Engine 15, the evaluations at 2500 rpm were discontinued as directed by the EPA Project Officer.

With Engines 1 through 15, undiluted HC and CO were measured on a garage-type emissions analyzer and undiluted $CO_2$ was measured using a laboratory grade analyzer. In addition, bagged samples of CVS diluted exhaust were analyzed for HC, CO, $NO_x$ and $CO_2$. Subsequent to Engine 15, the use of the garage-type analyzer was discontinued as directed by the EPA Project Officer. The garage-type analyzer used was unstable and unreliable, thereby requiring an excessively high level of effort to maintain and operate.

For Engines 14 through 22, HC and CO emissions, on an undiluted basis, were calculated using the measured diluted values and the ratio of the undiluted to diluted $CO_2$ concentration. With Engine 15, extra special care was taken in measuring the undiluted emissions using the garage-type analyzer to use in comparisons of the measured and calculated values. The calculated CO emissions were four percent higher than measured values, an essentially insignificant difference. With HC, the garage-type analyzer measured in ppm hexane and the dilute emissions were measured in ppm carbon. This factor makes comparison of the HC values to be inappropriate.

4. Methane Analyses

With Engines 17 through 22, methane was determined for the transient cycle tests using the SAE J1151 procedure "Methane Measurement Using

Gas Chromatography." The same bagged sample was used for measurement of methane as was used for the regulated emissions. As specified by the EPA Project Officer, the methane in g/kW-hr was calculated by multiplying the mass rate of total hydrocarbons by the volumetric ratio of methane.

## V. TEST PLAN, PREPARATIONS, AND DATA REDUCTION

This section describes the test plan followed, the preparations for testing, the fuel and lubricant used, and the methods utilized for analyzing the data.

### A. Test Plan

The original test plan is shown in Appendix A-2. Due to numerous changes that occurred, subsequently, a modified Plan of Performance was prepared. This modified Plan of Performance incorporated the operating changes that were put into effect by the EPA Project Officer.

Some examples of the project changes that occurred which significantly affected the effort were:

- Several engines, upon receipt, were not testworthy and others required considerable verification and some required mechanical repair.
- Rework and repair during tune-up (i.e., governors, carburetor linkage, etc.) was more extensive than anticipated.
- Additional cycles and emissions determinations, such as nine-mode and methane evaluations.
- Technical difficulty in following cycle and meeting the prescribed cycle parameters.

Although the basic purpose of this contract remained the same, many of the specific goals and the methods for achieving the goals changed. The final Scope of Work is shown in Appendix A-1.

### B. Engine Preparation and Tune-Up

At the start of this project, the engines were mounted onto the test stand, given a minor tune-up, and tested. Repairs, such as replacement of leaky valves in the engine, were not allowed in the original Scope of Work. As the project progressed, the engines were being received mounted in a truck and were checked over prior to mounting on the test stand. Subsequently, even more extensive tune-ups, and further assurances that the engine met manufacturer's specifications, were incorporated into this project. With the last several engines evaluated, some mechanical repair was conducted prior to testing.

Engines 1 through 3 - During this period in the project, only the four following tune-up items were to be checked: idle speed, idle $CO_2$, timing, and dwell. New engines were to be adjusted to manufacturer's specifications, if necessary. Used engines were tested as-received, then tuned-up and retested. Correlation engines received from EPA were to be tested as-received, except for possible idle-speed adjustment.

Engine 4 - For this engine, additional requirements included a compression check, valve lash adjustment (if applicable), and replacement of several components during the tune-up.

Engines 5 through 15 - For these engines, preparation was governed by an "Engine Tune-Up Specifications Check List," provided by the Project Officer. The main additional requirement was for the distributor advance curve. During this period, carburetor adjustments, other than idle speed and governor operations, were not made.

Engines 16 through 22 - With these engines, an initial examination was conducted before removal of the engine from the vehicle, carburetor air/fuel mixture was adjusted, more extensive component checks were made, and some rework of the valves was conducted. The final modifications to the data sheets were used for Engines 19 through 22, but there were no major changes with Engines 19 through 22, relative to Engines 16 through 18. Generally, only a few additional checks and diagnostic tests were incorporated. The details of the tune-up requirements can be obtained from the tune-up data sheets, which are included in Appendix E.

C. Fuels and Lubricants

A single batch of EM-267 leaded exhaust emissions fuel was used for all emissions tests conducted in this project. The properties of this fuel are given in Table 1. This fuel meets all of the requirements of the fuel desscribed in the proposed regulations.[1] The lubricant used throughout this project was Mobile Delvac SAE 30.

D. Data Reduction

Data taken during the engine tests included:

- Test Validation
- Emissions Data

Test validation was achieved by means of a Fluke 2240B Datalogger, which scanned the speed and torque command and feedback channels, as well as the throttle position, once per second. The channel scan rate of 15 channels per second, along with the order of scanning, resulted in a 200 millisecond delay between recording of the torque command and feedback signals. At the same time, a 70 millisecond delay was experienced between the recording in a suitable format on 7-track tape. The tape was then processed on a Hewlett-Packard computer at a neighboring department of the Institute to determine if the test met statistical specifications. The program listing and sample printouts are given in Appendix A-4. An additional requirement was that the

TABLE 1. DESCRIPTION OF EM-267 LEADED GASOLINE

| | EM-267 | Specifications in the Proposed Regulations[1] |
|---|---|---|
| Specific Gravity, at 60°F | 0.744 | -- |
| Reid Vapor Pressure, psi | 9.1 | 8.7-9.2 |
| Research Octane No. | 101 | 90 min |
| Lead, g/gal | 2.6 | 1.4 min. |
| Sulfur, Wt% | 0.003 | 0.10 max. |
| Distillation, °F (% Evaporated) | | |
| IBP | 85 | 75-95 |
| 10% | 134 | 120-135 |
| 50% | 218 | 200-230 |
| 90% | 309 | 300-325 |
| EP | 360 | 415 Max |
| Hydrocarbons, Vol. % | | |
| Aromatics | 27 | 35 Max. |
| Olefins | 1 | 10 Max. |
| Saturates | 72 | Remainder |

integrated work for the cycle must fall within the limits of +5 to -15 percent of the calculated reference work. This was determined by continuously integrating a horsepower feedback signal derived from the torque and speed feedback signals.

Emissions data reduction was conducted in accordance with the method described in the proposed rules.(1) Diluted gas samples were collected in bags and analyzed in a bag analysis cart for HC, CO, $CO_2$, and $NO_x$. The computer programs and subroutines used in calculating the transient emissions were derived from the bag analysis programs already in use for light-duty testing. Modifications were made to accommodate the fact that the transient cycle was divided into four segments (NYNF, LANF, LAF, NYNF), and bag samples were taken for each cycle. The computer programs calculated emission values for each segment, as well as a composite for the entire cycle.

E. Data Reporting Formats

The data generated in this project were reported to the EPA in several different formats. These formats are briefly described as follows:

Data Summary - The most pertinent data were summarized and these summaries were used in the progress reports and are included in Appendices B, C, and F.

Emissions Computer Coding Sheets - Data obtained were entered onto computer coding sheets (HD BASELINE TEST) that were provided by the EPA.

Engine Computer Coding Sheets - Engine information was entered onto computer coding sheets (HEAVY DUTY ENGINE INFORMATION) provided by the EPA.

## VI. HC AND CO BASELINE TESTING

The HC and CO baseline testing involved 1969 heavy-duty gasoline engines. Emissions are reported for transient and nine-mode tests.

### A. Engines Tested

Five different 1969 heavy-duty gasoline engines were evaluated in the HC and CO baseline phase of this project. The engines, and the heavy-duty vehicles from which they were removed, are identified in Table 2.

Three of the five engines were received mounted in the respective trucks. Two of the engines were received in shipping crates. Engines 2 and 13 were tested at the EPA prior to shipment to this laboratory. Engine 5 was retested as Engine 9.

### B. Engine Tune-up and Maintenance

During the HC and CO baseline portion of this project, the tune-up procedure and scope evolved in response to the as-received condition of the engines. The original test plan for in-use engines required testing as received, checking of the idle speed, idle CO, timing, and dwell, adjusting these parameters if necessary, and retesting. Subsequent requirements added the replacement of accessories, compression testing, and valve adjustment, and deleted carburetor mixture adjustment.

Tune-up and maintenance performed on each engine is briefly described as follows:

Engine 2 - This was a correlation engine, previously tested at EPA. Therefore, no adjustments were desirable. However, the idle speed as received was 360 rpm. This was adjusted to 700 rpm, the manufacturer's specification.

Engine 3 - Besides adjusting the basic four parameters, the plugs, points, and condenser were replaced.

Engine 4 - In addition to the adjustments and replacement items for Engine 3, a compression check was performed and the distributor cap, rotor, spark plug wires, oil and fuel filters, and PCV valve were replaced.

Engine 5 - In addition to the items covered in the tune-up of Engine 4, the valves were adjusted (Engine 4 had hydraulic lifters). In accordance with the tune-up check list provided by the EPA, the idle CO was not checked or adjusted. The distributor advance curve was checked and found

TABLE 2. 1969 HC AND CO BASELINE ENGINES TESTED

| Engine Number | Engine Description: Model Year | Make | CID | Serial Number |
|---|---|---|---|---|
| 2 | 1969 | IHC | 304 | 304-648048 |
| 3 | 1969 | IHC | 345 | 345-687073 |
| 4 | 1969 | IHC | 304 | V304-735364 |
| 5 & 9 | 1969[a] | Chevrolet | 366 | 3955274T |
| 13 | 1969 | Ford | 360 | 9E13F[b] |

| Engine Number | Heavy-Duty Vehicle Description: Model Year | Make | Serial Number |
|---|---|---|---|
| 2 | -- | -- | -- |
| 3[c] | 1969 | IHC | ND |
| 4 | 1969 | IHC | 004160H937177 |
| 5 & 9 | 1969 | Chevrolet | SE529P854232[d] |
| 13 | -- | -- | -- |

[a] Engine 9 was a retest of Engine 5.
[b] Number from Engine Identification Tag.
[c] Truck was rented from owner in Kentucky.
[d] Engine 5 & 9 came from a Model C-50 School Bus.

to be out of specification. The advance springs were replaced to achieve proper advance. The governor was found to be disconnected and was still inoperative when connected. The cross shaft in the distributor was excessively worn. GM provided a new distributor. The carburetor secondary actuator had a split diaphragm, which was replaced.

Engine 9 - This was the same engine as Number 5, after it had been shipped to the EPA and returned. In compression checks, the compression within the cylinders varied from 75 to 105 as Engine 5 and from 65 to 120 as Engine 9.

Engine 13 - This engine was previously tested at EPA, therefore, no tune-up was performed. When 9-mode tests were run on this engine, the HC emissions were nearly double those obtained by EPA, with a factor of ten difference in the 10 percent mode. It was concluded that some aspect of the engine had changed since the transient tests had been run. Investigation showed that the vacuum advance diaphragm had developed a leak. Replacement of the diaphragm had no noticeable effect on HC emissions. The Project Officer decided to move on to the next engine.

C. Emissions Test Results

Summaries of the emissions test results and copies of the computer printouts are given in Appendix B. Brief summaries of the results are presented in this section of the report.

The transient and nine-mode emissions results are summarized in Table 3. Of interest in these data are the nine-mode HC results for Engines 2 and 4 and the significant differences between most of the results with Engines 5 and 9. These areas of interest are discussed as follows:

Engines 2 and 4 - With Engines 2 and 4, the CO concentration at idle (based on nine-mode data) was 8 to 10 percent and about 75 percent of the total nine-mode composite HC was produced in the idle and cut-throttle modes. The values for all emissions with these two engines were very similar as shown in the following summary:

| | Values in g/kW-hr | | | |
|---|---|---|---|---|
| | Transient | | Nine-Mode | |
| Engine | 2 | 4 | 2 | 4 |
| HC | 12.0 | 12.0 | 25.6 | 27.1 |
| CO | 164. | 159. | 151. | 167. |
| NOx | 8.4 | 7.8 | 9.7 | 8.7 |
| Fuel | 402. | 370. | 431. | 423. |

TABLE 3. SUMMARY OF HC AND CO BASELINE TEST RESULTS

| Engine | Make & CID | Test[a] | Emissions and Fuel, g/kW-hr | | | |
|---|---|---|---|---|---|---|
| | | | HC | CO | $NO_x$ | Fuel |
| 2 | IHC 304 | Tran.[b] | 12.0 | 164 | 8.4 | 402 |
| 2 | IHC 304 | N-M | 25.6 | 151 | 9.7 | 431 |
| 3 | IHC 345 | Tran.[b] | 9.4 | 125 | 10.2 | 387 |
| 3 | IHC 345 | N-M | 9.5 | 87 | 12.4 | 413 |
| 4 | IHC 304 | Tran.[b] | 12.0 | 159 | 7.8 | 370 |
| 4 | IHC 304 | N-M | 27.1 | 167 | 8.7 | 423 |
| 5 | Chev. 366 | Tran. | 14.7 | 256 | 4.4 | 453 |
| 5 | Chev. 366 | N-M | 17.1 | 230 | 4.7 | 457 |
| 9[c] | Chev. 366 | Tran. | 11.4 | 181 | 6.2 | 403 |
| 9[c] | Chev. 366 | N-M | 17.4 | 275 | 3.4 | 500 |
| 13 | Ford 360 | Tran. | 8.2 | 132 | 7.0 | 382 |
| 13 | Ford 360 | N-M | 14.8 | 76 | 7.1 | 447 |

[a]Tran. = Transient N-M = Nine-Mode
[b]With these engines, cycle speed above 100 percent were set to 100 percent.
[c]Retest of engine previously tested as Engine 5.

Engine 3 - This was the only engine tested both before and after tune-up. Results of these tests are as follows:

| | Values in g/kW-hr | | | |
|---|---|---|---|---|
| | Transient | | Nine-Mode | |
| | Pre-tune | Post-tune | Pre-tune | Post-tune |
| HC | 9.3 | 9.4 | 11.6 | 9.5 |
| CO | 111. | 125. | 93. | 87. |
| $NO_x$ | 12.3 | 10.2 | 12.4 | 12.4 |
| Fuel | --- | 387. | 390. | 413. |

Engines 5 and 9 - Engine 5 was retested as Engine 9, after it had been shipped to the EPA and returned. It should be noted that the compression pressures varied greatly between cylinders. In the transient tests, a decrease was noted in HC, CO, and fuel consumption, and an increase in $NO_x$. Results of these tests are summarized as follows:

| | Values in g/kW-hr | | | |
|---|---|---|---|---|
| | Transient | | Nine-Mode | |
| | Eng. 5 | Eng. 9 | Eng. 5 | Eng. 9 |
| HC | 14.7 | 11.4 | 17.1 | 17.4 |
| CO | 256. | 181. | 230. | 275. |
| $NO_x$ | 7.8 | 6.2 | 4.7 | 3.4 |
| Fuel | 370. | 403. | 457. | 500. |

## VII. $NO_x$ BASELINE TESTING

The $NO_x$ baseline testing involved 1972 and 1973 heavy-duty gasoline engines. Emissions were evaluated in transient, nine-mode and idle tests. Results of the $NO_x$ baseline testing are given in Appendices C, D and E.

### A. Engines Tested

Nine different 1972 and 1973 heavy-duty gasoline engines were tested in the $NO_x$ baseline phase of this project. The engines, and the heavy-duty vehicles from which they were removed, are identified in Table 4. Included are one or more engines from each of the five major domestic heavy-duty gasoline engine manufacturers.

Engine 22 was a tuned-up version of the engine which had previously been evaluated as Engine 11. Engine 21 had been removed from a vehicle prior to the shipment of the engine to this laboratory. No readable serial numbers were located on the two Ford engines, and with Engine 19 the sixth digit could have been either a 3 or an 8.

A 1973 Dodge 318 engine had been scheduled for testing as Engine 12. However, when installed on the test stand it was determined to be running very poorly. A compression test showed zero in one cylinder. Removing the cylinder head revealed that an exhaust valve had no head and that the corresponding piston had been damaged. The Project Officer directed that no further effort be expended on that engine.

The engines actually tested were all operable when received, but the overall initial condition of these engines varied greatly. Defects in the engines were generally detected during initial screening checks or during the more extensive examinations that were performed on each engine, subsequent to Engine 15. All significant engine repairs or modifications (i.e., replacement of a valve) were conducted under the specific directive of the EPA Project Officer, and his approval was obtained prior to the commencement of testing of each engine.

### B. Engine Tune-Up and Maintenance

Tune-up of each engine involved replacement and/or adjustment of spark plugs, ignition wires, thermostat, distributor cap, points, rotor, condenser, PCV valve, air filter, fuel filter, oil filter and oil. Other adjustments or examinations included: ignition timing, valve clearances, cylinder compression, and the distributor mechanical and vacuum advance curves. As directed by the EPA Project Officer, carburetor idle mixture adjustment was incorporated after Engine 15, and cylinder power balancing and/or other evaluations

TABLE 4. 1972 AND 1973 $NO_x$ BASELINE ENGINES TESTED

| Engine Number [a] | Engine Description: Model Year | Make | CID | Serial Number |
|---|---|---|---|---|
| 14 | 1972 | Ford | 361 | --- |
| 15 | 1972 | Dodge | 413 | J413TH |
| 16 | 1973 | Chevrolet | 454 | T0608TRC |
| 17 | 1973 | GMC | 427 | T1113AHT |
| 18 | 1972 | Chevrolet | 350 | V0210TLX |
| 19 | 1972[b] | IHC | 345 | 1099236V345E |
| 20 | 1973 | Ford | 300 | --- |
| 21 | 1973 | IHC | 304 | 107287V304A |
| 22[c] | 1973 | GMC | 366 | T0818T0A |

| Engine Number | Heavy-Duty Vehicle Description: Model Year | Make | Serial Number |
|---|---|---|---|
| 14 | 1972 | Ford | F60ECP53814 |
| 15 | 1973 | Dodge | M39BN35060736 |
| 16 | 1973 | Chevrolet | CPZ373V320634 |
| 17 | 1973 | GMC | TCE66TV570537 |
| 18 | 1972 | Chevrolet | CPE322F150073 |
| 19 | 1973 | IHC | 106620H352956 |
| 20 | 1972 | Ford | F60BCN42126 |
| 21 | -- | -- | --- |
| 22 | 1973 | GMC | TCE61TV603311 |

[a] Evaluations were intiated on Engine 12, a 1973 Dodge 318, but were discontinued when mechanical condition of this engine was found to be unacceptable.

[b] No apparent change between the 1972 and the 1973 model year.

[c] Engine 22 was initially tested as Engine 11.

were conducted when justified by the results of the tune-up or the other examinations.

More extensive examination of the engines was incorporated into this project during conductance of the $NO_x$ baseline evaluations starting with Engine 16. Modified tune-up data sheets were incorporated with Engine 19. In addition, more extensive component checks were conducted to assure that the engines were representative of their respective model year and more extensive engine repairs were performed. All decisions, concerning significant engine repair or parts replacement and concerning acceptance of an engine for testing, were made by the EPA Project Officer. The tune-up data sheets are included in Appendix E and a selected summary of the tune-ups and the maintenance performed on the engines is given in Table 5.

Through Engine 15, tune-ups were conducted but major maintenance was generally not permitted. The tune-up and maintenance performed on each engine, subsequent to Engine 14, is briefly described as follows:

Engine 15 - A couple of minor difficulties were encountered with the 1972 Dodge 318 engine. The fuel pump sprung a leak after the first test and was replaced. The carburetor secondaries did not function smoothly, even after applying WD-40 to the linkage and bearing surfaces.

Engine 16 - The 1973 Chevrolet 454 was found to have a bad valve in Cylinder 6. This valve was replaced at the request of the Project Officer. During installation of the engine on the stand, it was determined that the left exhaust manifold was warped. It was also noticed that the manifold included air injection tubes. GM was contacted and from the carburetor and distributor numbers determined that this was a California engine with the air-pump missing. The engine was converted to "Federal" by changing the carburetor, intake manifold, and distributor.

The replacement distributor obtained had the right model number but had the wrong advance curve. Upon checking in the Motor Truck and Diesel Repair Manual, it was determined that the 1973 and 1974 models of this engine used the same distributor, but with different advance curves. Several additional distributors were obtained locally, but all of them met the 1974 advance curve specifications. The solution applied was to replace the weights with ones giving an acceptable advance curve.

The components, as-received and as subsequently tested, are identified as follows:

| | As-Received | As-Tested |
|---|---|---|
| Distributor | 1112105 | 1112113 |
| Carburetor | 7043507 | 7043207 |
| Intake Manifold | 330856 | 333839 |
| Exhaust Manifold | With Air Tubes | Air Tubes Removed |

In addition to replacing the intake valve on Cylinder Number 6, the valve seals were replaced on Cylinders 2, 4, 6, and 8. The cylinder compression

TABLE 5. $NO_x$ BASELINE ENGINE TUNE-UP AND MAINTENANCE

| Engine Number | Year | Make | CID | Compression Specs. | Compression As Tested | Problems Encountered and Maintenance Performed |
|---|---|---|---|---|---|---|
| 14 | 1972 | Ford | 361 | -- | 80-120 | |
| 15 | 1972 | Dodge | 413 | 100-140 | 100-110 | Carburetor secondaries did not function smoothly, even after lubrication. Fuel pump leaked and was replaced. |
| 16 | 1973 | Chev. | 454 | 20 Var. | 130-145 | A leaky valve in Cylinder 6 was replaced. Replaced carburetor, intake maniford and distributor to convert engine from California to Federal configuration. Distributor with correct advance curve could not be obtained, so the curve had to be shaped. |
| 17 | 1973 | GMC | 427 | 80% | 100-125 | Intake valve and seals replaced and exhaust valve reseated in Cylinder 5. Governor was replaced. Added three quarts of engine oil during the evaluations. |
| 18 | 1972 | Chev. | 350 | 80% | 125-150 | Throttle shaft bushing was significantly worn. Slight valve clatter on the left side of the engine, carburetor secondaries would open abruptly. |
| 19 | 1972 | IHC | 345 | -- | 115-125 | Carburetor was not correct model and was replaced. |
| 20 | 1972 | Ford | 300 | 75% | 115-135 | Engine as received did not have an air cleaner or a thermostat and the carburetor and distributor were not the correct model numbers. These items were installed or replaced as required. All valves were reseated, water pump and starter were defective and were replaced. The idle mixture spring on the carburetor was collapsed and was subsequently reworked. |
| 21 | 1973 | IHC | 304 | -- | 125-135 | Upon receipt there was a carburetor fuel leak and the idle mixture could not be adjusted. Repairs were made by overhauling the carburetor. The bowl gasket and an o-ring were found to be faulty. Idle fuel mixture adjustment was extremely sensitive on this engine. |
| 22 | 1973 | GMC | 366 | 80 | 115-135 | Governor did not function and was replaced. Accelerator pump was repaired. Cylinders 4 and 7 were "off balance" based on the General Motors cylinder balance test. |

pressures were as follows:

| Cylinder | Compression Pressures, gage reading | | |
|---|---|---|---|
| | Dry | Wet | Repaired |
| 1 | 120 | 140 | 120 |
| 3 | 120 | 130 | 120 |
| 5 | 125 | 135 | 125 |
| 7 | 125 | 140 | 120 |
| 2 | 130 | 145 | 135 |
| 4 | 115 | 140 | 125 |
| 6 | 90 | 95 | 125 |
| 8 | 115 | 140 | 120 |

After replacement of the intake valve in Cylinder 6, the compression pressures ranged from 120 to 135 with an average of 125. The specification given in the Service Manual was 150 with the lowest to be within 20 of the highest. The compression in this engine did not quite meet the specification in the Service Manual, but was well within the usual in-service requirement that the lowest be within 75 or 80 percent of the highest value.

Engine 17 - With the 1972 GMC 427 engine, the intake valve was replaced and the exhaust valve was reseated on Cylinder Number 5 prior to the removal of this engine from the truck. The compression pressures were as follows:

| Cylinder | Compression Pressures, gage reading | | |
|---|---|---|---|
| | Dry | Wet | Repaired |
| 1 | 110 | 125 | 110 |
| 3 | 105 | 120 | 100 |
| 5 | 85 | 85 | 125 |
| 7 | 110 | 110 | 100 |
| 2 | 115 | 120 | 110 |
| 4 | 110 | 105 | 100 |
| 6 | 120 | 135 | 110 |
| 8 | 125 | 135 | 120 |

After replacing the intake valve in Cylinder Number 5, the compression pressures were within the requirement that the lowest reading be within 80 percent of the highest.

Upon receipt of the truck, the lubricant level in the engine was about two quarts below the full mark on the dipstick. During the course of the engine set-up and emissions testing, a total of three quarts of oil were added to the engine. There was no noticeable lubricant leakage from the engine. Exhaust smoke, during prolonged cut-throttle operation with this engine, was relatively severe. This condition, which primarily occurred during the nine-mode test, possibly accounts for a major part of the oil consumption.

The governor circuit in the distributor, and the governor itself, were not functioning on the engine as received. Therefore, the distributor and governor were replaced with operable units having the same part numbers.

The idle mixture was set using the specified 50 rpm lean-drop method. The resultant CO level at 550 rpm was between 1.0 and 1.5 percent. This was also determined to be the lowest CO level achievable with reasonably acceptable idle.

Engine 18 - The 1972 Chevrolet engine required no rework and no replacement of major components. The compression pressures ranged from 125 to 150 with an average of 135. The specification given in the Service Manual was 150 with the lowest to be within 20 of the highest. The compression in this engine almost met the specification in the Service Manual and was well within the usual in-service requirement that the lowest be within 75 or 80 percent of the highest value.

This engine did have a worn throttle bushing, but this did not appear to have any serious effects. This worn bushing, however, may have been responsible for the variations in the emissions values measured in the idle tests.

Engine 19 - With the 1972 International 345, it was determined that the Holley 151786-R94 carburetor was not the correct unit. A manufacturer's representative was contacted, and one of the carburetor models recommended was obtained. The carburetor obtained for use with this IHC 345 was a 454578-C91. The measured compression ratio values ranged from 115 to 125.

Engine 20 - With the 1972 Ford 300 engine, the initial compression values ranged from 80 to 120. Indications were that this cylinder head had previously had one or more valve jobs performed on it, based on the appearance of the valves and the recess in the head. The EPA Project Officer directed that minimum rework be performed and then to recheck the compression. After seating of the valves, the compression values ranged from 115 to 135 and met the requirement that the lowest value be at least 75 percent of the highest.

This engine as received had a D3TF12127GA distributor and a YF64255 carburetor, and did not have an air cleaner. The carburetor was replaced with a D2TZ9510-AA carburetor replacement kit (Carburetor tag was Motorcraft D2HF KA) obtained through the EPA Project Officer. The distributor, apparently a 1973 model, was replaced with a rebuilt unit C9TZ-12127-FRM (C6TF-12127-AG on the distributor) which was obtained locally from a Ford dealer. This replacement distributor had the appropriate mechanical advance curve, but required rework of the vacuum advance unit to obtain the specified vacuum advance curve. An air cleaner was obtained and installed onto the engine.

With this engine, it was very difficult to assure the correctness of replacement components (carburetor and distributor) and some of the tune-up requirements (idle mixture adjustment) from available written sources (the manufacturer's shop manual or the Motor Repair Manual). In all cases, final pre-test acceptance was based on verbal approval from the EPA Project Officer.

Engine 21 - With the 1973 IHC 304 engine, there was a significant external fuel leak from the carburetor bowl and the idle-mixture could not be adjusted to obtain a CO value below several percent. The external leak was

found to be due to a faulty bowl gasket and an internal leak was due to a faulty O-ring. A replacement carburetor was not available so the existing carburetor was overhauled. This problem with the carburetor was the only difficulty of significance that was experienced with the IHC 304 engine. One item of possible interest, however, was a relatively large change in idle CO levels with small changes in the setting of the idle mixture screws (i.e, less than one-eighth of a turn would change idle CO from 0.6% to 1.2%). This made the setting and retaining of the specified CO percent somewhat difficult with this engine.

Engine 22 - The 1973 GMC 366 engine, previously tested as Engine 11, was retested as Engine 22. There were questions concerning the $NO_x$ emissions values that were originally obtained when this engine was tested as Engine 11. This engine was treated as though no previous tests had been conducted and underwent all current test and pre-test requirements.

In the tune-up, the only adjustable parameter found to be out of specification was the idle mixture. It should be noted that, at the time Engine 11 was evaluated, adjustment of the idle mixture was not permitted.

Testing was then initiated with this engine. The operation of the engine during the initial testing indicated the accelerator pump was not functioning. It was found that the check-ball in the accelerator pump chamber was laying loose in the chamber. The accelerator pump was repaired and the testing was resumed.

Following the evaluations with this engine, several additional engine diagnostic tests were conducted. The results are briefly summarized as follows:

| Cylinder | Cylinder Compression | Leak[a] Down | Cylinder[b] Balance | RPM[d] Drop | Carb. [e] Balance |
|---|---|---|---|---|---|
| 1 | 130 | 8 | A600 | 65 | X1120 |
| 2 | 130 | 8 | B665 | 75 | Y1045 |
| 3 | 120 | 26 | B665 | 70 | Y1045 |
| 4 | 120 | 14 | C000[c] | 45 | X1120 |
| 5 | 125 | 11 | D660 | 75 | Y1045 |
| 6 | 125 | 15 | A600 | 55 | X1120 |
| 7 | 130 | 10 | C000[c] | 75 | X1120 |
| 8 | 125 | 10 | D660 | 70 | Y1045 |

[a] Using a Sun Leak-Down Tester
[b] With six cylinders grounded from initial 1500 rpm
[c] Engine died
[d] With one cylinder grounded from initial 1500 rpm
[e] With four cylinders grounded from initial 1500 rpm

These data indicate that cylinder four was a weak cylinder. An additional check showed that all valves had approximately the same amount of lift. A rather severe knocking developed in the left side of the engine, and diagnostic evaluations were discontinued with this engine.

C. Emissions Test Results

Summaries of the emissions test results are given in Appendix C and copies of the computer printouts are given in Appendix D. Brief summaries of results are presented in this section of the report.

1. Transient and Nine-Mode Emissions

The transient and nine-mode emissions results are summarized in Table 6. These data show that, for the overall average, the HC, $NO_x$ and fuel consumption were somewhat lower for the transient tests than for the nine-mode tests, and power was somewhat higher. The CO emissions, however, were over twice as high in the transient tests as in the nine-mode tests. Inclusion of these data into the baseline was conducted by the EPA, as reported in the EPA technical report, "1972-73 Heavy-Duty Engine Baseline Program and $NO_x$ Emission Standard Development."(3)

2. Methane Emissions

The average methane emissions for the transient evaluations are summarized as follows:

| | Emissions, g/kW-hr | | Percent of Total HC | |
|---|---|---|---|---|
| Engine | Total HC | Methane | Methane | Non-Methane |
| 17 | 8.0 | 0.50 | 6 | 94 |
| 18 | 5.4 | 0.37 | 7 | 93 |
| 19 | 6.4 | 0.43 | 7 | 93 |
| 20 | 10.1 | 0.40 | 4 | 96 |
| 21 | 5.5 | 0.34 | 6 | 94 |
| 22 | 7.8 | 0.60 | 8 | 92 |
| Avg. | 7.2 | 0.44 | 6 | 94 |

The methane, as a percent of the total hydrocarbons in the exhaust, ranged from 4 to 8 percent; with an overall average of 6 percent.

3. Idle Emissions

Initially, the HC and CO emissions were measured using a garage-type analyzer, and $NO_x$ was measured using the nine-mode emissions cart. With Engines 14 and 15, HC and CO at idle were also determined using dilute bag samples. Subsequent to Engine 15, measurement of $NO_x$ at idle was discontinued and the HC, CO and $CO_2$ emissions were determined using a dilute bag sample. $CO_2$ was also measured in the undiluted exhaust, and the dilute HC and CO emission concentrations were adjusted, to an undiluted exhaust basis, using the ratio of the undiluted to diluted concentrations of $CO_2$. The results of the emissions results are summarized in Table 7. These data show that the two engines that produced the highest HC at idle (Engines 17 and 20), also produced high HC emissions in the transient tests. In general, however, there did not appear to be any direct relationship between emissions at idle and in the transient test. This is best illustrated for HC by the average data for Engines 16 and 18 and for Engines 19 and 21. Engines 16 and 18

TABLE 6. SUMMARY OF $NO_x$ BASELINE TEST RESULTS

| Engine | Make & CID | Test[a] | Emissions and Fuel, g/kW-hr | | | | | Power kW |
|---|---|---|---|---|---|---|---|---|
| | | | HC | CO | $NO_x$ | $CO_2$ | Fuel | |
| 14 | Ford 361 | Tran. | 14.7 | 216 | 6.2 | 937 | 417 | 23.4 |
| 14 | Ford 361 | N-M | 10.9 | 120 | 8.6 | 989 | 415 | 21.4 |
| 15 | Dodge 413 | Tran. | 9.5 | 212 | 7.2 | 982 | 424 | 26.9 |
| 15 | Dodge 413 | N-M | 10.7 | 71 | 9.3 | 1132 | 423 | 23.1 |
| 16 | Chev. 454 | Tran. | 3.9 | 100 | 6.1 | 1160 | 420 | 27.5 |
| 16 | Chev. 454 | N-M | 6.7 | 31 | 6.0 | 1292 | 461 | 22.0 |
| 17 | GMC 427 | Tran. | 8.0 | 68 | 10.9 | 1038 | 369 | 28.4 |
| 17 | GMC 427 | N-M | 10.6 | 47 | 9.8 | 1060 | 387 | 25.6 |
| 18 | Chev. 350 | Tran. | 5.1 | 108 | 8.4 | 901 | 343 | 24.7 |
| 18 | Chev. 350 | N-M | 9.0 | 44 | 9.7 | 1004 | 374 | 20.1 |
| 19 | IHC 345 | Tran. | 6.4 | 151 | 6.5 | 846 | 347 | 26.9 |
| 19 | IHC 345 | N-M | 8.4 | 46 | 9.2 | 956 | 390 | 20.3 |
| 20 | Ford 300 | Tran. | 10.1 | 95 | 11.6 | 935 | 352 | 19.4 |
| 20 | Ford 300 | N-M | 9.9 | 43 | 11.7 | 1030 | 374 | 16.7 |
| 21 | IHC 304 | Tran. | 5.5 | 115 | 7.9 | 934 | 357 | 23.0 |
| 21 | IHC 204 | N-M | 9.2 | 75 | 8.8 | 994 | 405 | 18.0 |
| 22 | GMC 366 | Tran. | 7.8 | 175 | 6.4 | 984 | 405 | 25.2 |
| 22 | GMC 366 | N-M | 8.6 | 132 | 5.6 | 1008 | 397 | 21.6 |
| Average of Tran/N-M in % | | | 83 | 225 | 91 | 92 | 95 | 120 |
| Minimum Tran/N-M in % | | | 57 | 133 | 71 | 87 | 88 | 109 |
| Maximum Tran/N-M in % | | | 135 | 328 | 114 | 98 | 102 | 133 |

[a] Tran. = Transient N-M = Nine-Mode

TABLE 7. SUMMARY OF IDLE HC AND CO EMISSIONS

| | Emissions | | | | | |
|---|---|---|---|---|---|---|
| | Idle | | Idle + Transient | | Transient Cycle, g/kW-hr | |
| Engine | HC, ppmC | CO, % | HC | CO | HC | CO |
| 14 | -- | -- | -- | -- | 14.7 | 216 |
| 15 | -- | -- | -- | -- | 9.5 | 212 |
| 16 | 5097 | 0.9 | 1300 | 0.01 | 3.9 | 100 |
| 17 | 7700 | 2.7 | 1000 | 0.04 | 8.0 | 68 |
| 18 | 4200 | 2.3 | 800 | 0.02 | 5.1 | 108 |
| 19 | 2100 | 1.4 | 300 | 0.01 | 6.4 | 151 |
| 20 | 17900 | 3.9 | 1800 | 0.04 | 10.1 | 95 |
| 21 | 1600 | 0.3 | 300 | 0.00 | 5.5 | 115 |
| 22 | 4900 | 1.0 | 600 | 0.01 | 7.8 | 175 |
| 16,17&20 | 10000 | -- | 1400 | -- | 7.3 | -- |
| 18,19&21 | 2600 | -- | 500 | -- | 5.7 | -- |
| 16&18 | 4600 | -- | 1000 | -- | 4.5 | -- |
| 19&21 | 1900 | -- | 300 | -- | 6.0 | -- |
| 17&20 | -- | 3.3 | -- | 0.04 | -- | 82 |
| 16&21 | -- | 0.6 | -- | <0.01 | -- | 108 |

produced about 2.5 times as much HC in the idle tests as produced by Engines 19 and 21, but only 75% as much in the transient tests. The lack of correlation for the CO emissions is best illustrated by the average data for Engines 17 and 20 and for Engines 16 and 21.

With Engine 20, the HC emissions at idle could be considered to be excessively high. The specific cause for the high HC emissions was not determined. The mechanical condition of this engine was discussed in the preceeding Section VII B.

4. Findings With Specific Engines

Several findings with a number of the engines were of interest and assist in understanding some of the results obtained. The findings are briefly discussed as follows:

Engine Power and Torque - With the 1972 model gasoline engines, the manufacturer's rated torque and horsepower do not appear to be directly related to the actual available power from the engine. Therefore, the manufacturer's rated power for 1972 model engines generally does not help in determining whether an engine is operating properly. An approximation which had been developed from a Chevrolet 350 engine and used in a couple of previous projects is as follows:

$$\text{Maximum Power} = 0.000116 \times \text{CID} \times \text{Rated RPM}$$
$$\text{Maximum Torque} = 0.715 \times \text{CID}$$

The power values for Engine 20, a 1972 Ford 300 engine, were as follows:

| | Mfg. Rated | Measured | Approximation |
|---|---|---|---|
| Power | 165 @ 3600 | 118 @ 3400 | 125 @ 3600 |
| Torque | 294 | 220 | 215 |

The measured values were less than 75 percent of the manufacturer's rated values, but did not differ much from the approximation. Therefore, it appears that this engine had a reasonable power output.

Manual Choke Operation - In keeping with the procedure prescribed by the EPA Project Officer, the choke was opened and remained open after the automatic cycle control system was engaged. With this method, there was some noticeable engine hesitation during the first several accelerations.

Engine 18 - The 1972 Chevrolet 350 engine has a four-barrel carburetor, and, when the secondaries came in, the immediate effects were dramatic. For example, with steady increase in throttle at 2500 rpm, the torque would increase in direct relation to the throttle setting until a point was reached at which the torque would suddenly double in value. This point was that at which the secondaries began to open. This condition initially made it difficult to meet the cycle parameters. However, by appropriate adjustment of the system gain control, acceptable cycle parameter values were attained. The gain setting was different for transient cycle Tests 18-1 and 18-3. The composite results for these tests, however, were in very good agreement.

Engine 20 - With the 1972 Ford 300 engine, a malfunction occurred which resulted in some potentially interesting results. The idle mixture, as initially adjusted, produced about 3 percent CO. From the emissions results during the initial testing, however, it became apparent that some change had occurred. It was found that the spring on the idle mixture adjusting screw was collapsed; allowing vibration to change the mixture setting. Based on a measured CO value of about 0.2 percent, the adjusting screw had apparently vibrated to a very lean position. The first two transient tests (20-1 and 20-2) had apparently been run at that condition. Tests 20-3 and 20-4 were then run after readjusting the idle mixture. The results of these tests are summarized as follows:

| | Average Values | | | | | | |
|---|---|---|---|---|---|---|---|
| | Lean-Cold | Test Hot | 20-1 & -2 Composite | Tuned-Cold | Test Hot | 20-1 & -2 Composite | Lean-Tuned/Tuned, in % |
| HC, g/kW-hr | 16.1 | 12.0 | 12.6 | 14.5 | 9.3 | 10.1 | +25% |
| CO, g/kW-hr | 96. | 76. | 79. | 110. | 93. | 95. | -17% |
| $CO_2$, g/kW-hr | 960. | 911. | 918. | 944. | 934. | 935. | -2% |
| $NO_x$, g/kW-hr | 8.6 | 10.9 | 10.5 | 10.6 | 11.8 | 11.6 | -9% |
| SFC, kw/kW-hr | 0.37 | 0.34 | 0.34 | 0.37 | 0.35 | 0.35 | -3% |
| WORK, kW-hr | 6.4 | 6.3 | 6.3 | 6.4 | 6.3 | 6.3 | 0% |
| POWER, kW | 19.6 | 19.5 | 19.5 | 19.5 | 19.4 | 19.4 | +1% |
| IDLE CO, % | ---- | ≈0.2 | ---- | ---- | ≈3.5 | ---- | ---- |

The very lean mixture condition produced 25 percent higher HC and 17 percent lower CO than was produced with the tuned-up idle mixture condition. The $NO_x$ value, however, was reduced by only 9 percent at the lean mixture condition relative to the tuned-up condition.

The $NO_x$ values per bag, for the hot transient, were as follows:

| | $NO_x$ in Grams for the Hot Transient | | | | |
|---|---|---|---|---|---|
| Bag | 1 | 2 | 3 | 4 | Total |
| Lean | 3 | 13±1 | 48±3 | 5 | 69 |
| Tuned | 5 | 15 | 49±4 | 5 | 74 |
| L-T | -2 | -2 | -1 | 0 | -5 |

These data illustrate that Bag 3 is the major contributor to the total $NO_x$ (about two-thirds of the total). These data further illustrate that the major contributors to the $NO_x$ composite test differences were Bags 1 and 2 of the hot transient (about 80 percent of the total differences). Not shown is that the HC emission rates for Bag 3 were essentially unchanged for the lean and tuned conditions.

Bag 3 primarily involves significant speed and load operating conditions. Therefore, it appears that idle mixture adjustment has minimal effect at significant speed and load operating conditions, and as a result has

relatively minor effect on total composite $NO_x$ emission rates.

Engine 22 - The 1973 GMC 366 engine was initially evaluated as Engine 11. Due to concerns over the $NO_x$ emission rates, this engine was subjected to an extensive tune-up and was retested as Engine 22. Problems were encountered with the accelerator pump, in an initial check-out run, and these problems were resolved.

Following repair of the accelerator pump, two runs were conducted that did not meet the specified cycle statistics. This was found to be associated with the fact that this was a relatively high-speed, governed engine. The procedure required that all speeds higher than the governed speed be attained by motoring the engine. The dynamometer used in this project, however, had a maximum motoring speed of 3500 rpm. Therefore, motored speeds above 3500 rpm were unattainable, and this had a significant effect on the speed standard error and intercept. This deviation in motored speed, however, was previously found to have a negligible effect on emissions. By careful adjustment of the controls, it was possible to obtain statistics meeting the requirements.

The results of the various evaluations conducted with this engine are summarized as follows:

| | Transient | | | Nine-Mode | |
|---|---|---|---|---|---|
| Engine Number | 11[a] | 22[b] | 22 | 11[a] | 22 |
| HC, g/kW-hr | 15.0 | 9.3 | 7.8 | 14.7 | 8.6 |
| CO, g/kW-hr | 230. | 193. | 175. | 185. | 132. |
| $NO_x$, g/kW-hr | 3.7 | 6.2 | 6.4 | 5.5 | 5.6 |
| SFC, kg/kW-hr | 0.42 | 0.42 | 0.41 | 0.44 | 0.40 |

[a] Idle mixture set very lean and the accelerator pump was probably not functioning.

[b] Accelerator pump was not functioning (Test 22-00).

Indications are that the large difference in HC emissions, between configuration 11 and 22, was due to the very lean idle mixture setting. The reason for the large difference in $NO_x$ emissions was not apparent.

## VIII. NEW CURRENT TECHNOLOGY ENGINES

Three different 1978 and 1979 engines were tested for purposes of correlation with the Environmental Protection Agency. One of the three engines was tested three different times. Emissions are reported for transient and nine-mode tests.

### A. Engines Tested

Three 1978 and 1979 engines were evaluated for the purpose of correlation with data generated on the same engines by the EPA. All of these engines were provided to this laboratory in crates and were designated as being ready for testing. All preparations on these engines, other than minor tune-up, were conducted prior to shipment to this laboratory.

On these three engines, the idle speed, idle mixture, ignition timing, and dwell were checked, and were adjusted to manufacturer's specifications when necessary. These engines are identified in Table 8.

TABLE 8. NEW 1978 AND 1979 ENGINES TESTED

| | Engine Description | | | |
|---|---|---|---|---|
| Engine Number | Model Year | Make | CID | Serial Number |
| 1[a] | 1978 | IHC | 404 | 404-053483 |
| 6[a] | 1978 | IHC | 404 | 404-053483 |
| 7 | 1978 | Chevrolet | 454 | T364776 |
| 8[a] | 1978 | IHC | 404 | 404-053483 |
| 10 | 1979 | GMC | 292 | --- |

[a] Engines 6 & 8 are retests of Engine 1.

### B. Emissions Test Results

Summaries of the emissions test results and copies of the computer printouts are given in Appendix F. Brief summaries of the results are given in Table 9.

An item of interest in these data is the significantly lower HC emissions in the nine-mode tests, relative to the transient tests. With the older engines evaluated in this project, the HC emissions in the nine-mode tests were generally equal to or greater than the HC emissions in the transient tests.

The IHC 404 engine was evaluated at three different times as part of a program to establish correlation between results obtained by this laboratory and the EPA. Engine test designations for these evaluations were Engine 1, 6 and 8. The minimum, average and maximum values for these three evaluations are included in Table 9.

TABLE 9. SUMMARY OF THE NEW ENGINE TEST RESULTS

| Engine | Make & CID | Test[a] | Transient Test Emissions and Fuel, g/kW-hr HC | CO | $NO_x$ | Fuel |
|---|---|---|---|---|---|---|
| 1[b] | IHC 404 | Tran. | 4.0 | 96 | 7.6 | 414 |
| | | N-M | 1.8 | 45 | 7.1 | 460 |
| 6[b] | IHC 404 | Tran. | 6.0 | 103 | 8.5 | 398 |
| | | N-M | 1.6 | 42 | 8.5 | 390 |
| 7 | CHEV. 454 | Tran. | 3.3 | 68 | 8.7 | 371 |
| | | N-M | 0.8 | 27 | 7.8 | 394 |
| 8[b] | IHC 404 | Tran. | 5.1 | 78 | 6.7 | 385 |
| | | N-M | 1.5 | 20 | 5.3 | 418 |
| 10 | GMC 292 | Tran. | 12.6 | 122 | 17.8 | 385 |
| | | N-M | 5.4 | 67 | 17.7 | 424 |
| Avg. of Engine 1, 6, 8 | | Tran. | 5.0 | 92 | 7.6 | 399 |
| Min. of Engine 1, 6, 8 | | Tran. | 4.0 | 78 | 6.7 | 385 |
| Max. of Engine 1, 6, 8 | | Tran. | 6.1 | 103 | 8.5 | 414 |
| Avg. of Engine 1, 6, 8[b] | | N-M | 1.6 | 36 | 7.0 | 422 |
| Min. of Engine 1, 6, 8[b] | | N-M | 1.5 | 20 | 5.3 | 390 |
| Max. of Engine 1, 6, 8[b] | | N-M | 1.8 | 45 | 8.5 | 460 |
| Avg. of Tran/N-Min %[c] | | | 320 | 230 | 107 | 93 |
| Min. of Tran/N-Min % | | | 230 | 180 | 101 | 91 |
| Max. of Tran/N-Min % | | | 410 | 260 | 111 | 95 |

[a]Tran. = Transient N-M = Nine-Mode
[b]Engines 6 & 8 are retests of engine 1.
[c]Average of the percentage for each engine.

## LIST OF REFERENCES


1. Federal Register, Vol. 44, No. 31, Tuesday, February 13, 1979.
   Note: The above proposed rules for heavy-duty emissions regulations, with some modifications, were subsequently issued as Subpart N to Part 86 in the Federal Register, Monday, January 21, 1980.

2. Cox, Timothy P., Glenn W. Passavant and Larry D. Ragsdale, "1969 Heavy-Duty Engine Baseline Program and 1983 Emissions Standards Development." Technical Report, Office of Air, Noise and Radiation, U.S. Environmental Protection Agency, Ann Arbor, May 1979.

3. Cox, Timothy et al, "1972-73 Heavy-Duty Engine Baseline Program and $NO_x$ Emission Standard Development." Technical Report No. EPA-AA, SDSB-81-01. March 1981.

4. Telephone conversation between Sherrill Martin and Richard Burgeson on December 13, 1978.

5. Code of Federal Regulations, Title 40, Chapter 1, Part 85, Subpart H.

6. Federal Register, Vol. 42, No. 174, Thursday, September 8, 1977.

7. Memorandum from Charles Urban and Harry Dietzmann that was transmitted to the EPA on August 10, 1979.

8. Telephone conversation between Sherrill Martin and Timothy Cox on September 5, 1979.

## APPENDICES

A - General Information
B - HC and CO Baseline Test Results
C - $NO_x$ Baseline Test Results
D - $NO_x$ Baseline Data Computer Printouts
E - $NO_x$ Baseline Engine Tune-up Record Sheets
F - Test Results On New Engines

# APPENDIX A

## GENERAL INFORMATION

A-1 - Revised Scope of Work
A-2 - Original Scope of Work
A-3 - CVS Nine-Mode Test Procedure
A-4 - Program TCP for Determination of Test Acceptability

APPENDIX A-1. REVISED SCOPE OF WORK

Contract No. 68-03-2603

Exhibit A

Scope of Work

The contractor shall test gasoline and diesel-type heavy-duty engines by the test procedures authorized below. The engines will be supplied by EPA.

A minimum of 22 gasoline engines and a minimum of 23 diesel engines shall be tested. In lieu of engines, up to 20 vehicles may be supplied by EPA. The contractor shall remove, test, and replace the engines. Vehicles shall be returned in the same general condition as received.

The Test Procedures, Equipment Specifications, and Calibration Procedures are outlined below. The detailed procedures shall be found in: Title 40 of the Code of Federal Regulations, Part 86, Subpart D, "For 1979 and Later Model Year Heavy-Duty Engines", as published in the Federal Register, September 8, 1977, pp. 45154 - 45174; revised Title 40 of the Code of Federal Regulations, Part 86, Subpart P and N, "For 1984 and Later Model Year Heavy-Duty Engines", as published in the Federal Register, January 21, 1980, pp. 4136 - 4227; and "Draft Recommended Practice for Measurement of Gaseous and Particulate Emissions from Heavy-Duty Diesel Engines Under Transient Conditions", EPA Technical Report No. SDSB-79-18, by E. Danielson, April 1979. Deviations from the procedures referenced above, substitution of additional procedures within the scope of technical direction, or substitution of procedures which supersede those procedures referenced above, shall be made only with prior approval of the EPA Project Officer.

I. Test Procedure

1. Receipt of Engine

a. The EPA Project Officer shall specify which engines are to be tested.

b. Engines will be furnished by EPA to the test facility. The contractor shall examine the engines for damage during shipment and will verify that the engine delivered is the same as specified by the EPA Project Officer. EPA will ensure that the contractor, at any time, has at least one engine on hand for testing until the total quantity of engines has been tested.

2. Engine Adjustment

a. All new engines shall be checked to determine:

1) Idle speed;

2) Rated power;

3) Rated speed;

4) Rated torque.

These checks shall be made with the engine warmed up. If the items checked are outside of the recommended specifications, the EPA Project Officer shall be notified. Subsequent action may include troubleshooting, engine adjustment, and mechanical repair.

b. All in-use engines shall be checked for operational integrity using procedures specified by the EPA Project Officer. These checks shall include, at a minimum:

1) Visual inspection, including verification that the carburetor and distributor are the proper parts for the engine being tested;

2) Cylinder compression check (warm).

The criteria against which the engine's integrity shall be checked shall be specified by the EPA Project Officer, who shall be notified if the engine fails checkout, and who shall direct any subsequent action. Subsequent action may include mechanical repair or engine rejection.

c. Following initial checkout, all in-use engines shall be subjected to major tune-up. What constitutes a major tune-up shall be prescribed by the EPA Project Officer, as will guidance and assistance should tune-up specifications be unattainable. Major tune-ups may require at a minimum:

1) Replacement and/or adjustment of ignition-related parts;

2) Possible mechanical repair;

3) Recording of "recommended" and "as-tune" specifications in a format to be specified by the EPA Project Officer.

3. Steady-State Emission Testing

a. Following engine checkout and any required adjustments, all engines shall be tested per Title 40 of the Code of Federal Regulations, Part 86, Subpart D, using a modified version of the "9-mode" Test Procedure for Gasoline Engines, or the "13-mode" Test Procedure for Diesel Engines.

b. A total of two (2) complete tests are required with a third test recommended if emission results from the first two tests are inexplicably variable.

c. These steady-state tests may, at the discretion of the contractor and the EPA Project Officer, serve as further checks on engine integrity, over and above those specified above.

4. Transient Emission Testing

a. Transient emission testing shall be conducted and validated per Title 40 of the Code of Federal Regulations, Part 86, Subpart N. In summary, such testing shall consist of:

1) Generation of maximum torque curve (mapping);

2) Generation of the transient reference cycle;

3) Pre-test engine soak or cool down;

4) Cold-start transient cycle, lasting approximately twenty (20) minutes during which emissions are sampled;

5) A twenty (20) minute soak with the engine off;

6) Hot-start transient cycle, lasting approximately twenty (20) minutes, during which emissions are sampled;

7) Emission calculations and test cycle validation.

b. A total of two (2) complete and valid tests are required, with a third test recommended if emission results from the first two are inexplicably variable. Generation of an engine map and the reference cycle need only be done once per engine, however.

5. Additional Testing

a. Limited additional testing for both research purposes and for checks on engine integrity may be required at the direction of the EPA Project Officer. Such additional testing may include idle emission tests, emission testing over alternate transient cycles, and the sampling of additional gases and exhaust matter during the standard tests.

6. Release of Engine

a. Upon completion of testing the contractor shall notify the EPA Project Officer for approval to discontinue testing. After such approval is given, the Project Officer will arrange to assume custody within a reasonable time.

II. Specifications and Equipment Requirements

1. Test Cycle

a. The test cycle is defined in terms of "normalized" speed and power. For speed, 0% indicates idle rpm and 100% is usually the manufacturers rated rpm for maximum power. For torque, 0% is no torque and 100% is the maximum torque which the engine can produce at a given engine speed. Other values are linearly related to the two set points. Negative values indicate an engine speed below idle or a motoring condition.

b. The test cycle is defined by a curve through the specified speed and torque sequences.

2. Dynamometer and Engine Equipment

a. The dynamometer shall be capable of performing the test cycle within the specified tolerances. The engine cooling system shall maintain (approximately) the manufacturers specified operating temperature.

b. Engine speed and torque shall be continuously recorded. In addition, the deviation from the test cycle shall also be shown to verify test validity.

3. Exhaust Gas Sampling System and Analyzers

a. The sampling system and gas analyzer shall conform to the specifications found in the appropriate Subparts of Title 40 of the Code of Federal Regulations, Part 86, or as specified by the EPA Project Officer.

4. Analytical Gasses, Fuel, Calibration Procedure

a. The analytical gases, fuels, and calibration procedures shall conform to the specifications found in the appropriate Subparts of Title 40 of the Code of Federal Regulations, Part 86, or as specified by the EPA Project Officer.

III. Additional Testing (Diesel Engines)

1. Particulates and Hydrocarbons

a. In addition to gaseous emission measurements, measurements of diesel particulate emissions shall be made during each transient emission test.

b. Both particulate and hydrocarbon measurements shall be made in accordance with "Draft Recommended Practice for Measurement of Gaseous and Particulate Emissions from Heavy-Duty Diesel Engines Under Transient Conditions," EPA Technical Report No. SDSB-79-18, by E. Danielson, April 1979, or as directed by the EPA Project Officer.

c. High-volume sampling of diesel particulates shall be made during all transient emission testing using equipment and procedure to be agreed upon between EPA and the contractor. High-volume particulate samples shall be stored in accordance with accepted scientific practice and shall be made available for distribution to outside laboratories.

2. Smoke

a. Continuous traces of exhaust opacity (approximately 6 inches/minute) shall be supplied for all transient diesel testing. An in-line smokemeter shall be used. Smokemeter malfunctions shall not void the exhaust emissions tests.

IV. Data Submission

1. Data Submission

a. Test results shall be submitted in two manners, packets and punched (and interpreted) 80-column cards. Formats for these submissions shall be specified by the EPA Project Officer.

b. Test results for each engine shall be submitted within a reasonable time after completion of each engine.

c. Strip charts and test notes shall be retained and submitted as requested by the Project Officer.

Exhibit A

Contract No. 68-03-2603

Scope of Work
(8 Pages)

The contractor shall test gasoline and Diesel type heavy duty engines by the transient test procedure outlined below. A tentative list of engines appears as Table A-1. Seven gasoline and ten Diesel engines will be from in-use vehicles. The remaining engines will be in new, or nearly new condition.

A minimum of 25 engines of each type shall be tested. Each engine test will require development of an engine torque curve, a high and low speed idle emission check, and a Cold/Hot Start Transient Emission Test. One replicate of the transient test shall be run. In-use engines shall be tested first in "as-received" condition; a tune-up may be required followed by additional testing.

The detailed Test Procedures, Equipment Specifications and Calibration procedures follow. References have been made to EPA's Motor Vehicle Engine Test Procedure, Title 40 of the Code of Federal Regulations Part 86 (e.g., 40 CFR §86.XXX); and also to proposed 40 CFR Part 86, Subpart D for 1979 heavy duty engines; see 41 Federal Register 21292-21313, 24 May 1976.

## I. Test Procedures

0. Overview: Figure 1 is a schematic of the test sequence. It shows the different test sequences for new and in-use engines. The items in these sequences, the equipment to be used and the calibration procedures to be followed are described below.

1. Receipt of engine:

(a) EPA will, for each engine, transmit a written test order to the contractor containing the engine description and necessary specifications.

(b) Engines will be furnished by EPA to the test facility. The contractor shall examine the engines for damage during shipment and will verify that the engine delivered is the same as specified in the test order. EPA will insure that the contractor, at any time, has at least one engine on hand for testing until the total quantity of engines has been tested.

2. Engine adjustment:

(a) All new engines, shall be checked to determine:

(1) Idle speed

(2) Idle CO exhaust concentration

(3) Timing (Gasoline engines only)

(4) Dwell (Gasoline engines only)

These checks shall be made with the engine warmed up.

(b) If the items checked are outside of the specifications on the test order, they shall be adjusted to fall within the specification range

3. Engine mapping

(a) Gasoline engines shall be warmed-up as follows:

(1) Idle - 1 minute

(2) 2000 rpm at 10% torque - 4 minutes

(3) 2000 rpm at 55% torque - 35 minutes

(b) Diesel engines shall be warmed-up by idling for 2 minutes and then by operating at rated speed, maximum power for 10 minutes.

(c) A curve of maximum torque versus speed shall be developed for engine speeds of -22% to +150% (percent speed is defined in the item on engine cycles). Readings will be taken from the lowest to highest speeds in 100 rpm increments. Duplicate readings are then taken going from highest to lowest speeds. The maximum torque curve is derived from the average of the two readings. If an engine will not develop any torque at a required speed, that reading is to be omitted.

4. Pre-test soak:

(a) The engine shall soak at an ambient temperature of 25C $\pm$5 for a period of 8 to 36 hours prior to the cold start test.

(b) If the engine soaks for more than 36 hours, it shall be warmed up, 3(a) or (b), and allowed to soak for 8 to 36 hours prior to the cold start test.

5. Cold start CVS test:

(a) The cold start CVS test is a continuous test consisting of 5 five minute segments in series. Exhaust mass emissions are determined separately for each segment. Engine start-up is included in the initial segment.

(b) All equipment is to be in a stand-by or operating mode prior to the start of the test.

(c) Start the engine, following the manufacturers procedure either using the engine starter or by operating the dynamometer at the engine cranking speed. Exhaust gas sampling is to begin when cranking starts.

(d) Once the engine starts, the operation cycle begins. The engine must be operated over the specified sequence of engine speed and torque, within the tolerances. See Item 11.

(e) At the end of each five minute segment, terminate the previous sampling and begin taking a new sample. Analyze sample bags as soon as possible, but in no case more than 20 minutes after the sample has been collected. Collect and calculate mass emissions in accordance with 40 CFR Part 86, Subpart B.

(f) At the end of the fifth sample collection period, stop sampling and then turn the engine off.

6. Pre-hot start soak: Allow the engine to soak for 15 minutes prior to the hot start test.

7. Hot start test: The hot start test consists of repeating the first segment of the cold start test. Sample collection includes engine starting but does not include engine shut down.

8. Idle test:

(a) Allow the engine to idle following the hot start test.

(b) Measure HC, CO and NOx in the undiluted exhaust with "gararge type" instruments. Also measure undiluted $CO_2$ using a "laboratory grade" analyzer.

(c) Simultaneously with the undiluted exhaust measurements, collect dilute exhaust and background samples using the CVS. Analyze for HC, CO, $CO_2$ and NOx.

(d) Increase engine speed to 2500 rpm ($\pm$ 100). If 2500 rpm cannot be obtained, then use maximum obtainable speed. Repeat the procedure in (b) and (c).

(e) Using the ratio of $CO_2$ undiluted/diluted calculate the undiluted concentrations of HC, CO and NOx from the CVS results.

9. Replication: Repeat items (4) through (8) to obtain a second set of test results. This completes the entire test sequence for new engines.

10. In-use engines; tune-ups:

(a) After running a replicate test on an in-use engine (in "as-received" condition) check the quantities listed in item 2 (a).

(b) If the quantities are within the test order specifications, testing of the in-use engine is complete.

(c) If the quantities are not within the tolerances on the order, proceed to adjust and/or tune-up the engine to meet the test order specifications. After the engine has been adjusted and/or tuned up, proceed with items 3 through 9 as if it were a new engine.

11. Release of engine: Upon completion of testing the contractor shall notify EPA. EPA will arrange to assume custody within a reasonable time.

II. Specifications and Equipment Requirements

12. Test Cycle:

(a) The test cycle is defined in terms of "normalized" speed and power. For speed, 0% indicates idle rpm and 100% is the manufacturers rated rpm for maximum power. For torque, 0% is no torque and 100% is the maximum torque which the engine can produce at a given engine speed. Other values are linearly related to the two set points. Negative values indicate an engine speed below idle or a motoring condition (which will be run with the throttle closed).

(b) The test cycle is defined by a curve through the specified speed and torque sequences.

The tolerances around each curve are defined as follows:

(1) Speed: The upper limit is 25 rpm higher than the highest point on the curve within 1 second of the given time. The lower limit is 25 rpm lower than the lowest point on the curve within 1 second of the given time. On speed accelerations, deviations of speed below the reference speed are acceptable if the engine is operated at WOT until the engine speed agrees with the reference speed.

(2) Torque: The upper limit is 5% or 30 ft-lbs (20 ft-lbs for gasoline engines), whichever is less, greater than the highest point on the curve within 1 second of the given time. The lower limit is 5% or 30 ft-lbs (20 ft-lbs for gasoline engines), whichever is less, lower than the lowest point on the curve within 1 second of the given time. The torque tolerances do not apply for conditions of decreasing torque with simultaneously decreasing speed for engine motoring.

(c) The test cycles will be provided to the contractor within one (1) month after the effective date of the contract.

13. Dynamometer and engine equipment:

(a) The dynamometer shall be capable of performing the test cycle withing the specified tolerances. The engine cooling system shall maintain (approximately) the manufacturers specified operating temperature.

(b) Engine speed and torque shall be continuously recorded to within ± 1% of the rated speed and maximum torque. In addition, the deviation from the test cycle shall also be shown to verify test validity.

14. Idle check equipment: "Garage type" instruments (Sun, EPA-75; and Teeco, Model 8A; or equivalents) shall be used to obtain idle readings. NDIR (Nondispersive infra-red) detection shall be used for HC and CO, chemiluminescent shall be used for NOx. The "laboratory grade" $CO_2$ analyzer shall conform to proposed 40 CFR §86.316-79.

15. Fuel: See proposed 40 CFR §86.307.

16. Analytical Gases: See proposed 40 CFR §86.308. Exception, the 0% $O_2$ oxygen interference check gas is not required.

17. Analyzers: See proposed 40 CFR §§86.316 to 86.318.

18. Exhaust gas sampling system: See 40 CFR §86.109. Flow rates may have to be increased to accommodate the quantities of exhaust gases generated.

19. Exhaust gas analytical system schematic: See 40 CFR §86.111, paragraph (a).

## III. Calibrations

20. Calibrations: See proposed 40 CFR §§86.319 and 86.320; 86.326 and 86.327; and 86.330 to 86.333. Also see 40 CFR §86.119.

## IV. Data Submission

21. Data submission:

(a) Test results shall be submitted in two manners, packets and punched (and interpreted) 80 column cards. Formats for these submissions shall be specified by the project officer within two months after contract award.

(b) Information to be submitted shall include (as applicable):

Engine Identification
Test Numbers, Dates

Idle RPM (as recieved/adjusted)

Timing (as received/adjusted)

Dwell (as received/adjusted)

Torque curve data

Idle Emissions HC, CO, NOx (as received/adjusted)

Barometric pressure

Ambient temperature

Analyzer calibration curves

CVS Test data, recorded for each segment:

- Inlet air temperature average for wet and dry bulbs
- CVS inlet temperature, PDP only
- CVS flow and raw data
- Background and Sample bag concentrations of HC, CO, $CO_2$ and NOx including zero and span readings and gas concentrations
- Diesel engine test shall include HFID analyzer data
- Integrated horsepower-hours
- Calculated emissions in grams, grams/mile, grams/hp-hr, grams/lb fuel, grams/kw-hr, grams/km and grams/kg fuel for each segment

(c) Strip charts and test notes shall be retained and submitted as requested by the project officer.

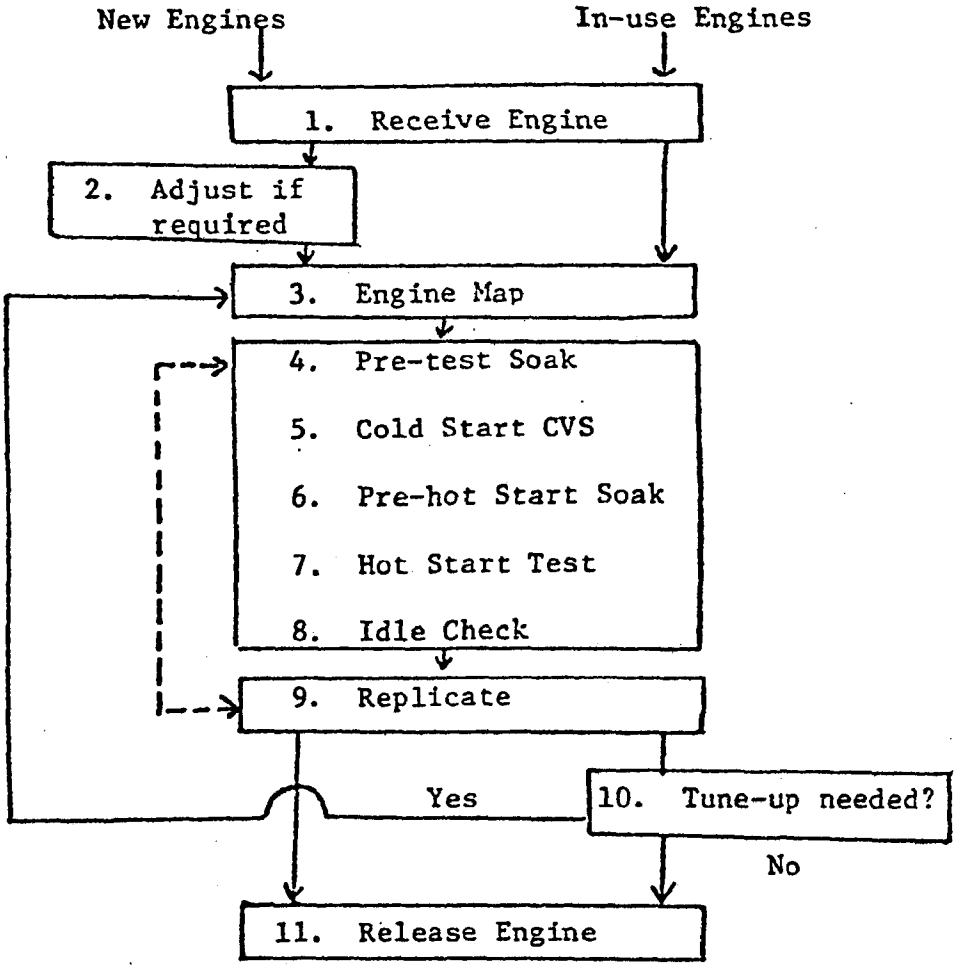
Table A-1

Tentative Engine List

| Manufacturer | CID | # New Engines | # In-Use | # Prototypes |
|---|---|---|---|---|
| **Gasoline Engines** | | | | |
| CHRYSLER | 318 | 1 to 2 | 0 to 1 | ↑ |
| | 360 | 1 to 2 | 0 to 1 | Undetermined |
| | 440 | 1 to 2 | 1 | possibly |
| GENERAL MOTORS | 350 | 1 to 3 | 1 | LDT |
| | 400 | 1 | 0 to 1 | engines |
| FORD | 300 | 1 | 0 to 1 | with |
| | 351 | 1 to 3 | 1 | catalysts |
| | 400 | 1 | 0 to 1 | will |
| IHC | 196 | 0 to 1 | 0 to 1 | be |
| | 304 | 0 to 1 | 0 to 1 | tested |
| | 345 | 1 | 0 to 1 | ↓ |
| | 391 | 0 to 1 | 0 to 1 | |
| | 400 | 0 to 1 | 0 to 1 | |
| | 446 | 0 to 1 | 0 to 1 | ___ |
| TOTAL GASOLINE TO BE TESTED | | 15 | 7 | 3 |
| **Diesel Engines** | | | | |
| CUMMINS | 855 | 1 to 3 | 1 to 2 | |
| | 1150 | 1 to 3 | 1 to 2 | |
| CATERPILLAR | 636 | 1 to 3 | 1 to 2 | |
| MACK | 672 | 1 to 3 | 1 to 2 | |
| GENERAL MOTORS | 568 | 1 to 2 | 0 to 1 | |
| | 552 | 1 to 2 | 0 to 1 | |
| | 736 | 1 to 3 | 1 to 2 | |
| TOTAL DIESEL TO BE TESTED | | 15 | 10 | |

Figure 1

Test Sequence



## APPENDIX A-3. CVS NINE-MODE TEST PROCEDURE

Note: Record Data on Sheet DD-2 for WARM-UP through Test

PRE-TEST

1. Bleed Flotron
2. Dyno Control to MANUAL, set SPEED SET to 1500 RPM (≃27.0 on dial)
3. Calibrate ACTUAL TORQUE
4. Calibrate ACTUAL RPM
5. Zero Flotron with ATTENUATOR set on 10v

WARM-UP (Evacuate bags during warm-up)

6. Turn WATER, IGN, BATTERY CHARGER and CVS on
7. Start Engine and run No Load at 1500±200 RPM for 1 minute
8. Run at 1500 rpm and 14±1 inch-Hg until Oil Temp is 200°F

MAX. LOAD

9. Go to WOT at 2000 rpm
10. Push Filter Buttons, start Chart (1 cm/min) and record data during minutes 1 to 2.
11. Go to 2000 rpm and 14±1 inch-Hg and start NINE-MODE TEST

NINE-MODE TEST (Start Directly from MAX. LOAD)

12. In 5 minutes or less, calculate modes and set up for running test and read: Baro, "Hg_____D.B. Temp., °F_____,R.H._____
13. Go to Mode 1 and Stabilize in one minute
14. Start Bag and Charts and Run 5 minutes (300 seconds)
15. Stop Bag and Charts and Record CVS Data
16. Repeat Steps 14 thru 16 for Modes 2 thru 9

Read: Baro, "Hg_____, D.B. Temp., °F_____, R.H._____

17. Go to 14±1 "Hg if testing is to continue or shut down
18. Assemble all data into a labeled envelope and deliver for processing.

```
FTN,L
      PROGRAM TCP
C*****THIS PROGRAM CALCULATES THE PARAMETERS AND ACCEPTABILITY FOR A RUN
C     LATEST PROGRAM REVISION - AUGUST 27, 1979
      DIMENSION TC(600),SC(600),TP(600),SR(600),TR(600),IDTEST(71)
     1          ,ITT(7)
      DATA STX,STY,STX2,STY2,STXY,SSX,SSY,SSX2,SSY2,SSXY,SHX,SHY,SHX2,
     1 SHY2,SHXY/15*0./
      M=0
      N=0
      READ(10,13)ITT,ITID
13    FORMAT(7A1,I1)
      WRITE(6,60)ITT,ITID
60    FORMAT(1H0,30X,7A1,I1)
      READ(10,15)IDTEST
15    FORMAT(71A1)
      WRITE(6,16)IDTEST
16    FORMAT(1H0,71A1)
      READ(10,7)TCL,SCL,SRL,TRL,TPL,TCH,SCH,SRH,TRH,VOIDA
7     FORMAT(10F8.3)
      READ(10,28)VOIDB,VOIDC,VOIDD,VOIDE,TPH
28    FORMAT(5F8.3)
      READ(10,27)TCAL,TMAX,SCAL,SMAX,SIDL,HMAX,PTS
27    FORMAT(7F8.0)
      WRITE(6,11)TCL,TCH,SCL,SCH,SRL,SRH,TRL,TRH,TPL,TPH
11    FORMAT(1H0,10F8.3)
      WRITE(6,41)TCAL,TMAX,SCAL,SMAX,SIDL,HMAX,PTS
41    FORMAT(1H ,7F8.0)
      TCF=TMAX/(TCH-TCL)
      TRF=TCAL/(TRH-TRL)
      SCF=(SMAX-SIDL)/(SCH-SCL)
      SRF=SCAL/(SRH-SRL)
      TPCUT=(TPH-TPL)*.99+TPL
      NPT=PTS
      DO 6 J=1,2
      READ(9,1)(TC(I),SC(I),SR(I),TR(I),TP(I),I=1,NPT)
1     FORMAT(25X,5F6.0,25X,5F6.0)
      DO 8 I=1,NPT
      TC(I)=(TC(I)-TCL)*TCF
      SC(I)=(SC(I)-SCL)*SCF+SIDL
      SR(I)=SR(I)*SRF
8     TR(I)=TR(I)*TRF
      DO 6 I=1,NPT
      M=M+1
      SSX=SSX+SC(I)
      SSY=SSY+SR(I)
      SSX2=SSX2+SC(I)**2
      SSY2=SSY2+SR(I)**2
      SSXY=SSXY+SC(I)*SR(I)
      IF(ABS(TP(I)).GE.ABS(TPCUT).AND.TR(I).LT.TC(I))GO TO 6
      IF(TC(I).LT.(-.11*TMAX))GO TO 6
      N=N+1
      STX=STX+TC(I)
      STY=STY+TR(I)
      STX2=STX2+TC(I)**2
      STY2=STY2+TR(I)**2
```

```
      STXY=STXY+TC(I)*TR(I)
      SHX=SHX+TC(I)*SC(I)
      SHY=SHY+TR(I)*SR(I)
      SHX2=SHX2+(TC(I)*SC(I))**2
      SHY2=SHY2+(TR(I)*SR(I))**2
      SHXY=SHXY+TC(I)*SC(I)*TR(I)*SR(I)
6     CONTINUE
      TMN=STXY-STX*STY/N
      TMD=STX2-STX**2/N
      TM=TMN/TMD
      TB=STY/N-TM*STX/N
      TR2=TMN**2/(TMD*(STY2-STY**2/N))
      TSE=SQRT((STY2-TB*STY-TM*STXY)/N)*100./TMAX
      SMN=SSXY-SSX*SSY/M
      SMD=SSX2-SSX**2/M
      SM=SMN/SMD
      SB=SSY/M-SM*SSX/M
      SR2=SMN**2/(SMD*(SSY2-SSY**2/M))
      SSE=SQRT((SSY2-SB*SSY-SM*SSXY)/M)
      HMN=SHXY-SHX*SHY/N
      HMD=SHX2-SHX**2/N
      HM=HMN/HMD
      HB=(SHY/N-HM*SHX/N)/5252.
      HR2=HMN**2/(HMD*(SHY2-SHY**2/N))
      HSE=SQRT((SHY2-HB*SHY-HM*SHXY)/N)/(5252.*HMAX*.01)
      WRITE(6,18)
18    FORMAT(1H0,5X,"CALCULATED VALUES",14X,"ACCEPTANCE CRITERIA-HOT")
      WRITE(6,2)
2     FORMAT(1H ,4X,"SPEED TORQUE  POWER",
     1       15X,"SPEED    TORQUE     POWER")
      WRITE(6,3)SSE,TSE,HSE
3     FORMAT(1H ,"SE",X,F6.0,X,F5.0,"%",X,F5.0,"%",
     1       17X,"100.",5X,"13.%",7X,"8.%")
      WRITE(6,4)SM,TM,HM
4     FORMAT(1H ,"M ",X,F6.3,X,F6.3,X,F6.3,
     1       13X,".97-1.03",2X,".83-1.03",2X,".89-1.03")
      WRITE(6,5)SR2,TR2,HR2
5     FORMAT(1H ,"R2",X,F6.4,X,F6.4,X,F6.4,
     1       13X,".97-1.00",2X,".88-1.00",2X,".91-1.00")
      WRITE(6,9)SB,TB,HB
9     FORMAT(1H ,"B ",X,F6.0,X,F6.1,X,F6.1,
     1       15X,"-50+50",4X,"-15+15",6X,"-5+5")
      WRITE(6,10)M,N
10    FORMAT(1H ,"M=",I4,"N=",I4)
C*****THE FOLLOWING DETERMINES ACCEPTABILITY OF THE RUN BASED ON
C     THE DRAFT OF SUBPART N RECEIVED DECEMBER 1979
C     TEST EQUAL 1 FOR COLD START AND 2 FOR HOT START
      IF(SSE.GT.100.) GO TO 20
      IF(TSE.GT.13.) GO TO 20
      IF(HSE.GT.8.) GO TO 20
      IF(SR2.LT.0.970) GO TO 20
      IF(HR2.LT.0.910) GO TO 20
      IF(ABS(SB).GT.50.) GO TO 20
      IF(ABS(TB).GT.15.) GO TO 20
      IF(ABS(HB).GT.5.) GO TO 20
      IF(SM.LT.0.970) GO TO 20
```

```
      IF(SM.GT.1.030) GO TO 20
      IF(TM.LT.0.830) GO TO 30
      IF(TM.GT.1.030) GO TO 30
      IF(HM.LT.0.890) GO TO 30
      IF(HM.GT.1.030) GO TO 30
      IF(TR2.LT..880) GO TO 30
      WRITE(6,31)
31    FORMAT(1H ,"THIS RUN IS ACCEPTABLE BASED ON DRAFT SUBPART N JAN ",
     1          "1980")
      IF(ITID.EQ.0) GO TO 45
      IF(ITID.GT.2) GO TO 45
      GO TO 50
20    IF(ITID.EQ.1) GO TO 40
30    IF(ITID.EQ.1) GO TO 35
      IF(ITID.EQ.0) GO TO 45
      IF(ITID.GT.2) GO TO 45
      WRITE(6,32)
32    FORMAT(1H ,"THIS HOT START RUN IS UNACCEPTABLE BASED ON ",
     1"DRAFT SUBPART N JAN, 1980")
      GO TO 50
35    CONTINUE
      IF(TM.LT.0.770) GO TO 40
      IF(TM.GT.1.030) GO TO 40
      IF(HM.LT.0.870) GO TO 40
      IF(HM.GT.1.030) GO TO 40
      IF(TR2.LT.0.850) GO TO 40
      WRITE (6,33)
33    FORMAT(1H ,"THIS COLD START RUN IS ACCEPTABLE BASED ON",
     1" DRAFT SUBPART N JAN 1980")
      GO TO 50
40    WRITE(6,34)
34    FORMAT(1H ,"THIS COLD START RUN IS UNACCEPTABLE BASED ON",
     1" DRAFT SUBPART N JAN, 1980")
      GO TO 50
45    WRITE(6,19)
19    FORMAT(1H ,"****DATA CARD OMITTED-TEST WAS NOT IDENTIFIED",
     1     "AS TO COLD-OR HOT-START****")
50    CONTINUE
      WRITE(6,12)
12    FORMAT(1H1)
      STOP
      END
```

APPENDIX A-4 (Cont'd). PROGRAM TCP FOR DETERMINATION OF TEST ACCEPTABILITY

TCP SAMPLE PRINTOUT

C-START1

TEST 22-4 1973GMC 366 GASOLINE 03-17-80

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| -.456 | 6.561 | .806 | 6.813 | .001 | 5.003 | .000 | 4.010 | .636 | 4.584 |
| 1249. | 286. | 7500. | 4000. | 550. | 178. | 572. | | | |

| | CALCULATED VALUES | | | ACCEPTANCE CRITERIA-HOT | | |
|---|---|---|---|---|---|---|
| | SPEED | TORQUE | POWER | SPEED | TORQUE | POWER |
| SE | 93. | 9.% | 6.% | 100. | 13.% | 8.% |
| M | .979 | .929 | .976 | .97-1.03 | .83-1.03 | .89-1.03 |
| R2 | .9918 | .9263 | .9738 | .97-1.00 | .88-1.00 | .91-1.00 |
| B | 31. | 9.0 | 1.2 | -50+50 | -15+15 | -5+5 |

M=1144N=1134
THIS RUN IS ACCEPTABLE BASED ON DRAFT SUBPART N JAN 1980

C-START1

TEST 22-2 1973GMC 366 GASOLINE 03-11-80

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| -.456 | 6.565 | .811 | 6.818 | .002 | 5.005 | .021 | 4.026 | .646 | 4.522 |
| 1249. | 286. | 7500. | 4000. | 550. | 178. | 572. | | | |

| | CALCULATED VALUES | | | ACCEPTANCE CRITERIA-HOT | | |
|---|---|---|---|---|---|---|
| | SPEED | TORQUE | POWER | SPEED | TORQUE | POWER |
| SE | 107. | 8.% | 6.% | 100. | 13.% | 8.% |
| M | .992 | .935 | .993 | .97-1.03 | .83-1.03 | .89-1.03 |
| R2 | .9893 | .9452 | .9797 | .97-1.00 | .88-1.00 | .91-1.00 |
| B | 49. | 8.3 | 1.4 | -50+50 | -15+15 | -5+5 |

M=1144N=1134
THIS COLD START RUN IS UNACCEPTABLE BASED ON DRAFT SUBPART N JAN. 1980

## APPENDIX B

## HC AND CO BASELINE TEST RESULTS

| Table Number | Engine Number | Description |
|---|---|---|
| | | Summary of the Results |
| B-1 | 2 | 1969 IHC 304 |
| B-2 | 3 | 1969 IHC 345 |
| B-3 | 4 | 1969 IHC 304 |
| B-4 | 5 | 1969 Chevrolet 366 |
| B-5 | 9[a] | 1969 Chevrolet 366 |
| B-6 | 13 | 1969 Ford 360 |
| B-7 thru B-12 | All | Transient Test Computer Printouts |
| B-13 thru B-17 | 2 thru 9 | Nine-Mode Computer Printouts |

TABLE B-1. ENGINE 2 SUMMARY OF RESULTS
I969 IHC 304

TRANSIENT CYCLE

| | | TEST 2-1 | | | TEST 2-2 | | | |
|---|---|---|---|---|---|---|---|---|
| | | Cold | Hot | Composite | Cold | Hot | Composite | Average |
| HC, | g/kW-hr | 16.79 | 12.21 | 12.86 | 14.74 | 10.53 | 11.13 | 12.00 |
| CO, | g/kW-hr | 176.52 | 170.82 | 171.63 | 163.75 | 154.77 | 156.05 | 163.84 |
| $CO_2$, | g/kW-hr | 1019 | 983 | 988 | 998 | 961 | 966 | 977 |
| NOX, | g/kW-hr | 7.94 | 8.54 | 8.45 | 7.86 | 8.38 | 8.31 | 8.38 |
| SFC, | kg/kW-hr | 0.425 | 0.407 | 0.410 | 0.410 | 0.390 | 0.393 | 0.402 |
| WORK, | kW-hr | 6.77 | 7.00 | 6.97 | 6.97 | 7.02 | 7.01 | 6.99 |
| POWER, | kW | 20.89 | 21.60 | 21.50 | 21.50 | 21.60 | 21.64 | 21.57 |

NINE MODE

| | | Test 2-1 | Test 2-3 | Average |
|---|---|---|---|---|
| HC, | g/kW-hr | 25.774 | 25.472 | 25.623 |
| CO, | g/kW-hr | 151.450 | 149.885 | 150.668 |
| $CO_2$, | g/kW-hr | | -- | -- |
| NOX, | g/kW-hr | 9.526 | 9.852 | 9.689 |
| SFC, | kg/kW-hr | 0.430 | 0.431 | 0.431 |

ENGINE DESCRIPTION

Engine: 1969 IHC 304 CID V-8 S/N 304-648048
Rated Power: 193 Hp at 4400 rpm
Rated Torque: 273 ft lbs at 2800 rpm
Measured Idle Speed: 700 rpm

Comments: Rated Power and Torque are not applicable.

TRANSIENT CYCLE AVERAGE VALUES

| | | | | | g/kg Fuel | g/km[a] |
|---|---|---|---|---|---|---|
| HC, | g/kW-hr | (g/hp-hr) | 12.00 | 8.95 | HC 29.85 | 8.06 |
| CO, | g/kW-hr | (g/hp-hr) | 163.84 | 122.18 | CO 407.56 | 110.01 |
| NOX, | g/kW-hr | (g/hp-hr) | 8.38 | 6.25 | NOX 20.85 | 5.63 |
| SFC, | kg/kW-hr | (lb/hp-hr) | 0.402 | 0.661 | FUEL CONS. -- | 270. |
| WORK, | kW-hr | (hp-hr) | 6.99 | 9.37 | | |

[a] Using a composite value of 10.41 km for the Transient Cycle.

TABLE B-1 (Cont'd). ENGINE 2 SUMMARY OF RESULTS
1969 IHC 304

TRANSIENT CYCLE MODAL RESULTS[b]

| | Cold Cycle | | | | Hot Cycle | | | |
|---|---|---|---|---|---|---|---|---|
| Test 2-1 | NYNF | LANF | LAF | NYNF | NYNF | LANF | LAF | NYNF |
| HC, gram | 45.27 | 23.90 | 22.70 | 21.72 | 18.28 | 22.38 | 23.80 | 20.95 |
| CO, gram | 284.97 | 243.14 | 421.09 | 245.38 | 217.03 | 258.51 | 469.09 | 250.64 |
| $CO_2$, gram | 749.7 | 1486.4 | 3994.9 | 664.3 | 690.6 | 1451.0 | 4046.5 | 690.1 |
| NOX, gram | 2.54 | 10.87 | 36.48 | 3.85 | 3.68 | 12.08 | 40.27 | 3.72 |
| FUEL, kg | 0.423 | 0.613 | 1.491 | 0.353 | 0.343 | 0.608 | 1.532 | 0.363 |
| KW-HR | 0.53 | 1.29 | 4.33 | 0.62 | 0.61 | 1.39 | 4.36 | 0.63 |
| TEST 2-2 | | | | | | | | |
| HC, gram | 47.14 | 25.88 | 20.24 | 9.50 | 12.90 | 15.26 | 22.80 | 22.88 |
| CO, gram | 290.11 | 261.19 | 429.23 | 160.78 | 160.17 | 202.49 | 469.96 | 253.18 |
| $CO_2$ gram | 726.9 | 1528.1 | 3993.0 | 706. | 689.7 | 1430.1 | 3934.9 | 685.2 |
| NOX, gram | 2.42 | 10.77 | 37.97 | 3.65 | 4.04 | 12.42 | 38.58 | 3.73 |
| FUEL, kg | 0.420 | 0.637 | 1.492 | 0.312 | 0.310 | 0.566 | 1.496 | 0.364 |
| KW-HR | 0.56 | 1.38 | 4.36 | 0.68 | 0.63 | 1.39 | 4.38 | 0.61 |



POWER MAPPING (TQ in ft-lb) @ Temp. - 68 Baro. - 29.21

| RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ |
|---|---|---|---|---|---|---|---|---|---|
| - | | 1100 | 195 | 2100 | 222 | 3100 | 211 | 4100 | |
| - | | 1200 | 199 | 2200 | 222 | 3200 | 208 | 4200 | |
| - | | 1300 | 203 | 2300 | 222 | 3300 | 205 | 4300 | |
| 400 | | 1400 | 207 | 2400 | 222 | 3400 | 202 | 4400 | |
| 500 | 157 | 1500 | 210 | 2500 | 222 | 3500 | 198 | 4500 | |
| 600 | 165 | 1600 | 213 | 2600 | 221 | 3600 | 194 | 4600 | |
| 700 | 172 | 1700 | 216 | 2700 | 219 | 3700 | 190 | 4700 | |
| 800 | 178 | 1800 | 218 | 2800 | 218 | 3800 | 185 | 4800 | |
| 900 | 184 | 1900 | 219 | 2900 | 216 | 3900 | 0 | 4900 | |
| 1000 | 189 | 2000 | 221 | 3000 | 214 | 4000 | | 5000 | |

[b] Barometric Pressure: Test 2-1 = 745 mm Hg Test 2-2 = 743 mm Hg

TABLE B-2. ENGINE 3 SUMMARY OF RESULTS
1969 IHC 345

TRANSIENT CYCLE

| | | TEST 3-1 | | | TEST 3-2 | | | |
|---|---|---|---|---|---|---|---|---|
| | | Cold | Hot | Composite | Cold | Hot | Composite | Average |
| HC, | g/kW-hr | 14.46 | 9.53 | 10.23 | 14.87 | 7.60 | 8.64 | 9.44 |
| CO, | g/kW-hr | 108.85 | 123.74 | 121.61 | 100.38 | 133.33 | 128.62 | 125.12 |
| $CO_2$, | g/kW-hr | 1044 | 990 | 998 | 1096 | 988 | 1003 | 1001 |
| NOX, | g/kW-hr | 10.73 | 9.87 | 9.99 | 11.22 | 10.29 | 10.42 | 10.21 |
| SFC, | kg/kW-hr | 0.397 | 0.383 | 0.385 | 0.410 | 0.385 | 0.389 | 0.387 |
| WORK, | kW-hr | 6.73 | 6.64 | 6.65 | 6.45 | 6.84 | 6.78 | 7.72 |
| POWER, | kW | 20.76 | 20.48 | 20.52 | 19.90 | 21.10 | 20.93 | 20.73 |

NINE MODE

| | | Test 3-1 | Test 3-2 | Average |
|---|---|---|---|---|
| HC, | g/kW-hr | 9.862 | 9.059 | 9.461 |
| CO, | g/kW-hr | 93.021 | 80.898 | 86.960 |
| $CO_2$, | g/kW-hr | -- | -- | -- |
| NOX, | g/kW-hr | 12.515 | 12.283 | 12.399 |
| SFC, | kg/kW-hr | 0.413 | 0.413 | 0.413 |

ENGINE DESCRIPTION

Engine: 1969 IHC 345 CID V-8 S/N 687073
Rated Power: 197 hp at 4000 rpm
RAted Torque: 304 ft lbs at 2200 rpm
Measured Idle Speed: 470 rpm

Comments: Rated Power and Torque are not applicable.

TRANSIENT CYCLE AVERAGE VALUES

| | | | | | g/kg Fuel | g/km[a] |
|---|---|---|---|---|---|---|
| HC, | g/kW-hr (g/hp-hr) | 9.44 | (7.04) | HC | 24.39 | 6.09 |
| CO, | g/kW-hr (g/hp-hr) | 125.12 | (93.30) | CO | 323.31 | 80.77 |
| NOX, | g/kW-hr (g/hp-hr) | 10.21 | (7.61) | NOX | 26.38 | 6.59 |
| SFC, | kg/kW-hr (lb/hp-hr) | 0.387 | (0.636) | FUEL CONS. | -- | 250. |
| WORK, | kW-hr (hp-hr) | 6.72 | (0.01) | | | |

[a] Using a composite value of 10.41 km for the Transient Cycle.

TABLE B-2 (Cont'd.) ENGINE 3 SUMMARY OF RESULTS
1969 IHC 345

TRANSIENT CYCLE MODAL RESULTS[b]

| | Cold Cycle | | | | Hot Cycle | | | |
|---|---|---|---|---|---|---|---|---|
| Test 3-1 | NYNF | LANF | LAF | NYNF | NYNF | LANF | LAF | NYNF |
| HC, gram | 43.80 | 22.45 | 19.42 | 11.70 | 14.31 | 15.44 | 19.51 | 14.07 |
| CO, gram | 161.35 | 165.06 | 304.37 | 102.28 | 114.38 | 193.70 | 371.31 | 142.80 |
| $CO_2$, gram | 781.6 | 1525.5 | 4095.9 | 624.8 | 568.8 | 1388.9 | 4040.6 | 582.2 |
| NOX, gram | 2.78 | 12.55 | 52.90 | 4.05 | 2.92 | 10.51 | 48.68 | 3.46 |
| FUEL, kg | 0.370 | 0.585 | 1.461 | 0.259 | 0.250 | 0.549 | 1.477 | 0.268 |
| KW-HR | 0.44 | 1.28 | 4.45 | 0.56 | 0.41 | 1.29 | 4.40 | 0.55 |
| TEST 3-2 | | | | | | | | |
| HC, gram | 43.89 | 22.56 | 17.94 | 11.54 | 15.30 | 11.80 | 18.74 | 6.18 |
| CO, gram | 125.63 | 151.00 | 276.99 | 93.89 | 123.54 | 223.47 | 437.71 | 127.66 |
| $CO_2$ gram | 640.1 | 1552.6 | 4247.7 | 631.9 | 671.0 | 1367.8 | 4103.9 | 617.7 |
| NOX, gram | 1.92 | 12.60 | 54.26 | 3.56 | 4.33 | 11.32 | 50.67 | 4.11 |
| FUEL, kg | 0.308 | 0.587 | 1.494 | 0.257 | 0.288 | 0.554 | 1.529 | 0.264 |
| KW-HR | 0.21 | 1.27 | 4.43 | 0.54 | 0.54 | 1.28 | 4.47 | 0.55 |



POWER MAPPING (TQ in ft-lb) @ Temp. - 78 Baro. - 29.22

| RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ |
|---|---|---|---|---|---|---|---|---|---|
| - | | 1100 | 222 | 2100 | 250 | 3100 | 226 | 4100 | |
| - | | 1200 | 228 | 2200 | 250 | 3200 | 221 | 4200 | |
| - | | 1300 | 232 | 2300 | 249 | 3300 | 216 | 4300 | |
| 400 | 169 | 1400 | 236 | 2400 | 248 | 3400 | 210 | 4400 | |
| 500 | 178 | 1500 | 240 | 2500 | 246 | 3500 | 0 | 4500 | |
| 600 | 187 | 1600 | 243 | 2600 | 244 | 3600 | | 4600 | |
| 700 | 195 | 1700 | 246 | 2700 | 242 | 3700 | | 4700 | |
| 800 | 203 | 1800 | 248 | 2800 | 239 | 3800 | | 4800 | |
| 900 | 210 | 1900 | 249 | 2900 | 235 | 3900 | | 4900 | |
| 1000 | 216 | 2000 | 250 | 3000 | 231 | 4000 | | 5000 | |

[b]Barometric Pressure: Test 3-1 = 745 mm Hg Test 3-2 = 748 mm Hg.

TABLE B-3. ENGINE 4 SUMMARY OF RESULTS
1969 IHC 304

TRANSIENT CYCLE

| | | TEST 4-1 | | | TEST 4-3 | | | |
|---|---|---|---|---|---|---|---|---|
| | | Cold | Hot | Composite | Cold | Hot | Composite | Average |
| HC, | g/kW-hr | 14.65 | 10.92 | 11.45 | 17.30 | 11.77 | 12.56 | 12.01 |
| CO, | g/kW-hr | 154.98 | 158.61 | 158.09 | 164.08 | 158.53 | 159.32 | 158.71 |
| $CO_2$, | g/kW-hr | 923. | 876. | 883. | 923. | 882. | 888. | 886. |
| NOX, | g/kW-hr | 7.55 | 7.48 | 7.49 | 8.19 | 8.12 | 8.13 | 7.81 |
| SFC, | kg/kW-hr | 0.382 | 0.366 | 0.368 | 0.390 | 0.368 | 0.371 | 0.370 |
| WORK, | kW-hr | 6.42 | 6.64 | 6.61 | 6.36 | 6.67 | 6.63 | 6.62 |
| POWER, | kW | 19.81 | 20.48 | 20.38 | 19.62 | 20.58 | 20.44 | 20.41 |

NINE MODE

| | | Test 4-3 | Test 4-5 | Average |
|---|---|---|---|---|
| HC, | g/kW-hr | 26.773 | 27.481 | 27.127 |
| CO, | g/kW-hr | 167.466 | 166.821 | 167.144 |
| $CO_2$, | g/kW-hr | -- | -- | -- |
| NOX, | g/kW-hr | 8.798 | 8.688 | 8.743 |
| SFC, | kg/kW-hr | 0.423 | 0.422 | 0.423 |

ENGINE DESCRIPTION

Engine: 1969 IHC 304 CID V-8 S/N V304-735364
Rated Power: 193 hp at 4400 rpm
Rated Torque: 273 ft lbs at 2800 rpm
Measured Idle Speed: 475 rpm

Comments: Rated Power and Torque are not applicable.

TRANSIENT CYCLE AVERAGE VALUES

| | | | | | g/kg Fuel | g/km[a] |
|---|---|---|---|---|---|---|
| HC, | g/kW-hr (g/hp-hr) | 12.01 | (8.96) | HC | 32.46 | 7.64 |
| CO, | g/kW-hr (g/hp-hr) | 158.71 | (118.35) | CO | 428.95 | 100.93 |
| NOX, | g/kW-hr (g/hp-hr) | 7.81 | (5.82) | NOX | 21.11 | 4.97 |
| SFC, | kg/kW-hr (lb/hp-hr) | 0.370 | (0.609) | FUEL CONS. | -- | 235. |
| WORK, | kW-hr (hp-hr) | 6.62 | (8.88) | | | |

[a] Using a composite value of 10.41 km for the Transient Cycle.

TABLE B-3 (Cont'd). ENGINE 4 SUMMARY OF RESULTS
1969 IHC 304

TRANSIENT CYCLE MODAL RESULTS[b]

| | Cold Cycle | | | | Hot Cycle | | | |
|---|---|---|---|---|---|---|---|---|
| TEST 4-1 | NYNF | LANF | LAF | NYNF | NYNF | LANF | LAF | NYNF |
| HC, gram | 39.17 | 20.01 | 21.70 | 13.17 | 14.92 | 17.87 | 23.11 | 16.54 |
| CO, gram | 174.80 | 207.49 | 443.27 | 169.25 | 145.68 | 224.21 | 502.99 | 179.58 |
| $CO_2$, gram | 527.4 | 1279.1 | 3581.1 | 538.3 | 538.3 | 1203.8 | 3527.9 | 540.0 |
| NOX, gram | 1.32 | 8.93 | 35.52 | 2.71 | 2.72 | 8.40 | 35.62 | 2.87 |
| FUEL, kg | 0.292 | 0.526 | 1.370 | 0.267 | 0.257 | 0.508 | 1.384 | 0.276 |
| KW-HR | 0.28 | 1.26 | 4.36 | 0.52 | 0.51 | 1.26 | 4.35 | 0.51 |
| TEST 4-3 | | | | | | | | |
| HC, gram | 43.08 | 24.33 | 23.41 | 19.13 | 17.60 | 18.92 | 23.63 | 18.40 |
| CO, gram | 170.15 | 227.98 | 467.62 | 177.07 | 153.14 | 224.03 | 499.52 | 180.97 |
| $CO_2$, gram | 475.4 | 1284.4 | 3579.9 | 529.1 | 519.4 | 1185.0 | 3641.0 | 539.9 |
| NOX, gram | 1.38 | 9.79 | 37.86 | 3.05 | 2.93 | 8.94 | 39.26 | 3.01 |
| FUEL, kg | 0.277 | 0.542 | 1.384 | 0.274 | 0.257 | 0.503 | 1.419 | 0.278 |
| KW-HR | 0.22 | 1.25 | 4.38 | 0.51 | 0.51 | 1.26 | 4.39 | 0.51 |



POWER MAPPING (TQ in ft-lb) @ Temp. - 78° Baro. - 29.16

| RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ |
|---|---|---|---|---|---|---|---|---|---|
| - | | 1100 | 191 | 2100 | 222 | 3100 | 217 | 4100 | |
| - | | 1200 | 196 | 2200 | 223 | 3200 | 215 | 4200 | |
| - | | 1300 | 201 | 2300 | 224 | 3300 | 212 | 4300 | |
| 400 | 142 | 1400 | 205 | 2400 | 224 | 3400 | 209 | 4400 | |
| 500 | 151 | 1500 | 208 | 2500 | 224 | 3500 | 205 | 4500 | |
| 600 | 159 | 1600 | 212 | 2600 | 224 | 3600 | 201 | 4600 | |
| 700 | 167 | 1700 | 214 | 2700 | 223 | 3700 | 197 | 4700 | |
| 800 | 174 | 1800 | 217 | 2800 | 222 | 3800 | 192 | 4800 | |
| 900 | 180 | 1900 | 219 | 2900 | 221 | 3900 | 0 | 4900 | |
| 1000 | 186 | 2000 | 221 | 3000 | 219 | 4000 | | 5000 | |

[b]Barometric Pressure: Test 4-1 = 745 mm Hg Test 4-3 = 748 mm Hg.

TABLE B-4. ENGINE 5 SUMMARY OF RESULTS
1969 Chevrolet 366

TRANSIENT CYCLE

| | TEST 5-3 | | | TEST 5-4 | | | |
|---|---|---|---|---|---|---|---|
| | Cold | Hot | Composite | Cold | Hot | Composite | Average |
| HC, g/kW-hr | 20.04 | 16.26 | 16.80 | 17.76 | 11.81 | 12.66 | 14.73 |
| CO, g/kW-hr | 292.29 | 251.48 | 257.31 | 290.46 | 249.75 | 255.57 | 256.44 |
| $CO_2$, g/kW-hr | 982. | 942. | 948. | 1060. | 1015. | 1021. | 985. |
| NOX, g/kW-hr | 3.58 | 3.91 | 3.86 | 4.68 | 4.97 | 4.93 | 4.40 |
| SFC, kg/kW-hr | 0.474 | 0.438 | 0.443 | 0.496 | 0.456 | 0.462 | 0.453 |
| WORK, kW-hr | 7.40 | 7.71 | 7.67 | 7.39 | 7.79 | 7.73 | 7.70 |
| POWER, kW | 22.83 | 23.79 | 23.65 | 22.80 | 24.03 | 23.85 | 23.75 |
| kW-hr Dev.[b] | -4.7 | -0.8 | -- | 0.4 | -4.8 | -- | -- |

NINE MODE

| | Test 5-3 | Test 5-4 | Average |
|---|---|---|---|
| HC, g/kW-hr | 16.623 | 17.499 | 17.061 |
| CO, g/kW-hr | 230.329 | 228.677 | 229.503 |
| $CO_2$, g/kW-hr | -- | -- | -- |
| NOX, g/kW-hr | 4.747 | 4.721 | 4.734 |
| SFC, kg/kW-hr | 0.457 | 0.456 | 0.457 |

ENGINE DESCRIPTION

Engine: 1969 Chevrolet 366 CID V-8 S/N 3955274T
Rated Power: 235 hp at 4000 rpm
Rated Torque: 345 ft lbs at 2600 rpm
Measured Idle Speed: 500 rpm

Comments: Rated Power and Torque are not applicable.

TRANSIENT CYCLE AVERAGE VALUES

| | | | | g/kg Fuel | g/km[a] |
|---|---|---|---|---|---|
| HC, | g/kW-hr (g/hp-hr) | 14.73 | (10.98) | HC 32.52 | 10.90 |
| CO, | g/kW-hr (g/hp-hr) | 256.44 | (191.23) | CO 566.09 | 189.68 |
| NOX, | g/kW-hr (g/hp-hr) | 4.40 | (3.28) | NOX 9.71 | 3.26 |
| SFC, | kg/kW-hr (lb/hp-hr) | 0.453 | (0.745) | FUEL CONS. -- | 355. |
| WORK, | kW-hr (hp-hr) | 7.70 | (10.33) | | |

[a] Using a composite value of 10.41 km for the Transient Cycle.
[b] Test kW-hr minus Reference kW-hr divided by the Reference kW-hr times 100%.

TABLE B-4 (Cont'd). ENGINE 5 SUMMARY OF RESULTS
1969 Chevrolet 366

TRANSIENT CYCLE MODAL RESULTS [C]

| | Cold Cycle | | | | Hot Cycle | | | |
|---|---|---|---|---|---|---|---|---|
| TEST 5-3 | NYNF | LANF | LAF | NYNF | NYNF | LANF | LAF | NYNF |
| HC, gram | 41.40 | 40.63 | 40.25 | 25.97 | 44.74 | 25.69 | 35.27 | 19.56 |
| CO, gram | 222.47 | 476.02 | 1223.87 | 239.71 | 223.97 | 417.93 | 1098.81 | 197.22 |
| $CO_2$, gram | 749.6 | 1694.6 | 4085.1 | 731.7 | 740.7 | 1635.0 | 4096.4 | 789.7 |
| NOX, gram | 1.92 | 7.96 | 14.21 | 2.39 | 2.61 | 6.51 | 18.36 | 2.67 |
| FUEL, kg | 0.388 | 0.811 | 1.934 | 0.375 | 0.389 | 0.748 | 1.871 | 0.366 |
| KW-HR | 0.26 | 1.43 | 5.14 | 0.56 | 0.56 | 1.46 | 5.12 | 0.56 |
| TEST 5-4 | | | | | | | | |
| HC, gram | 41.79 | 36.20 | 36.11 | 17.13 | 18.82 | 22.07 | 35.71 | 15.36 |
| CO, gram | 238.45 | 504.10 | 1184.22 | 219.12 | 194.06 | 375.62 | 1154.62 | 220.79 |
| $CO_2$, gram | 776.1 | 1807.4 | 4426.6 | 818.0 | 862.4 | 1733.1 | 4451.5 | 862.1 |
| NOX, gram | 2.07 | 7.00 | 22.64 | 2.82 | 3.27 | 8.28 | 24.18 | 2.99 |
| FUEL, kg | 0.405 | 0.856 | 2.018 | 0.384 | 0.387 | 0.755 | 2.011 | 0.397 |
| KW-HR | 0.24 | 1.46 | 5.12 | 0.57 | 0.56 | 1.48 | 5.15 | 0.60 |



POWER MAPPING (TQ in ft-lb) @ Temp. - 78 Baro. - 29.49

| RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ |
|---|---|---|---|---|---|---|---|---|---|
| - | | 1100 | 237 | 2100 | 275 | 3100 | 280 | 4100 | 0 |
| - | | 1200 | 244 | 2200 | 276 | 3200 | 276 | 4200 | |
| - | | 1300 | 246 | 2300 | 277 | 3300 | 274 | 4300 | |
| 400 | | 1400 | 249 | 2400 | 278 | 3400 | 269 | 4400 | |
| 500 | 83 | 1500 | 254 | 2500 | 278 | 3500 | 264 | 4500 | |
| 600 | 185 | 1600 | 260 | 2600 | 279 | 3600 | 256 | 4600 | |
| 700 | 211 | 1700 | 266 | 2700 | 280 | 3700 | 251 | 4700 | |
| 800 | 220 | 1800 | 268 | 2800 | 280 | 3800 | 243 | 4800 | |
| 900 | 225 | 1900 | 271 | 2900 | 280 | 3900 | 231 | 4900 | |
| 1000 | 231 | 2000 | 274 | 3000 | 280 | 4000 | 223 | 5000 | |

[C]Barometric Pressure: Test 5-3 = 741 mm Hg Test 5-4 = 736 mm Hg.

TABLE B-5. ENGINE 9 SUMMARY OF RESULTS
1969 Chevrolet 366

TRANSIENT CYCLE

| | | TEST 9-1 | | | TEST 9-3 | | | |
|---|---|---|---|---|---|---|---|---|
| | | Cold | Hot | Composite | Cold | Hot | Composite | Average |
| HC, | g/kW-hr | 12.96 | 11.02 | 11.30 | 16.24 | 10.47 | 11.29 | 11.42 |
| CO, | g/kW-hr | 187.74 | 170.56 | 173.01 | 195.95 | 187.22 | 188.47 | 180.74 |
| $CO_2$, | g/kW-hr | 947. | 927. | 930. | 970. | 972. | 972. | 959. |
| NOX, | g/kW-hr | 5.57 | 5.68 | 5.66 | 5.83 | 6.14 | 6.10 | 6.24 |
| SFC, | kg/kW-hr | 0.404 | 0.388 | 0.390 | 0.419 | 0.410 | 0.411 | 0.403 |
| WORK, | kW-hr | 7.65 | 7.66 | 7.66 | 7.59 | 7.53 | 7.54 | 7.56 |
| POWER, | kW | 23.60 | 23.63 | 23.63 | 23.42 | 23.23 | 23.26 | 23.31 |

NINE MODE

| | | Test 9-2 | Test 9-3 | Average |
|---|---|---|---|---|
| HC, | g/kW-hr | 17.665 | 17.077 | 17.371 |
| CO, | g/kW-hr | 263.118 | 287.357 | 275.24 |
| $CO_2$, | g/kW-hr | -- | -- | -- |
| NOX, | g/kW-hr | 3.564 | 3.334 | 3.449 |
| SFC, | kg/kW-hr | 0.495 | 0.504 | 0.500 |

TRANSIENT CYCLE AVERAGE VALUES

| | | | | | g/kg Fuel | g/km[a] |
|---|---|---|---|---|---|---|
| HC, | g/kW-hr (g/hp-hr) | 11.42 | (8.52) | HC | 28.34 | 8.25 |
| CO, | g/kW-hr (g/hp-hr) | 180.74 | (134.78) | CO | 448.49 | 131.95 |
| NOX, | g/kW-hr (g/hp-hr) | 6.24 | (4.65) | NOX | 15.48 | 4.29 |
| SFC, | kg/kW-hr (lb/hp-hr) | 0.403 | (0.663) | FUEL CONS. | -- | 293. |
| WORK, | kW-hr (hp-hr) | 7.56 | (10.14) | | | |

[a] Using a composite value of 10.41 km for the Transient Cycle.

TABLE B-5 (Cont'd). ENGINE 9 SUMMARY OF RESULTS
1969 Chevrolet 366

TRANSIENT CYCLE STATISTICS

| | Cold Cycle | | | Hot Cycle | | |
|---|---|---|---|---|---|---|
| TEST 9-1 | Speed | Torque | Power | Speed | Torque | Power |
| Standard Error | 50. | 10.% | 7.% | 51. | 8.% | 5.% |
| Slope | 1.006 | .926 | .958 | 1.002 | .927 | .960 |
| Corr. Coef. | .9973 | .9158 | .9597 | .9972 | .9474 | .9762 |
| Intercept | 5. | 5.9 | 1.7 | 16. | 2.8 | .8 |
| Points Used | 1144 | 1107 | 1107 | 1144 | 1140 | 1140 |
| kW-hr Dev.[b] | ---------- | -3.8 | ---------- | ---------- | -3.7 | ---------- |
| TEST 9-3 | | | | | | |
| Standard Error | 55. | 12.% | 7.% | 53. | 8.% | 6.% |
| Slope | 1.006 | .857 | .923 | 1.005 | .896 | .934 |
| Corr. Coef. | .9968 | .8521 | .9468 | .9971 | .9335 | .9669 |
| Intercept | 7. | 6.4 | 1.4 | 14. | 3.2 | .9 |
| Points Used | 1144 | 1132 | 1132 | 1144 | 1144 | 1144 |
| kW-hr Dev.[b] | ---------- | -4.5 | ---------- | ---------- | -5.3 | ---------- |

TRANSIENT CYCLE MODAL RESULTS[c]

| | Cold Cycle | | | | Hot Cycle | | | |
|---|---|---|---|---|---|---|---|---|
| Test 9-1 | NYNF | LANF | LAF | NYNF | NYNF | LANF | LAF | NYNF |
| HC, gram | 37.59 | 23.02 | 26.60 | 11.90 | 26.64 | 18.92 | 25.87 | 12.95 |
| CO, gram | 219.37 | 320.03 | 722.4 | 173.99 | 179.62 | 303.17 | 652.45 | 170.74 |
| $CO_2$, gram | 779.7 | 1621.9 | 4069.9 | 757.4 | 748.1 | 1578.6 | 4050.1 | 719.5 |
| NOX, gram | 2.65 | 9.02 | 27.98 | 2.9 | 3.37 | 8.06 | 29.03 | 3.00 |
| FUEL, kg | 0.392 | 0.696 | 1.667 | 0.337 | 0.351 | 0.667 | 1.626 | 0.324 |
| KW-HR | 0.59 | 1.46 | 5.02 | 0.58 | 0.59 | 1.46 | 5.02 | 0.58 |
| TEST 9-3 | | | | | | | | |
| HC, gram | 44.26 | 25.38 | 41.00 | 12.71 | 15.74 | 18.24 | 29.54 | 15.40 |
| CO, gram | 201.47 | 320.38 | 785.16 | 180.91 | 160.35 | 297.27 | 778.22 | 174.71 |
| $CO_2$ gram | 856.1 | 1685.1 | 4115.7 | 711.9 | 831.5 | 1645.4 | 4109.8 | 736.2 |
| NOX, gram | 3.19 | 10.77 | 27.91 | 2.43 | 3.90 | 9.61 | 30.05 | 2.67 |
| FUEL, kg | 0.414 | 0.715 | 1.727 | 0.327 | 0.357 | 0.684 | 1.711 | 0.334 |
| KW-HR | 0.64 | 1.47 | 4.91 | 0.57 | 0.61 | 1.44 | 4.91 | 0.58 |

[b]Test kW-hr minus Reference kW-hr divided by the Reference kW-hr times 100%.
[c]Barometric Pressure: Test 9-1 = 748 mm Hg Test 9-3 = 738 mm Hg.

TABLE B-5 (Cont'd). ENGINE 9 SUMMARY OF RESULTS
1969 Chevrolet 366

ENGINE DESCRIPTION

Engine: 1969 Chevrolet 366 CID No. 3955274T
Carburetor: Holley 4-Barrel list 4098-1
Distributor: Delco-Remy 1111337
Rated Power:
Maximum Torque:
Comments:

ENGINE DATA

| | Measured |
|---|---|
| Max. Engine Torque, Ft-Lb @ RPM | 280 @ 2300 |
| Max. Engine Power, HP @ RPM | 172 @ 3700 |
| Cylinder Compression, psi min.-max. (avg.) | 75-105(91) |
| Idle RPM | 500 |

POWER MAPPING (TQ in ft-lb) @ Temp. - 77° Baro. - 29.34

| RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ |
|---|---|---|---|---|---|---|---|---|---|
| - | | 1100 | 237 | 2100 | 274 | 3100 | 271 | 4100 | |
| - | | 1200 | 241 | 2200 | 277 | 3200 | 270 | 4200 | |
| - | | 1300 | 242 | 2300 | 280 | 3300 | 266 | 4300 | |
| 400 | | 1400 | 240 | 2400 | 279 | 3400 | 261 | 4400 | |
| 500 | | 1500 | 244 | 2500 | 279 | 3500 | 254 | 4500 | |
| 600 | 154 | 1600 | 255 | 2600 | 279 | 3600 | 250 | 4600 | |
| 700 | 212 | 1700 | 260 | 2700 | 275 | 3700 | 244 | 4700 | |
| 800 | 221 | 1800 | 265 | 2800 | 275 | 3800 | 237 | 4800 | |
| 900 | 225 | 1900 | 269 | 2900 | 273 | 3900 | 230 | 4900 | |
| 1000 | 233 | 2000 | 275 | 3000 | 272 | 4000 | 0 | 5000 | |

TABLE B-5 (Cont'd). ENGINE 9 SUMMARY OF RESULTS
1969 Chevrolet 366

TRANSIENT CYCLE

| | | TEST 9-4 | | | TEST | | | |
|---|---|---|---|---|---|---|---|---|
| | | Cold | Hot | Composite | Cold | Hot | Composite | Average |
| HC, | g/kW-hr | 16.27 | 10.91 | 11.68 | | | | |
| CO, | g/kW-hr | 207.52 | 176.29 | 180.75 | | | | |
| $CO_2$, | g/kW-hr | 978. | 975. | 975. | | | | |
| NOX, | g/kW-hr | 6.74 | 7.01 | 6.97 | | | | |
| SFC, | kg/kW-hr | 0.427 | 0.406 | 0.409 | | | | |
| WORK, | kW-hr | 7.53 | 7.46 | 7.47 | | | | |
| POWER, | kW | 23.23 | 23.01 | 23.04 | | | | |

TRANSIENT CYCLE STATISTICS

| | Cold Cycle | | | Hot Cycle | | |
|---|---|---|---|---|---|---|
| TEST 9-4 | Speed | Torque | Power | Speed | Torque | Power |
| Standard Error | 53. | 11.% | 7.% | 55. | 8.% | 5.% |
| Slope | 1.006 | .870 | .923 | 1.002 | .893 | .927 |
| Corr. Coef. | .9970 | .8847 | .9524 | .9968 | .9450 | .9741 |
| Intercept | 9. | 5.8 | 1.5 | 20. | 3.3 | .9 |
| Points Used | 1144 | 1127 | 1127 | 1144 | 1143 | 1143 |
| kW-hr Dev.[d] | ---------- | -5.4 | ---------- | ---------- | -6.1 | ---------- |

TRANSIENT CYCLE MODAL RESULTS[e]

| | Cold Cycle | | | | Hot Cycle | | | |
|---|---|---|---|---|---|---|---|---|
| Test 9-4 | NYNF | LANF | LAF | NYNF | NYNF | LANF | LAF | NYNF |
| HC, gram | 39.61 | 24.68 | 45.19 | 12.93 | 17.25 | 19.11 | 28.90 | 16.18 |
| CO, gram | 217.81 | 286.56 | 795.13 | 162.10 | 142.32 | 298.27 | 750.12 | 124.65 |
| $CO_2$, gram | 892.2 | 1611.3 | 4104.5 | 748.8 | 734.9 | 1586.1 | 4177.3 | 774.8 |
| NOX, gram | 3.81 | 10.10 | 33.44 | 3.36 | 3.73 | 10.22 | 34.70 | 3.64 |
| FUEL, kg | 0.429 | 0.724 | 1.733 | 0.329 | 0.319 | 0.667 | 1.717 | 0.322 |
| KW-HR | 0.61 | 1.45 | 4.89 | 0.57 | 0.58 | 1.44 | 4.89 | 0.56 |

[d] Test kW-hr minus Reference kW-hr divided by the Reference kW-hr times 100%.
[e] Barometric Pressure: Test 9-4 = 740 mm Hg.

TABLE B-6. ENGINE 13 SUMMARY OF RESULTS
1969 Ford 360

TRANSIENT CYCLE

| | | TEST 13-2 | | | TEST 13-3 | | | |
|---|---|---|---|---|---|---|---|---|
| | | Cold | Hot | Composite | Cold | Hot | Composite | Average |
| HC, | g/kW-hr | 11.00 | 7.28 | 7.81 | 12.72 | 7.95 | 8.63 | 8.22 |
| CO, | g/kW-hr | 160.41 | 123.05 | 128.39 | 164.78 | 127.22 | 132.59 | 131.99 |
| $CO_2$, | g/kW-hr | 1042. | 985. | 993. | 1000. | 974. | 978. | 980. |
| NOX, | g/kW-hr | 6.56 | 7.25 | 7.15 | 6.40 | 7.03 | 6.94 | 6.97 |
| SFC, | kg/kW-hr | 0.419 | 0.379 | 0.385 | 0.409 | 0.378 | 0.382 | 0.382 |
| WORK, | kW-hr | 8.28 | 8.45 | 8.43 | 8.43 | 8.45 | 8.45 | 8.45 |
| POWER, | kW | 25.54 | 26.07 | 25.99 | 26.01 | 26.07 | 26.06 | 26.05 |

NINE MODE

| | | Test 13-1 | Test 13-2 | Test 13-5 | Average |
|---|---|---|---|---|---|
| HC, | g/kW-hr | 14.39 | 15.19 | 14.76 | 14.78 |
| CO, | g/kW-hr | 80.21 | 76.42 | 72.72 | 76.45 |
| $CO_2$, | g/kW-hr | 1171.9 | 1279.9 | 1146.6 | 1199. |
| NOX, | g/kW-hr | 6.88 | 7.42 | 6.93 | 7.08 |
| SFC, | kg/kW-hr | 0.443 | 0.422 | 0.456 | 0.447 |
| POWER, | kW | 19.2 | 19.2 | 18.7 | 19.0 |

TRANSIENT CYCLE AVERAGE VALUES

| | | | | | g/kg Fuel | g/km[a] |
|---|---|---|---|---|---|---|
| HC, | g/kW-hr (g/hp-hr) | 8.22 | (6.13) | HC | 21.52 | 6.67 |
| CO, | g/kW-hr (g/hp-hr) | 131.99 | (98.43) | CO | 345.52 | 107.14 |
| NOX, | g/kW-hr (g/hp-hr) | 6.97 | (5.20) | NOX | 18.25 | 5.66 |
| SFC, | kg/kW-hr (lb/hp-hr) | 0.382 | (0.628) | FUEL CONS. | -- | 311. |
| WORK, | kW-hr (hp-hr) | 8.45 | (11.33) | | | |

[a] Using a composite value of 10.41 km for the Transient Cycle.

TABLE B-6 (Cont'd). ENGINE 13 SUMMARY OF RESULTS
1969 Ford 360

TRANSIENT CYCLE STATISTICS

| | Cold Cycle | | | Hot Cycle | | |
|---|---|---|---|---|---|---|
| TEST 13-2 | Speed | Torque | Power | Speed | Torque | Power |
| Standard Error | 66. | 9.% | 7.% | 70. | 5.% | 6.% |
| Slope | .990 | .940 | .973 | .993 | .947 | .975 |
| Corr. Coef. | .9958 | .9310 | .9640 | .9953 | .9734 | .9864 |
| Intercept | -3. | 7.5 | 1.4 | 1. | 8.6 | 1.8 |
| Points Used | 1144 | 1090 | 1090 | 1144 | 1129 | 1129 |
| kW-hr Dev.[b] | ---------- | 0 | ---------- | ---------- | 2.0 | ---------- |
| TEST 13-3 | | | | | | |
| Standard Error | 63. | 7.% | 7.% | 60. | 6.% | 6.% |
| Slope | .989 | .953 | .977 | .991 | .961 | .987 |
| Corr. Coef. | .9962 | .9504 | .9752 | .9965 | .9713 | .9845 |
| Intercept | 4. | 9.9 | 2.6 | 6. | 7.4 | 1.4 |
| Points Used [b] | 1144 | 1085 | 1085 | 1144 | 1143 | 1143 |
| kW-hr Dev. | ---------- | 1.7 | ---------- | ---------- | 2.0 | ---------- |

TRANSIENT CYCLE MODAL RESULTS[c]

| | Cold Cycle | | | | Hot Cycle | | | |
|---|---|---|---|---|---|---|---|---|
| Test 13-2 | NYNF | LANF | LAF | NYNF | NYNF | LANF | LAF | NYNF |
| HC, gram | 31.96 | 21.30 | 26.82 | 11.04 | 12.00 | 14.50 | 24.82 | 10.20 |
| CO, gram | 199.72 | 255.65 | 706.76 | 166.71 | 118.04 | 159.23 | 615.42 | 147.01 |
| $CO_2$, gram | 954.6 | 1814.4 | 4953.2 | 906.5 | 850.4 | 1822.7 | 4820.4 | 827.0 |
| NOX, gram | 2.39 | 8.74 | 38.86 | 4.37 | 4.04 | 11.20 | 41.91 | 4.08 |
| FUEL, kg | 0.432 | 0.720 | 1.938 | 0.379 | 0.339 | 0.668 | 1.849 | 0.344 |
| KW-HR | 0.60 | 1.60 | 5.35 | 0.73 | 0.74 | 1.62 | 5.34 | 0.74 |
| TEST 13-3 | | | | | | | | |
| HC, gram | 42.63 | 23.80 | 28.26 | 12.51 | 13.26 | 15.81 | 26.88 | 11.25 |
| CO, gram | 212.99 | 276.91 | 731.20 | 165.75 | 119.37 | 160.11 | 644.37 | 151.04 |
| $CO_2$ gram | 904.7 | 1803.7 | 4856.4 | 859.9 | 836.4 | 1816.0 | 4744.5 | 831.3 |
| NOX, gram | 2.46 | 8.86 | 38.28 | 4.30 | 3.99 | 11.09 | 40.29 | 4.03 |
| FUEL, kg | 0.433 | 0.730 | 1.921 | 0.366 | 0.336 | 0.668 | 1.842 | 0.348 |
| KW-HR | 0.67 | 1.63 | 5.37 | 0.75 | 0.73 | 1.62 | 5.36 | 0.74 |

[b]Test kW-hr minus Reference kW-hr divided by the Reference kW-hr times 100%.
[c]Barometric Pressure: Test 13-2 = 745 mm Hg Test 13-3 = 745 mm Hg.

TABLE B-6 (Cont'd). ENGINE 13 SUMMARY OF RESULTS
1969 Ford 360

ENGINE DESCRIPTION

Engine: 1969 Ford 360 CID Tag No. 9E13F
Carburetor:
Distributor:
Rated Power:
Maximum Torque:
Comments:

ENGINE DATA

| | Measured |
|---|---|
| Max. Engine Torque, Ft-Lb @ RPM | 265 @ 2200 |
| Max. Engine Power, HP @ RPM | 158 @ 4000 |
| Cylinder Compression, psi min.-max. (avg.) | -- |
| Idle RPM | 600 |



POWER MAPPING (TQ in ft-lb) @ Temp. - 81 Baro. - 29.25

| RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ |
|---|---|---|---|---|---|---|---|---|---|
| - | | 1100 | 232 | 2100 | 264 | 3100 | 246 | 4100 | |
| - | | 1200 | 238 | 2200 | 265 | 3200 | 242 | 4200 | |
| - | | 1300 | 241 | 2300 | 264 | 3300 | 236 | 4300 | |
| 400 | 193 | 1400 | 244 | 2400 | 263 | 3400 | 232 | 4400 | |
| 500 | 213 | 1500 | 247 | 2500 | 262 | 3500 | 228 | 4500 | |
| 600 | 219 | 1600 | 252 | 2600 | 261 | 3600 | 224 | 4600 | |
| 700 | 229 | 1700 | 256 | 2700 | 259 | 3700 | 219 | 4700 | |
| 800 | 225 | 1800 | 258 | 2800 | 257 | 3800 | 216 | 4800 | |
| 900 | 226 | 1900 | 260 | 2900 | 256 | 3900 | 213 | 4900 | |
| 1000 | 230 | 2000 | 262 | 3000 | 252 | 4000 | 208 | 5000 | |

TABLE B-6 (Cont'd). ENGINE 13 SUMMARY OF RESULTS
1969 Ford 360

NINE-MODE MODAL RESULTS[d]

| | | Torque | Weighting | Weighted Emissions, grams/hour | | | | Weighted Fuel & Power | |
|---|---|---|---|---|---|---|---|---|---|
| Test 13-1 | | N.m | Factor | HC | CO | $CO_2$ | $NO_x$ | kg/hr | kW |
| 1 | Idle | 0 | 0.232 | 32.94 | 237.36 | 731.9 | 0.22 | 0.337 | 0.00 |
| 2 | 25% | 85 | 0.077 | 9.80 | 21.06 | 2176.1 | 7.24 | 0.741 | 1.38 |
| 3 | 55% | 190 | 0.147 | 33.20 | 117.45 | 5795.6 | 45.71 | 2.094 | 5.85 |
| 4 | 25% | 85 | 0.077 | 9.39 | 31.31 | 2099.3 | 6.55 | 0.734 | 1.38 |
| 5 | 10% | 34 | 0.057 | 4.32 | 13.76 | 1179.5 | 1.68 | 0.401 | 0.40 |
| 6 | 25% | 85 | 0.077 | 9.61 | 27.40 | 2178.1 | 7.14 | 0.751 | 1.38 |
| 7 | 90% | 312 | 0.113 | 51.03 | 950.04 | 5896.4 | 56.53 | 2.486 | 7.38 |
| 8 | 25% | 85 | 0.077 | 9.72 | 37.77 | 2143.5 | 6.75 | 0.727 | 1.38 |
| 9 | CT | 0 | 0.143 | 115.66 | 99.72 | 242.0 | 0.02 | 0.221 | 0.00 |
| Test 13-2 | | | | | | | | | |
| 1 | Idle | 0 | 0.232 | 35.11 | 152.48 | 968.8 | 0.22 | 0.421 | 0.00 |
| 2 | 25% | 88 | 0.077 | 9.67 | 22.60 | 2079.9 | 6.42 | 0.727 | 1.42 |
| 3 | 55% | 190 | 0.147 | 33.38 | 98.59 | 5970.4 | 49.13 | 2.067 | 5.85 |
| 4 | 25% | 85 | 0.077 | 9.37 | 29.79 | 3899.5 | 6.50 | 0.699 | 1.31 |
| 5 | 10% | 34 | 0.057 | 4.38 | 13.86 | 1169.2 | 1.85 | 0.388 | 0.37 |
| 6 | 25% | 90 | 0.077 | 9.81 | 25.28 | 2226.7 | 7.93 | 0.741 | 1.42 |
| 7 | 90% | 315 | 0.113 | 55.62 | 978.87 | 5854.3 | 62.88 | 2.607 | 7.44 |
| 8 | 25% | 85 | 0.077 | 10.24 | 35.63 | 2129.2 | 7.25 | 0.709 | 1.36 |
| 9 | CT | 0 | 0.143 | 123.84 | 108.40 | 250.0 | 0.09 | 0.227 | 0.00 |
| Test 13-5 | | | | | | | | | |
| 1 | Idle | 0 | 0.232 | 18.40 | 200.14 | 678.2 | 0.00 | 0.421 | 0.00 |
| 2 | 25% | 83 | 0.077 | 10.30 | 19.15 | 1918.0 | 5.42 | 0.726 | 1.33 |
| 3 | 55% | 184 | 0.147 | 32.49 | 83.63 | 5663.5 | 45.55 | 2.100 | 5.68 |
| 4 | 25% | 83 | 0.077 | 9.28 | 33.74 | 1954.4 | 5.63 | 0.727 | 1.33 |
| 5 | 10% | 31 | 0.057 | 4.30 | 9.33 | 1123.8 | 1.58 | 0.414 | 0.37 |
| 6 | 25% | 85 | 0.077 | 10.32 | 29.15 | 2103.8 | 7.01 | 0.751 | 1.38 |
| 7 | 90% | 305 | 0.113 | 62.43 | 847.05 | 5740.1 | 57.56 | 2.399 | 7.23 |
| 8 | 25% | 84 | 0.077 | 10.53 | 34.68 | 2088.2 | 6.69 | 0.734 | 1.36 |
| 9 | CT | 0 | 0.143 | 117.89 | 102.09 | 171.8 | 0.00 | 0.260 | 0.00 |

[d]Barometric Pressure: Test 13-1 = 737 mm Hg Test 13-2 = 736 mm Hg Test 13-5 = 735 mm Hg.

# TABLE B-7A. TEST 2-1 EMISSIONS RESULTS

COLD TRANSIENT

PROJECT NO. 11-5044-001

ENGINE NO.IH304
ENGINE 400FL 69
ENGINE 5.0 L(304 CID) V-8
CVS NO. 4

TEST NO. 2-1 RUN
DATE 10/ 9/78
TIME 10:00 GASOLINE EM-267-F
DYNO NO. 2 BAG CART NO. 2

BAROMETER 744.98 MM HG(29.33 IN HG)
DRY BULB TEMP. 22.2 DEG C(72.0 DEG F)

RELATIVE HUMIDITY 65 PCT
ABSOLUTE HUMIDITY 11.0 GM/KG( 77.3 GRAINS/LB) NOX HUMIDITY C.F. 1.0111

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 703.6 (27.7) | 711.2 (28.0) | 744.2 (29.3) | 713.7 (28.1) |
| BLOWER INLET P MM. H2O(IN. H2O) | 454.7 (17.9) | 462.3 (18.2) | 508.0 (20.0) | 459.7 (18.1) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7166 | 8086 | 8319 | 7163 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 179.3 ( 6333) | 202.1 ( 7138) | 206.7 ( 7299) | 179.1 ( 6324) |
| HC SAMPLE METER/RANGE/PPM | 45.9/ 3/ 459 | 22.8/ 3/ 228 | 20.4/ 3/ 204 | 22.2/ 3/ 222 |
| HC BCKGRD METER/RANGE/PPM | 2.2/ 3/ 22 | 2.4/ 3/ 24 | 1.5/ 3/ 15 | 1.2/ 3/ 12 |
| CO SAMPLE METER/RANGE/PPM | 48.1/ 3/ 1416 | 36.7/ 3/ 1082 | 62.6/ 3/ 1843 | 41.5/ 3/ 1223 |
| CO BCKGRD METER/RANGE/PPM | .5/ 3/ 15 | .6/ 3/ 18 | .6/ 3/ 18 | .5/ 3/ 15 |
| CO2 SAMPLE METER/RANGE/PCT | 17.2/ 3/ .28 | 27.1/ 3/ .44 | 62.1/ 3/ 1.10 | 15.5/ 3/ .25 |
| CO2 BCKGRD METER/RANGE/PCT | 3.2/ 3/ .05 | 2.9/ 3/ .04 | 2.9/ 3/ .04 | 3.0/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 7.7/ 2/ 8 | 28.3/ 2/ 28 | 91.9/ 2/ 92 | 11.9/ 2/ 12 |
| NOX BCKGRD METER/RANGE/PPM | .9/ 2/ 0 | .5/ 2/ 1 | .7/ 2/ 1 | .8/ 2/ 1 |
| DILUTION FACTOR | 29.16 | 23.43 | 10.37 | 34.49 |
| HC CONCENTRATION PPM | 438 | 205 | 190 | 210 |
| CO CONCENTRATION PPM | 1365 | 1033 | 1750 | 1177 |
| CO2 CONCENTRATION PCT | .23 | .40 | 1.06 | .20 |
| NOX CONCENTRATION PPM | 7.3 | 27.8 | 91.3 | 11.1 |
| HC MASS GRAMS | 45.27 | 23.90 | 22.70 | 21.72 |
| CO MASS GRAMS | 284.97 | 243.14 | 421.09 | 245.38 |
| CO2 MASS GRAMS | 749.7 | 1486.4 | 3994.9 | 664.3 |
| NOX MASS GRAMS | 2.54 | 10.87 | 36.48 | 3.85 |
| FUEL KG (LB) | .423 ( .93) | .613 ( 1.35) | 1.491 ( 3.29) | .353 ( .78) |
| KW HR (HP HR) | .53 ( .71) | 1.29 ( 1.73) | 4.33 ( 5.81) | .62 ( .83) |
| BSHC G/KW HR (G/HP HR) | 85.62 ( 63.85) | 18.56 ( 13.84) | 5.24 ( 3.91) | 35.00 ( 26.10) |
| BSCO G/KW HR (G/HP HR) | 539.00 ( 401.93) | 188.88 ( 140.85) | 97.23 ( 72.51) | 395.35 ( 294.82) |
| BSCO2 G/KW HR (G/HP HR) | 1417.98 (1057.39) | 1154.66 ( 861.03) | 922.45 ( 687.87) | 1070.40 ( 798.20) |
| BSNOX G/KW HR (G/HP HR) | 4.80 ( 3.58) | 8.45 ( 6.30) | 8.42 ( 6.28) | 6.21 ( 4.63) |
| BSFC KG/KW HR (LB/HP HR) | .800 ( 1.315) | .476 ( .783) | .344 ( .566) | .568 ( .934) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 6.77 ( 9.08) |
| BSHC G/KW HR (G/HP HR) | 16.79 ( 12.52) |
| BSCO G/KW HR (G/HP HR) | 176.52 (131.63) |
| BSCO2 G/KW HR (G/HP HR) | 1019 ( 760) |
| BSNOX G/KW HR (G/HP HR) | 7.94 ( 5.92) |
| BSFC KG/KW HR (LB/HP HR) | .925 ( .699) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| *MULTIPLIER FOR* | *G/TEST* | *0.000* |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE B-7A (CONT'D). TEST 2-1 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO. IH304
ENGINE MODEL 69
ENGINE 5.0 L(304 CID) V-8
CVS NO. 9

TEST NO. 2-1 RUN
DATE 10/ 9/78
TIME 04:30
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 743.20 MM HG(29.26 IN HG)
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)

RELATIVE HUMIDITY 65 PCT
ABSOLUTE HUMIDITY 13.2 GM/KG( 92.1 GRAINS/LB)

NOX HUMIDITY C.F. 1.0873

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 703.6 (27.7) | 711.2 (28.0) | 744.2 (29.3) | 713.7 (28.1) |
| BLOWER INLET P MM. H2O(IN. H2O) | 454.7 (17.9) | 462.3 (18.2) | 508.0 (20.0) | 459.7 (18.1) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7164 | 8085 | 8318 | 7163 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 178.8 ( 6315) | 201.5 ( 7119) | 206.1 ( 7280) | 178.6 ( 6308) |
| HC SAMPLE METER/RANGE/PPM | 18.8/ 3/ 188 | 20.4/ 3/ 204 | 21.1/ 3/ 211 | 21.5/ 3/ 215 |
| HC BCKGRD METER/RANGE/PPM | 1.1/ 3/ 11 | 1.2/ 3/ 12 | 1.2/ 3/ 12 | 1.2/ 3/ 12 |
| CO SAMPLE METER/RANGE/PPM | 37.0/ 3/ 1091 | 39.0/ 3/ 1150 | 69.9/ 3/ 2057 | 42.5/ 3/ 1252 |
| CO BCKGRD METER/RANGE/PPM | .7/ 3/ 21 | .5/ 3/ 15 | .6/ 3/ 18 | .5/ 3/ 15 |
| CO2 SAMPLE METER/RANGE/PCT | 16.0/ 3/ .26 | 26.6/ 3/ .44 | 62.3/ 3/ 1.10 | 16.0/ 3/ .26 |
| CO2 BCKGRD METER/RANGE/PCT | 3.0/ 3/ .05 | 3.0/ 3/ .05 | 2.0/ 3/ .03 | 3.0/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 10.1/ 2/ 10 | 29.1/ 2/ 29 | 94.3/ 2/ 94 | 10.6/ 2/ 11 |
| NOX BCKGRD METER/RANGE/PPM | .2/ 2/ 0 | .3/ 2/ 0 | .4/ 2/ 0 | .6/ 2/ 1 |
| DILUTION FACTOR | 35.21 | 23.55 | 10.17 | 33.58 |
| HC CONCENTRATION PPM | 177 | 193 | 200 | 203 |
| CO CONCENTRATION PPM | 1042 | 1101 | 1954 | 1205 |
| CO2 CONCENTRATION PCT | .21 | .39 | 1.07 | .21 |
| NOX CONCENTRATION PPM | 9.9 | 28.8 | 93.9 | 10.0 |
| HC MASS GRAMS | 18.28 | 22.38 | 23.80 | 20.95 |
| CO MASS GRAMS | 217.03 | 258.51 | 469.09 | 250.64 |
| CO2 MASS GRAMS | 690.6 | 1451.0 | 4046.5 | 690.1 |
| NOX MASS GRAMS | 3.68 | 12.08 | 40.27 | 3.72 |
| FUEL KG (LB) | .343 ( .76) | .608 ( 1.34) | 1.532 ( 3.38) | .363 ( .80) |
| KW HR (HP HR) | .61 ( .82) | 1.39 ( 1.87) | 4.36 ( 5.84) | .63 ( .85) |
| BSHC G/KW HR (G/HP HR) | 29.98 ( 22.30) | 16.06 ( 11.98) | 5.46 ( 4.07) | 33.02 ( 24.62) |
| BSCO G/KW HR (G/HP HR) | 354.94 ( 264.68) | 185.58 ( 138.39) | 107.63 ( 80.26) | 395.06 ( 294.59) |
| BSCO2 G/KW HR (G/HP HR) | 1129.40 ( 842.19) | 1041.62 ( 776.74) | 928.44 ( 692.34) | 1087.67 ( 811.08) |
| BSNOX G/KW HR (G/HP HR) | 6.02 ( 4.49) | 8.67 ( 6.47) | 9.24 ( 6.89) | 5.87 ( 4.37) |
| BSFC KG/KW HR (LB/HP HR) | .562 ( .924) | .436 ( .717) | .351 ( .578) | .572 ( .940) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 7.00 ( 9.38) |
| BSHC G/KW HR (G/HP HR) | 12.21 ( 9.10) |
| BSCO G/KW HR (G/HP HR) | 170.82 (127.38) |
| BSCO2 G/KW HR (G/HP HR) | 983 ( 733) |
| BSNOX G/KW HR (G/HP HR) | 8.54 ( 6.37) |
| BSFC KG/KW HR (LB/HP HR) | .907 ( .669) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE B-7B. TEST 2-2 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.IH304
ENGINE MODEL 69
ENGINE 5.0 L(304 CID) V-8
CVS NO. 9

TEST NO. 2-2 RUN
DATE 10/10/78
TIME 03:10 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 2

BAROMETER 742.70 MM HG(29.24 IN HG)
DRY BULB TEMP. 23.9 DEG C(75.0 DEG F)

RELATIVE HUMIDITY 69 PCT
ABSOLUTE HUMIDITY 13.2 GM/KG( 92.1 GRAINS/LB) — NOX HUMIDITY C.F. 1.0872

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 703.6 (27.7) | 711.2 (28.0) | 744.2 (29.3) | 713.7 (28.1) |
| BLOWER INLET P MM. H2O(IN. H2O) | 454.7 (17.9) | 462.3 (18.2) | 508.0 (20.0) | 459.7 (18.1) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7165 | 8086 | 8318 | 7163 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 178.7 ( 6311) | 201.4 ( 7114) | 206.0 ( 7274) | 178.5 ( 6303) |
| HC SAMPLE METER/RANGE/PPM | 46.8/ 3/ 468 | 23.9/ 3/ 239 | 18.3/ 3/ 183 | 10.3/ 3/ 103 |
| HC BCKGRD METER/RANGE/PPM | 1.1/ 3/ 11 | 1.7/ 3/ 17 | 1.4/ 3/ 14 | 1.1/ 3/ 11 |
| CO SAMPLE METER/RANGE/PPM | 49.5/ 3/ 1458 | 39.7/ 3/ 1170 | 64.7/ 3/ 1905 | 28.0/ 3/ 828 |
| CO BCKGRD METER/RANGE/PPM | .8/ 3/ 24 | .7/ 3/ 21 | 1.2/ 3/ 37 | 1.1/ 3/ 34 |
| CO2 SAMPLE METER/RANGE/PCT | 17.1/ 3/ .27 | 27.8/ 3/ .46 | 62.4/ 3/ 1.10 | 16.4/ 3/ .26 |
| CO2 BCKGRD METER/RANGE/PCT | 3.5/ 3/ .05 | 3.0/ 3/ .05 | 3.1/ 3/ .05 | 3.1/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 6.7/ 2/ 7 | 26.1/ 2/ 26 | 89.0/ 2/ 89 | 10.8/ 2/ 11 |
| NOX BCKGRD METER/RANGE/PPM | .2/ 2/ 0 | .4/ 2/ 0 | .4/ 2/ 0 | 1.0/ 2/ 1 |
| DILUTION FACTOR | 28.97 | 22.51 | 10.29 | 37.95 |
| HC CONCENTRATION PPM | 457 | 223 | 170 | 92 |
| CO CONCENTRATION PPM | 1394 | 1119 | 1790 | 774 |
| CO2 CONCENTRATION PCT | .22 | .41 | 1.06 | .22 |
| NOX CONCENTRATION PPM | 6.5 | 25.7 | 88.6 | 9.8 |
| HC MASS GRAMS | 47.14 | 25.88 | 20.24 | 9.50 |
| CO MASS GRAMS | 290.11 | 261.19 | 429.23 | 160.78 |
| CO2 MASS GRAMS | 726.9 | 1528.1 | 3993.0 | 706.0 |
| NOX MASS GRAMS | 2.42 | 10.77 | 37.97 | 3.65 |
| FUEL KG (LB) | .420 ( .93) | .637 ( 1.40) | 1.492 ( 3.29) | .312 ( .69) |
| KW HR (HP HR) | .56 ( .75) | 1.38 ( 1.85) | 4.36 ( 5.84) | .68 ( .91) |
| BSHC G/KW HR (G/HP HR) | 84.73 ( 63.18) | 18.76 ( 13.99) | 4.64 ( 3.46) | 14.06 ( 10.48) |
| BSCO G/KW HR (G/HP HR) | 521.51 ( 388.89) | 189.38 ( 141.22) | 98.49 ( 73.44) | 237.90 ( 177.40) |
| BSCO2 G/KW HR (G/HP HR) | 1306.79 ( 974.47) | 1107.95 ( 826.20) | 916.17 ( 683.19) | 1044.66 ( 779.00) |
| BSNOX G/KW HR (G/HP HR) | 4.35 ( 3.24) | 7.81 ( 5.82) | 8.71 ( 6.50) | 5.40 ( 4.02) |
| BSFC KG/KW HR (LB/HP HR) | .755 ( 1.241) | .462 ( .759) | .342 ( .563) | .461 ( .758) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 6.97 ( 9.35) |
| BSHC G/KW HR (G/HP HR) | 14.74 ( 10.99) |
| BSCO G/KW HR (G/HP HR) | 163.75 (122.11) |
| BSCO2 G/KW HR (G/HP HR) | 998 ( 744) |
| BSNOX G/KW HR (G/HP HR) | 7.86 ( 5.86) |
| BSFC KG/KW HR (LB/HP HR) | .410 ( .675) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE B-7B (CONT'D). TEST 2-2 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.IH304
ENGINE MODEL 69
ENGINE 5.0 L(304 CID) V-8
CVS NO. 9

TEST NO. 2-2 RUN
DATE 10/10/78
TIME 03:10 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 2

BAROMETER 742.70 MM HG(29.24 IN HG)
DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)

RELATIVE HUMIDITY 74 PCT
ABSOLUTE HUMIDITY 14.6 GM/KG(102.2 GRAINS/LB) — NOX HUMIDITY C.F. 1.1463

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H20(IN. H20) | 703.6 (27.7) | 711.2 (28.0) | 744.2 (29.3) | 713.7 (28.1) |
| BLOWER INLET P MM. H20(IN. H20) | 454.7 (17.9) | 462.3 (18.2) | 508.0 (20.0) | 459.7 (18.1) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7164 | 8085 | 8316 | 7162 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 178.6 ( 6310) | 201.4 ( 7113) | 205.9 ( 7273) | 178.4 ( 6302) |
| HC SAMPLE METER/RANGE/PPM | 13.4/ 3/ 134 | 14.0/ 3/ 140 | 20.1/ 3/ 201 | 23.3/ 3/ 233 |
| HC BCKGRD METER/RANGE/PPM | .9/ 3/ 9 | .9/ 3/ 9 | 1.0/ 3/ 10 | 1.1/ 3/ 11 |
| CO SAMPLE METER/RANGE/PPM | 27.5/ 3/ 814 | 30.9/ 3/ 913 | 70.4/ 3/ 2072 | 43.2/ 3/ 1273 |
| CO BCKGRD METER/RANGE/PPM | .7/ 3/ 21 | .7/ 3/ 21 | .7/ 3/ 21 | .6/ 3/ 18 |
| CO2 SAMPLE METER/RANGE/PCT | 16.0/ 3/ .26 | 26.3/ 3/ .43 | 61.7/ 3/ 1.09 | 16.1/ 3/ .26 |
| CO2 BCKGRD METER/RANGE/PCT | 3.0/ 3/ .05 | 3.0/ 3/ .05 | 3.2/ 3/ .05 | 3.2/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 10.6/ 2/ 11 | 28.4/ 2/ 28 | 85.9/ 2/ 86 | 10.2/ 2/ 10 |
| NOX BCKGRD METER/RANGE/PPM | .3/ 2/ 0 | .3/ 2/ 0 | .5/ 2/ 1 | .7/ 2/ 1 |
| DILUTION FACTOR | 38.51 | 25.08 | 10.26 | 33.16 |
| HC CONCENTRATION PPM | 125 | 131 | 192 | 222 |
| CO CONCENTRATION PPM | 770 | 863 | 1960 | 1218 |
| CO2 CONCENTRATION PCT | .21 | .39 | 1.04 | .21 |
| NOX CONCENTRATION PPM | 10.3 | 28.1 | 85.4 | 9.5 |
| HC MASS GRAMS | 12.90 | 15.26 | 22.80 | 22.88 |
| CO MASS GRAMS | 160.17 | 202.49 | 469.96 | 253.18 |
| CO2 MASS GRAMS | 689.7 | 1430.1 | 3934.9 | 685.2 |
| NOX MASS GRAMS | 4.04 | 12.42 | 38.58 | 3.73 |
| FUEL KG (LB) | .310 ( .68) | .566 ( 1.25) | 1.496 ( 3.30) | .364 ( .80) |
| KW HR (HP HR) | .63 ( .85) | 1.39 ( 1.87) | 4.38 ( 5.87) | .61 ( .82) |
| BSHC G/KW HR (G/HP HR) | 20.34 ( 15.17) | 10.95 ( 8.17) | 5.21 ( 3.88) | 37.42 ( 27.91) |
| BSCO G/KW HR (G/HP HR) | 252.46 ( 188.26) | 145.36 ( 108.40) | 107.38 ( 80.07) | 414.06 ( 308.77) |
| BSCO2 G/KW HR (G/HP HR) | 1087.10 ( 810.65) | 1026.65 ( 765.57) | 899.06 ( 670.43) | 1120.55 ( 835.59) |
| BSNOX G/KW HR (G/HP HR) | 6.36 ( 4.75) | 8.91 ( 6.65) | 8.82 ( 6.57) | 6.09 ( 4.54) |
| BSFC KG/KW HR (LB/HP HR) | .488 ( .802) | .407 ( .668) | .342 ( .562) | .596 ( .979) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 7.02 ( 9.41) |
| BSHC G/KW HR (G/HP HR) | 10.53 ( 7.85) |
| BSCO G/KW HR (G/HP HR) | 154.77 (115.41) |
| BSCO2 G/KW HR (G/HP HR) | 961 ( 716) |
| BSNOX G/KW HR (G/HP HR) | 8.38 ( 6.25) |
| BSFC KG/KW HR (LB/HP HR) | .390 ( .641) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE B-8A. TEST 3-1 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.IH345
ENGINE MODEL 69 IH-345
ENGINE 5.7 L(345 CID) V-8
CVS NO. 9

TEST NO.3-1 RUN
DATE 10/30/78
TIME 09:20 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 2

BAROMETER 745.24 MM HG(29.34 IN HG)
DRY BULB TEMP. 27.8 DEG C(82.0 DEG F)

RELATIVE HUMIDITY 29 PCT
ABSOLUTE HUMIDITY 6.9 GM/KG( 48.4 GRAINS/LB) — NOX HUMIDITY C.F. .8890

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 703.6 (27.7) | 713.7 (28.1) | 756.9 (29.8) | 713.7 (28.1) |
| BLOWER INLET P MM. H2O(IN. H2O) | 452.1 (17.8) | 464.8 (18.3) | 515.6 (20.3) | 462.3 (18.2) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7167 | 8088 | 8320 | 7164 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 179.4 ( 6338) | 202.1 ( 7140) | 206.5 ( 7294) | 179.1 ( 6326) |
| HC SAMPLE METER/RANGE/PPM | 43.1/ 3/ 431 | 20.6/ 3/ 206 | 17.3/ 3/ 173 | 12.5/ 3/ 125 |
| HC BCKGRD METER/RANGE/PPM | .8/ 3/ 8 | 1.4/ 3/ 14 | 1.1/ 3/ 11 | 1.2/ 3/ 12 |
| CO SAMPLE METER/RANGE/PPM | 27.6/ 3/ 817 | 25.1/ 3/ 744 | 45.6/ 3/ 1343 | 18.0/ 3/ 536 |
| CO BCKGRD METER/RANGE/PPM | 1.1/ 3/ 34 | 1.0/ 3/ 31 | 1.3/ 3/ 40 | 1.3/ 3/ 40 |
| CO2 SAMPLE METER/RANGE/PCT | 17.6/ 3/ .28 | 27.6/ 3/ .45 | 63.5/ 3/ 1.12 | 14.7/ 3/ .23 |
| CO2 BCKGRD METER/RANGE/PCT | 3.0/ 3/ .05 | 2.9/ 3/ .04 | 2.9/ 3/ .04 | 2.9/ 3/ .04 |
| NOx SAMPLE METER/RANGE/PPM | 9.4/ 2/ 9 | 36.8/ 2/ 37 | 50.3/ 3/ 151 | 13.7/ 2/ 14 |
| NOX BCKGRD METER/RANGE/PPM | .3/ 2/ 0 | .3/ 2/ 0 | .1/ 3/ 0 | .4/ 2/ 0 |
| DILUTION FACTOR | 33.01 | 24.44 | 10.55 | 44.78 |
| HC CONCENTRATION PPM | 423 | 193 | 163 | 113 |
| CO CONCENTRATION PPM | 772 | 701 | 1266 | 490 |
| CO2 CONCENTRATION PCT | .24 | .41 | 1.08 | .19 |
| NOX CONCENTRATION PPM | 9.1 | 36.5 | 150.6 | 13.3 |
| HC MASS GRAMS | 43.80 | 22.45 | 19.42 | 11.70 |
| CO MASS GRAMS | 161.35 | 165.06 | 304.37 | 102.28 |
| CO2 MASS GRAMS | 781.6 | 1525.5 | 4095.9 | 624.8 |
| NOX MASS GRAMS | 2.78 | 12.55 | 52.90 | 4.05 |
| FUEL KG (LB) | .370 ( .82) | .585 ( 1.29) | 1.461 ( 3.22) | .259 ( .57) |
| KW HR (HP HR) | .44 ( .59) | 1.28 ( 1.72) | 4.45 ( 5.97) | .56 ( .75) |
| BSHC G/KW HR (G/HP HR) | 99.02 ( 73.84) | 17.51 ( 13.06) | 4.36 ( 3.25) | 20.90 ( 15.59) |
| BSCO G/KW HR (G/HP HR) | 364.75 ( 272.00) | 128.75 ( 96.01) | 68.39 ( 51.00) | 182.74 ( 136.27) |
| BSCO2 G/KW HR (G/HP HR) | 1766.93 (1317.60) | 1184.95 ( 887.34) | 920.27 ( 686.25) | 1116.24 ( 832.38) |
| BSNOX G/KW HR (G/HP HR) | 6.28 ( 4.69) | 9.79 ( 7.30) | 11.89 ( 8.86) | 7.24 ( 5.40) |
| BSFC KG/KW HR (LB/HP HR) | .837 ( 1.376) | .456 ( .750) | .328 ( .540) | .463 ( .762) |

TOTAL TEST RESULTS 4 BAGS

| | | |
|---|---|---|
| TOTAL KW HR (HP HR) | 6.73 | ( 9.03) |
| BSHC G/KW HR (G/HP HR) | 14.46 | ( 10.78) |
| BSCO G/KW HR (G/HP HR) | 108.85 | ( 81.17) |
| BSCO2 G/KW HR (G/HP HR) | 1044 | ( 778) |
| BSNOX G/KW HR (G/HP HR) | 10.73 | ( 8.00) |
| BSFC KG/KW HR (LB/HP HR) | .397 | ( .653) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE B-8A (CONT'D). TEST 3-1 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.IH345
ENGINE MODEL 69 IH 345
ENGINE 5.7 L(345 CID) V-8
CVS NO. 9

TEST NO.3-1 RUN
DATE 10/30/78
TIME 09:20 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 2

BAROMETER 745.24 MM HG(29.34 IN HG)
DRY BULB TEMP. 23.9 DEG C(75.0 DEG F)

RELATIVE HUMIDITY 36 PCT
ABSOLUTE HUMIDITY 6.8 GM/KG( 47.4 GRAINS/LB) — NOX HUMIDITY C.F. .8851

BAG RESULTS

| | 1 NYNF | 2 LANF | 3 LAF | 4 NYNF |
|---|---|---|---|---|
| BLOWER DIF P MM. H2O(IN. H2O) | 703.6 (27.7) | 713.7 (28.1) | 756.9 (29.8) | 713.7 (28.1) |
| BLOWER INLET P MM. H2O(IN. H2O) | 452.1 (17.8) | 464.8 (18.3) | 515.6 (20.3) | 462.3 (18.2) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7169 | 8084 | 8316 | 7162 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 179.4 ( 6335) | 202.0 ( 7136) | 206.4 ( 7290) | 179.0 ( 6324) |
| HC SAMPLE METER/RANGE/PPM | 15.4/ 3/ 154 | 14.4/ 3/ 144 | 17.2/ 3/ 172 | 14.7/ 3/ 147 |
| HC BCKGRD METER/RANGE/PPM | 1.6/ 3/ 16 | 1.2/ 3/ 12 | .9/ 3/ 9 | 1.1/ 3/ 11 |
| CO SAMPLE METER/RANGE/PPM | 19.3/ 3/ 574 | 29.0/ 3/ 857 | 55.3/ 3/ 1628 | 24.9/ 3/ 738 |
| CO BCKGRD METER/RANGE/PPM | .6/ 3/ 18 | .6/ 3/ 18 | 1.1/ 3/ 34 | 1.4/ 3/ 43 |
| CO2 SAMPLE METER/RANGE/PCT | 13.2/ 3/ .21 | 25.0/ 3/ .41 | 62.5/ 3/ 1.10 | 14.1/ 3/ .22 |
| CO2 BCKGRD METER/RANGE/PCT | 2.4/ 3/ .04 | 2.3/ 3/ .04 | 2.5/ 3/ .04 | 3.1/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 10.0/ 2/ 10 | 31.1/ 2/ 31 | 46.7/ 3/ 140 | 12.2/ 2/ 12 |
| NOX BCKGRD METER/RANGE/PPM | .4/ 2/ 0 | .4/ 2/ 0 | .3/ 3/ 1 | .8/ 2/ 1 |
| DILUTION FACTOR | 47.69 | 26.40 | 10.48 | 43.05 |
| HC CONCENTRATION PPM | 138 | 132 | 164 | 136 |
| CO CONCENTRATION PPM | 548 | 823 | 1545 | 685 |
| CO2 CONCENTRATION PCT | .17 | .38 | 1.07 | .18 |
| NOX CONCENTRATION PPM | 9.6 | 30.7 | 139.3 | 11.4 |
| HC MASS GRAMS | 14.31 | 15.44 | 19.51 | 14.07 |
| CO MASS GRAMS | 114.38 | 193.70 | 371.31 | 142.80 |
| CO2 MASS GRAMS | 568.8 | 1388.9 | 4040.6 | 582.2 |
| NOX MASS GRAMS | 2.92 | 10.51 | 48.68 | 3.46 |
| FUEL KG (LB) | .250 ( .55) | .549 ( 1.21) | 1.477 ( 3.26) | .268 ( .59) |
| KW HR (HP HR) | .41 ( .54) | 1.29 ( 1.73) | 4.40 ( 5.90) | .55 ( .73) |
| BSHC G/KW HR (G/HP HR) | 35.23 ( 26.27) | 11.96 ( 8.92) | 4.43 ( 3.31) | 25.76 ( 19.21) |
| BSCO G/KW HR (G/HP HR) | 281.54 ( 209.95) | 150.04 ( 111.89) | 84.37 ( 62.91) | 261.44 ( 194.96) |
| BSCO2 G/KW HR (G/HP HR) | 1400.09 (1044.04) | 1075.86 ( 802.27) | 918.08 ( 684.62) | 1065.94 ( 794.87) |
| BSNOX G/KW HR (G/HP HR) | 7.18 ( 5.36) | 8.14 ( 6.07) | 11.06 ( 8.25) | 6.34 ( 4.73) |
| BSFC KG/KW HR (LB/HP HR) | .616 ( 1.013) | .425 ( .699) | .336 ( .552) | .491 ( .808) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 4.64 ( 3.46) |
| BSHC G/KW HR (G/HP HR) | 9.53 ( 7.11) |
| BSCO G/KW HR (G/HP HR) | 123.74 ( 92.27) |
| BSCO2 G/KW HR (G/HP HR) | 990 ( 739) |
| BSNOX G/KW HR (G/HP HR) | 9.87 ( 7.36) |
| BSFC KG/KW HR (LB/HP HR) | .383 ( .630) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE B-8B. TEST 3-2 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.IH345
ENGINE MODEL 69
ENGINE 5.7 L(345 CID) V-8
CVS NO. 9

TEST NO.3-2 RUN
DATE 11/ 1/78
TIME 08:40 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 2

BAROMETER 748.28 MM HG(29.46 IN HG)
DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)

RELATIVE HUMIDITY 40 PCT
ABSOLUTE HUMIDITY 7.3 GM/KG( 51.0 GRAINS/LB) — NOX HUMIDITY C.F. .8986

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 703.6 (27.7) | 713.7 (28.1) | 756.9 (29.8) | 713.7 (28.1) |
| BLOWER INLET P MM. H2O(IN. H2O) | 452.1 (17.8) | 464.8 (18.3) | 515.6 (20.3) | 462.3 (18.2) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7167 | 8087 | 8319 | 7163 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 180.2 ( 6365) | 203.0 ( 7170) | 207.4 ( 7325) | 179.9 ( 6353) |
| HC SAMPLE METER/RANGE/PPM | 43.0/ 3/ 430 | 20.9/ 3/ 209 | 15.9/ 3/ 159 | 12.0/ 3/ 120 |
| HC BCKGRD METER/RANGE/PPM | .8/ 3/ 8 | 1.7/ 3/ 17 | 1.0/ 3/ 10 | .9/ 3/ 9 |
| CO SAMPLE METER/RANGE/PPM | 20.7/ 3/ 615 | 22.6/ 3/ 671 | 41.4/ 3/ 1220 | 16.7/ 3/ 498 |
| CO BCKGRD METER/RANGE/PPM | .2/ 3/ 6 | .6/ 3/ 18 | 1.1/ 3/ 34 | 1.4/ 3/ 43 |
| CO2 SAMPLE METER/RANGE/PCT | 14.9/ 3/ .24 | 28.0/ 3/ .46 | 65.0/ 3/ 1.15 | 14.6/ 3/ .23 |
| CO2 BCKGRD METER/RANGE/PCT | 2.9/ 3/ .04 | 3.0/ 3/ .05 | 2.5/ 3/ .04 | 2.7/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 6.7/ 2/ 7 | 36.6/ 2/ 37 | 51.0/ 3/ 153 | 12.3/ 2/ 12 |
| NOX BCKGRD METER/RANGE/PPM | .5/ 2/ 1 | .5/ 2/ 1 | .3/ 3/ 1 | .8/ 2/ 1 |
| DILUTION FACTOR | 39.34 | 24.44 | 10.42 | 45.71 |
| HC CONCENTRATION PPM | 422 | 193 | 150 | 111 |
| CO CONCENTRATION PPM | 599 | 639 | 1147 | 448 |
| CO2 CONCENTRATION PCT | .19 | .42 | 1.12 | .19 |
| NOX CONCENTRATION PPM | 6.2 | 36.1 | 152.2 | 11.5 |
| HC MASS GRAMS | 43.89 | 22.56 | 17.94 | 11.54 |
| CO MASS GRAMS | 125.63 | 151.00 | 276.99 | 93.89 |
| CO2 MASS GRAMS | 640.1 | 1552.6 | 4247.7 | 631.9 |
| NOX MASS GRAMS | 1.92 | 12.60 | 54.26 | 3.56 |
| FUEL KG (LB) | .308 ( .68) | .587 ( 1.29) | 1.494 ( 3.29) | .257 ( .57) |
| KW HR (HP HR) | .21 ( .28) | 1.27 ( 1.71) | 4.43 ( 5.94) | .54 ( .73) |
| BSHC G/KW HR (G/HP HR) | 211.36 ( 157.61) | 17.72 ( 13.22) | 4.05 ( 3.02) | 21.30 ( 15.88) |
| BSCO G/KW HR (G/HP HR) | 605.04 ( 451.17) | 118.63 ( 88.46) | 62.55 ( 46.64) | 173.34 ( 129.26) |
| BSCO2 G/KW HR (G/HP HR) | 3082.86 (2298.89) | 1219.70 ( 909.53) | 959.24 ( 715.31) | 1166.51 ( 869.86) |
| BSNOX G/KW HR (G/HP HR) | 9.27 ( 6.91) | 9.90 ( 7.38) | 12.25 ( 9.14) | 6.57 ( 4.90) |
| BSFC KG/KW HR (LB/HP HR) | 1.483 ( 2.438) | .461 ( .758) | .337 ( .555) | .475 ( .781) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 6.45 ( 8.65) |
| BSHC G/KW HR (G/HP HR) | 14.87 ( 11.09) |
| BSCO G/KW HR (G/HP HR) | 100.38 ( 74.86) |
| BSCO2 G/KW HR (G/HP HR) | 1096 ( 818) |
| BSNOX G/KW HR (G/HP HR) | 11.22 ( 8.36) |
| BSFC KG/KW HR (LB/HP HR) | .410 ( .674) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE B-8B (CONT'D). TEST 3-2 EMISSIONS RESULTS

HOT TRANSIENT

PROJECT NO. 11-5044-001

ENGINE NO.IH345
ENGINE MODEL 69
ENGINE 5.7 L(345 CID) V-8
CVS NO. 9

TEST NO.3-2 RUN
DATE 11/ 1/78
TIME
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 748.28 MM HG(29.46 IN HG)
DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)

RELATIVE HUMIDITY 59 PCT
ABSOLUTE HUMIDITY 12.2 GM/KG( 85.6 GRAINS/LB)

NOX HUMIDITY C.F. 1.0527

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | NYNF | LANF | LAF | NYNF |
| DESCRIPTION | | | | |
| BLOWER DIF P MM. H2O(IN. H2O) | 703.6 (27.7) | 713.7 (28.1) | 756.9 (29.8) | 713.7 (28.1) |
| BLOWER INLET P MM. H2O(IN. H2O) | 452.1 (17.8) | 464.8 (18.3) | 515.6 (20.3) | 462.3 (18.2) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7164 | 8163 | 8516 | 7241 |
| TIME SECONDS | 272.0 | 310.0 | 323.6 | 275.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 180.1 ( 6363) | 204.9 ( 7237) | 212.3 ( 7499) | 181.8 ( 6422) |
| HC SAMPLE METER/RANGE/PPM | 19.8/ 3/ 198 | 14.6/ 3/ 146 | 19.1/ 3/ 191 | 10.1/ 3/ 101 |
| HC BCKGRD METER/RANGE/PPM | 5.2/ 3/ 52 | 4.8/ 3/ 48 | 4.2/ 3/ 42 | 4.3/ 3/ 43 |
| CO SAMPLE METER/RANGE/PPM | 20.9/ 3/ 621 | 33.0/ 3/ 974 | 63.5/ 3/ 1870 | 21.9/ 3/ 650 |
| CO BCKGRD METER/RANGE/PPM | .6/ 3/ 18 | .4/ 3/ 12 | .9/ 3/ 28 | 1.1/ 3/ 34 |
| CO2 SAMPLE METER/RANGE/PCT | 15.2/ 3/ .24 | 24.8/ 3/ .41 | 62.1/ 3/ 1.10 | 14.4/ 3/ .23 |
| CO2 BCKGRD METER/RANGE/PCT | 2.6/ 3/ .04 | 2.8/ 3/ .04 | 2.9/ 3/ .04 | 2.9/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 13.1/ 2/ 13 | 28.6/ 2/ 29 | 39.6/ 3/ 119 | 11.8/ 2/ 12 |
| NOX BCKGRD METER/RANGE/PPM | 1.2/ 2/ 1 | 1.2/ 2/ 1 | .1/ 3/ 0 | .6/ 2/ 1 |
| DILUTION FACTOR | 41.53 | 26.01 | 10.35 | 44.30 |
| HC CONCENTRATION PPM | 147 | 100 | 153 | 59 |
| CO CONCENTRATION PPM | 589 | 937 | 1770 | 603 |
| CO2 CONCENTRATION PCT | .20 | .36 | 1.06 | .19 |
| NOX CONCENTRATION PPM | 11.9 | 27.4 | 118.5 | 11.2 |
| HC MASS GRAMS | 15.30 | 11.80 | 18.74 | 6.18 |
| CO MASS GRAMS | 123.54 | 223.47 | 437.71 | 127.66 |
| CO2 MASS GRAMS | 671.0 | 1367.8 | 4103.9 | 617.7 |
| NOX MASS GRAMS | 4.33 | 11.32 | 50.67 | 4.11 |
| FUEL KG (LB) | .288 ( .64) | .554 ( 1.22) | 1.529 ( 3.37) | .264 ( .58) |
| KW HR (HP HR) | .54 ( .72) | 1.28 ( 1.72) | 4.47 ( 6.00) | .55 ( .74) |
| BSHC G/KW HR (G/HP HR) | 28.48 ( 21.24) | 9.21 ( 6.86) | 4.19 ( 3.12) | 11.23 ( 8.37) |
| BSCO G/KW HR (G/HP HR) | 229.99 ( 171.50) | 174.32 ( 129.99) | 97.85 ( 72.97) | 231.81 ( 172.86) |
| BSCO2 G/KW HR (G/HP HR) | 1249.23 ( 931.55) | 1067.00 ( 795.66) | 917.43 ( 684.13) | 1121.72 ( 836.46) |
| BSNOX G/KW HR (G/HP HR) | 8.06 ( 6.01) | 8.83 ( 6.59) | 11.33 ( 8.45) | 7.46 ( 5.56) |
| BSFC KG/KW HR (LB/HP HR) | .536 ( .882) | .432 ( .710) | .342 ( .562) | .480 ( .789) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 6.84 ( 9.18) |
| BSHC G/KW HR (G/HP HR) | 7.60 ( 5.67) |
| BSCO G/KW HR (G/HP HR) | 133.33 ( 99.42) |
| BSCO2 G/KW HR (G/HP HR) | 988 ( 737) |
| BSNOX G/KW HR (G/HP HR) | 10.29 ( 7.67) |
| BSFC KG/KW HR (LB/HP HR) | .385 ( .633) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE B-9A. TEST 4-1 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

| | | |
|---|---|---|
| ENGINE NO. 11304 | TEST NO. 4-1 RUN | |
| ENGINE MODEL 69 IN 304 | DATE 11/17/77 | |
| ENGINE 5.0 L(304. CID) V-8 | TIME 09:15 | GASOLINE EM-267-F |
| CVS NO. 9 | DYNO NO. 2 | BAG CART NO. 1 |
| BAROMETER 745.49 MM HG(29.35 IN HG) | RELATIVE HUMIDITY 26. PCT | |
| DRY BULB TEMP. 25.0 DEG C(77.0 DEG F) | ABSOLUTE HUMIDITY 5.3 GM/KG( 36.8 GRAINS/LB) | NOX HUMIDITY C.F. .8478 |

BAG RESULTS

| BAG NUMBER | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 703.6 (27.7) | 713.7 (28.1) | 756.9 (29.8) | 713.7 (28.1) |
| BLOWER INLET P MM. H2O(IN. H2O) | 452.1 (17.8) | 464.8 (18.3) | 515.6 (20.3) | 462.3 (18.2) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER R.VOLUTIONS | 7168. | 8090. | 8322. | 7166. |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METERS(SCF) | 179.5 ( 6341.) | 202.3 ( 7144.) | 206.6 ( 7299.) | 179.2 ( 6330.) |
| HC SAMPLE METER/RANGE/PPM | 39.0/ 3/ 390. | 18.4/ 3/ 184. | 19.3/ 3/ 193. | 14.5/ 3/ 145. |
| HC BCKGRD METER/RANGE/PPM | 1.2/ 3/ 12. | 1.3/ 3/ 13. | 1.2/ 3/ 12. | 1.8/ 3/ 18. |
| CO SAMPLE METER/RANGE/PPM | 35.9/ 3/ 849. | 37.8/ 3/ 898. | 72.3/ 3/1897. | 34.9/ 3/ 824. |
| CO BCKGRD METER/RANGE/PPM | .1/ 3/ 2. | .1/ 3/ 2. | .1/ 3/ 2. | .1/ 3/ 2. |
| CO2 SAMPLE METER/RANGE/PCT | 13.2/ 3/ .21 | 24.3/ 3/ .40 | 57.0/ 3/ 1.00 | 13.7/ 3/ .22 |
| CO2 BCKGRD METER/RANGE/PCT | 3.2/ 3/ .05 | 3.4/ 3/ .05 | 4.1/ 3/ .06 | 3.5/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 5.9/ 2/ 6. | 28.2/ 2/ 28. | 35.7/ 3/ 107. | 10.4/ 2/ 10. |
| NOX BCKGRD METER/RANGE/PPM | 1.4/ 2/ 1. | 1.0/ 2/ 1. | .4/ 3/ 1. | 1.1/ 2/ 1. |
| DILUTION FACTOR | 40.48 | 26.69 | 11.10 | 42.92 |
| HC CONCENTRATION PPM | 378. | 171. | 182. | 127. |
| CO CONCENTRATION PPM | 836. | 881. | 1842. | 811. |
| CO2 CONCENTRATION PCT | .16 | .35 | .95 | .16 |
| NOX CONCENTRATION PPM | 4.5 | 27.2 | 106.0 | 9.3 |
| HC MASS GRAMS | 39.17 | 20.01 | 21.70 | 13.17 |
| CO MASS GRAMS | 174.80 | 207.49 | 443.27 | 169.25 |
| CO2 MASS GRAMS | 527.4 | 1279.1 | 3581.1 | 538.3 |
| NOX MASS GRAMS | 1.32 | 8.93 | 35.52 | 2.71 |
| FUEL KG (LB) | .292 ( .64) | .526 ( 1.16) | 1.370 ( 3.02) | .267 ( .59) |
| KW HR (HP HR) | .28 ( .38) | 1.26 ( 1.69) | 4.36 ( 5.84) | .52 ( .70) |
| BSHC G/KW HR (G/HP HR) | 139.96 ( 104.37) | 15.89 ( 11.85) | 4.98 ( 3.72) | 25.15 ( 18.76) |
| BSCO G/KW HR (G/HP HR) | 624.59 ( 465.76) | 164.76 ( 122.86) | 101.76 ( 75.88) | 323.23 ( 241.03) |
| BSCO2 G/KW HR (G/HP HR) | 1884.62 (1405.36) | 1015.63 ( 757.35) | 822.12 ( 613.06) | 1028.11 ( 766.66) |
| BSNOX G/KW HR (G/HP HR) | 4.72 ( 3.52) | 7.09 ( 5.29) | 8.16 ( 6.08) | 5.18 ( 3.86) |
| BSFC KG/KW HR (LB/HP HR) | 1.043 ( 1.715) | .418 ( .687) | .315 ( .517) | .509 ( .837) |

TOTAL TEST RESULTS 4 BAGS — PARTICULATE DATA, TOTAL FOR 4 BAGS

| | | | |
|---|---|---|---|
| TOTAL KW HR (HP HR) | 6.42 ( 8.61) | 90MM FILTER | |
| BSHC G/KW HR (G/HP HR) | 14.76 ( 10.93) | SAMPLE FLOW SCM(SCF) | 0.000 ( 0.00) |
| BSCO G/KW HR (G/HP HR) | 156.96 (119.57) | MULTIPLIER FOR G/TEST | 0.000 |
| BSCO2 G/KW HR (G/HP HR) | 923. ( 688.) | MULTIPLIER FOR G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| BSNOX G/KW HR (G/HP HR) | 7.55 ( 5.63) | MULTIPLIER FOR G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |
| BSFC KG/KW HR (LB/HP HR) | .392 ( .649) | | |
| | | 20 x 20 FILTERS | |
| | | SAMPLE FLOW SCM(SCF) | 0.00 ( 0.01) |

# TABLE B-9A (CONT'D). TEST 4-1 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

| | | |
|---|---|---|
| ENGINE NO. 14304 | TEST NO. 4-1 RUN | |
| ENGINE MODEL 69 IN 304 | DATE 11/17/77 | |
| ENGINE 5.0 L(304. CID) V-8 | TIME 09:15 | GASOLINE EM-267-F |
| CVS NO. 9 | DYNO NO. 2 | BAG CART NO. 1 |
| BAROMETER 745.49 MM HG(29.35 IN HG) | RELATIVE HUMIDITY 24. PCT | |
| DRY BULB TEMP. 27.8 DEG C(82.0 DEG F) | ABSOLUTE HUMIDITY 5.7 GM/KG( 39.9 GRAINS/LB) | NOX HUMIDITY C.F. .8584 |

BAG RESULTS

| BAG NUMBER | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 703.6 (27.7) | 713.7 (28.1) | 756.9 (29.8) | 713.7 (28.1) |
| BLOWER INLET P MM.H2O(IN. H2O) | 452.1 (17.8) | 464.8 (18.3) | 515.6 (20.3) | 462.3 (18.2) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 55.0 (131.0) | 55.0 (131.0) | 55.0 (131.0) | 55.0 (131.0) |
| BLOWER REVOLUTIONS | 7168. | 8090. | 8322. | 7494. |
| TIME, SECONDS | 272.0 | 307.0 | 316.0 | 284.4 |
| TOTAL FLOW STD. CU. METERS(SCF) | 179.2 ( 6331.) | 202.0 ( 7133.) | 206.3 ( 7287.) | 187.1 ( 6609.) |
| HC SAMPLE METER/RANGE/PPM | 15.7/ 3/ 157. | 16.4/ 3/ 164. | 20.6/ 3/ 206. | 16.5/ 3/ 165. |
| HC BCKGRD METER/RANGE/PPM | 1.3/ 3/ 13. | 1.1/ 3/ 11. | 1.3/ 3/ 13. | 1.2/ 3/ 12. |
| CO SAMPLE METER/RANGE/PPM | 30.3/ 3/ 709. | 40.6/ 3/ 970. | 79.8/ 3/2153. | 35.4/ 3/ 836. |
| CO BCKGRD METER/RANGE/PPM | .1/ 3/ 2. | .1/ 3/ 2. | .1/ 3/ 2. | .1/ 3/ 2. |
| CO2 SAMPLE METER/RANGE/PCT | 13.7/ 3/ .22 | 22.9/ 3/ .37 | 56.0/ 3/ .98 | 13.4/ 3/ .21 |
| CO2 BCKGRD METER/RANGE/PCT | 3.5/ 3/ .05 | 3.1/ 3/ .05 | 3.6/ 3/ .06 | 3.6/ 3/ .06 |
| NOX SAMPLE METER/RANGE/PPM | 10.3/ 2/ 10. | 26.4/ 2/ 26. | 35.5/ 3/ 107. | 10.9/ 2/ 11. |
| NOX BCKGRD METER/RANGE/PPM | 1.1/ 2/ 1. | 1.1/ 2/ 1. | .5/ 3/ 2. | 1.6/ 2/ 2. |
| DILUTION FACTOR | 44.35 | 27.73 | 11.04 | 43.14 |
| HC CONCENTRATION PPM | 144. | 153. | 194. | 153. |
| CO CONCENTRATION PPM | 698. | 953. | 2094. | 824. |
| CO2 CONCENTRATION PCT | .16 | .33 | .93 | .16 |
| NOX CONCENTRATION PPM | 9.2 | 25.3 | 105.1 | 9.3 |
| HC MASS GRAMS | 14.92 | 17.87 | 23.11 | 16.54 |
| CO MASS GRAMS | 145.68 | 224.21 | 502.99 | 179.58 |
| CO2 MASS GRAMS | 538.3 | 1203.8 | 3527.9 | 540.0 |
| NOX MASS GRAMS | 2.72 | 8.40 | 35.62 | 2.87 |
| FUEL KG (LB) | .257 ( .57) | .508 ( 1.12) | 1.384 ( 3.05) | .276 ( .61) |
| KW HR (HP HR) | .51 ( .68) | 1.26 ( 1.69) | 4.35 ( 5.84) | .51 ( .69) |
| BSHC G/KW HR (G/HP HR) | 29.25 ( 21.81) | 14.19 ( 10.58) | 5.31 ( 3.96) | 32.15 ( 23.97) |
| BSCO G/KW HR (G/HP HR) | 285.60 ( 212.97) | 178.03 ( 132.76) | 115.59 ( 86.20) | 348.98 ( 260.23) |
| BSCO2 G/KW HR (G/HP HR) | 1055.30 ( 786.94) | 955.87 ( 712.79) | 810.75 ( 604.57) | 1049.41 ( 782.55) |
| BSNOX G/KW HR (G/HP HR) | 5.32 ( 3.97) | 6.67 ( 4.98) | 8.19 ( 6.10) | 5.58 ( 4.16) |
| BSFC KG/KW HR (LB/HP HR) | .503 ( .828) | .404 ( .664) | .318 ( .523) | .536 ( .881) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KG FUEL (LB FUEL) | 6.64 ( 8.90) |
| BSHC G/KW HR (G/HP HR) | 10.92 ( 8.14) |
| BSCO G/KW HR (G/HP HR) | 153.61 (114.28) |
| BSCO2 G/KW HR (G/HP HR) | 877. ( 653.) |
| BSNOX G/KW HR (G/HP HR) | 7.42 ( 5.57) |
| BSFC KG/KW HR (LB/HP HR) | .366 ( .601) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | |
|---|---|
| SAMPLE FLOW SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR G/TEST | 0.000 |
| MULTIPLIER FOR G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | |
|---|---|
| SAMPLE FLOW SCM(SCF) | 0.00 ( 0.0) |

# TABLE B-9B. TEST 4-3 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

| | | |
|---|---|---|
| ENGINE NO. D304 | TEST NO. 4-3 RUN | |
| ENGINE MODEL 69 IN 304 | DATE 11/21/77 | |
| ENGINE 5.0 LITER (304. CID) V-8 | TIME 08:40 | GASOLINE EM-267-F |
| CVS NO. 9 | DYNO NO. 2 | BAG CART NO. 1 |
| BAROMETER 748.03 MM HG(29.45 IN HG) | RELATIVE HUMIDITY 38. PCT | |
| DRY BULB TEMP. 22.4 DEG C(73.0 DEG F) | ABSOLUTE HUMIDITY 6.7 GM/KG( 46.7 GRAINS/LB) | NOX HUMIDITY C.F. .8826 |

BAG RESULTS

| BAG NUMBER | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 703.6 (27.7) | 713.7 (28.1) | 756.9 (29.8) | 713.7 (28.1) |
| BLOWER INLET P MM. H2O(IN. H2O) | 452.1 (17.8) | 462.3 (18.2) | 515.6 (20.3) | 462.3 (18.2) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7170. | 8091. | 8323. | 7166. |
| TIME SECONDS | 271.9 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METERS(SCF) | 180.2 ( 6366.) | 203.1 ( 7173.) | 207.4 ( 7326.) | 179.9 ( 6353.) |
| HC SAMPLE METER/RANGE/PPM | 43.3/ 3/ 433. | 22.6/ 3/ 226. | 21.3/ 3/ 213. | 20.1/ 3/ 201. |
| HC RCRCD METER/RANGE/PPM | 1.9/ 3/ 19. | 1.9/ 3/ 19. | 1.9/ 3/ 19. | 1.7/ 3/ 17. |
| CO SAMPLE METER/RANGE/PPM | 35.0/ 3/ 826. | 41.2/ 3/ 986. | 75.4/ 3/2001. | 36.4/ 3/ 862. |
| CO RCRCD METER/RANGE/PPM | .1/ 3/ 2. | .1/ 3/ 2. | .1/ 3/ 2. | .1/ 3/ 2. |
| CO2 SAMPLE METER/RANGE/PCT | 12.2/ 3/ .19 | 24.3/ 3/ .40 | 56.3/ 3/ .99 | 13.4/ 3/ .21 |
| CO2 RCRCD METER/RANGE/PCT | 3.2/ 3/ .05 | 3.4/ 3/ .05 | 3.4/ 3/ .05 | 3.4/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 5.4/ 2/ 5. | 29.5/ 2/ 30. | 36.4/ 3/ 109. | 11.3/ 2/ 11. |
| NOX RCRCD METER/RANGE/PPM | .9/ 2/ 1. | 1.0/ 2/ 1. | .4/ 3/ 1. | 1.3/ 2/ 1. |
| DILUTION FACTOR | 42.34 | 26.04 | 11.12 | 42.36 |
| HC CONCENTRATION PPM | 414. | 208. | 196. | 184. |
| CO CONCENTRATION PPM | 811. | 964. | 1936. | 845. |
| CO2 CONCENTRATION PCT | .14 | .35 | .94 | .16 |
| NOX CONCENTRATION PPM | 4.5 | 28.5 | 108.1 | 10.0 |
| HC MASS GRAMS | 43.08 | 24.33 | 23.41 | 19.13 |
| CO MASS GRAMS | 170.15 | 227.98 | 467.62 | 177.07 |
| CO2 MASS GRAMS | 475.4 | 1284.4 | 3579.9 | 529.1 |
| NOX MASS GRAMS | 1.38 | 9.79 | 37.86 | 3.05 |
| FUEL KG (LB) | .277 ( .61) | .542 ( 1.20) | 1.384 ( 3.05) | .274 ( .60) |
| KW HR (HP HR) | .22 ( .29) | 1.25 ( 1.68) | 4.38 ( 5.87) | .51 ( .68) |
| BSHC G/KW HR (G/HP HR) | 198.85 ( 148.28) | 19.46 ( 14.51) | 5.35 ( 3.99) | 37.51 ( 27.97) |
| BSCO G/KW HR (G/HP HR) | 785.31 ( 585.60) | 182.33 ( 135.96) | 106.80 ( 79.64) | 347.14 ( 258.87) |
| BSCO2 G/KW HR (G/HP HR) | 2194.34 (1636.32) | 1027.26 ( 766.03) | 817.61 ( 609.69) | 1037.35 ( 773.55) |
| BSNOX G/KW HR (G/HP HR) | 6.35 ( 4.74) | 7.83 ( 5.84) | 8.65 ( 6.45) | 5.97 ( 4.45) |
| BSFC KG/KW HR (LB/HP HR) | 1.280 ( 2.104) | .434 ( .713) | .316 ( .519) | .536 ( .882) |

TOTAL TEST RESULTS - 4 BAGS

| | |
|---|---|
| TOTAL HC MASS (GRAMS) | 6.36 ( 8.52) |
| BSHC G/KW HR (G/HP HR) | 17.30 ( 12.90) |
| BSCO G/KW HR (G/HP HR) | 164.08 (122.35) |
| BSCO2 G/KW HR (G/HP HR) | 923. ( 689.) |
| BSNOX G/KW HR (G/HP HR) | 6.19 ( 6.11) |
| BSFC KG/KW HR (LB/HP HR) | .390 ( .641) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE B-9B (CONT'D). TEST 4-3 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

| | | |
|---|---|---|
| ENGINE NO. 1P304 | TEST NO. 4-3 RUN | |
| ENGINE MODEL 49 IN 304 | DATE 11/21/77 | |
| ENGINE 5.0 LITER, CID V-8 | TIME 09:20 | GASOLINE EM-267-F |
| CVS NO. 8 | DYNO NO. 2 | BAG CART NO. 1 |
| BAROMETER 744.01 MM HG(29.45 IN HG) | RELATIVE HUMIDITY 34. PCT | |
| DRY BULB TEMP. 25.6 DEG C(78.0 DEG F) | ABSOLUTE HUMIDITY 7.0 GM/KG( 49.0 GRAINS/LB) | NOX HUMIDITY C.F. .8911 |

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| FLOWRS DIF P MM. H2O(IN. H2O) | 703.6 (27.7) | 713.7 (28.1) | 756.9 (29.8) | 713.7 (28.1) |
| FLOWRS INLET P MM. H2O(IN. H2O) | 452.1 (17.8) | 464.8 (18.3) | 515.6 (20.3) | 462.3 (18.2) |
| FLOWRS INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| FLOWRS REVOLUTIONS | 7167. | 8088. | 8320. | 7165. |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METERS(SCF) | 180.2 ( 6363.) | 203.0 ( 7169.) | 207.3 ( 7324.) | 179.8 ( 6352.) |
| HC SAMPLE METER/RANGE/PPM | 18.6/ 3/ 186. | 17.8/ 3/ 178. | 21.3/ 3/ 213. | 19.3/ 3/ 193. |
| HC RECORD METER/RANGE/PPM | 1.7/ 3/ 17. | 1.7/ 3/ 17. | 1.7/ 3/ 17. | 1.6/ 3/ 16. |
| CO SAMPLE METER/RANGE/PPM | 31.7/ 3/ 743. | 40.5/ 3/ 967. | 79.3/ 3/2136. | 37.1/ 3/ 880. |
| CO RECORD METER/RANGE/PPM | .1/ 3/ 2. | .1/ 3/ 2. | .1/ 3/ 2. | .1/ 3/ 2. |
| CO2 SAMPLE METER/RANGE/PCT | 13.3/ 3/ .21 | 22.6/ 3/ .37 | 57.2/ 3/ 1.01 | 13.6/ 3/ .21 |
| CO2 RECORD METER/RANGE/PCT | 3.5/ 3/ .05 | 3.2/ 3/ .05 | 3.5/ 3/ .05 | 3.4/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 10.8/ 2/ 11. | 27.1/ 2/ 27. | 37.3/ 3/ 112. | 11.1/ 2/ 11. |
| NOX RECORD METER/RANGE/PPM | 1.3/ 2/ 1. | 1.3/ 2/ 1. | .3/ 3/ 1. | 1.3/ 2/ 1. |
| DILUTION FACTOR | 44.42 | 27.98 | 10.84 | 41.78 |
| HC CONCENTRATION PPM | 169. | 162. | 198. | 177. |
| CO CONCENTRATION PPM | 730. | 948. | 2069. | 864. |
| CO2 CONCENTRATION PCT | .16 | .32 | .96 | .16 |
| NOX CONCENTRATION PPM | 9.5 | 25.8 | 111.1 | 9.8 |
| HC MASS GRAMS | 17.60 | 18.92 | 23.63 | 18.40 |
| CO MASS GRAMS | 153.14 | 224.03 | 499.52 | 180.97 |
| CO2 MASS GRAMS | 519.4 | 1185.0 | 3641.0 | 539.9 |
| NOX MASS GRAMS | 2.93 | 8.94 | 39.26 | 3.01 |
| FUEL KG (LB) | .257 ( .57) | .503 ( 1.11) | 1.419 ( 3.13) | .278 ( .61) |
| KW HR (HP HR) | .51 ( .68) | 1.26 ( 1.69) | 4.39 ( 5.89) | .51 ( .68) |
| BSHC G/KW HR (G/HP HR) | 34.51 ( 25.73) | 14.97 ( 11.16) | 5.38 ( 4.01) | 36.40 ( 27.14) |
| BSCO G/KW HR (G/HP HR) | 300.24 ( 223.89) | 177.25 ( 132.18) | 113.73 ( 84.81) | 357.96 ( 266.93) |
| BSCO2 G/KW HR (G/HP HR) | 1018.22 ( 759.29) | 937.59 ( 699.16) | 828.99 ( 618.18) | 1067.94 ( 796.36) |
| BSNOX G/KW HR (G/HP HR) | 5.74 ( 4.28) | 7.07 ( 5.28) | 8.94 ( 6.67) | 5.96 ( 4.45) |
| BSFC KG/KW HR (LB/HP HR) | .504 ( .829) | .398 ( .655) | .323 ( .531) | .550 ( .905) |

TOTAL TEST RESULTS, 4 BAGS

| | |
|---|---|
| TOTAL HC G/TEST (G/MI) | 6.67 ( 4.99) |
| BSHC G/KW HR (G/HP HR) | 11.77 ( 8.78) |
| BSCO G/KW HR (G/HP HR) | 156.53 (116.72) |
| BSCO2 G/KW HR (G/HP HR) | 892. ( 666.) |
| BSNOX G/KW HR (G/HP HR) | 5.12 ( 3.82) |
| BSFC KG/KW HR (LB/HP HR) | .348 ( .606) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE B-10A. TEST 5-3 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.CH366
ENGINE MODEL 69 CHEV 366
ENGINE 6.0 L(366 CID) V-8
CVS NO. 9

TEST NO. 5-3 RUN
DATE 12/19/78
TIME 08:30
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 740.92 MM HG(29.17 IN HG)
DRY BULB TEMP. 26.7 DEG C(80.0 DEG F)

RELATIVE HUMIDITY 33 PCT
ABSOLUTE HUMIDITY 7.3 GM/KG( 51.3 GRAINS/LB)

NOX HUMIDITY C.F. .8997

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 670.6 (26.4) | 685.8 (27.0) | 726.4 (28.6) | 685.8 (27.0) |
| BLOWER INLET P MM. H2O(IN. H2O) | 444.5 (17.5) | 462.3 (18.2) | 508.0 (20.0) | 459.7 (18.1) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7168 | 8089 | 8320 | 7164 |
| TIME SECONDS | 272.0 | 307.0 | 315.9 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 182.4 ( 6441) | 205.4 ( 7254) | 210.2 ( 7423) | 181.9 ( 6426) |
| HC SAMPLE METER/RANGE/PPM | 41.1/ 3/ 411 | 36.0/ 3/ 360 | 34.7/ 3/ 347 | 26.4/ 3/ 264 |
| HC BCKGRD METER/RANGE/PPM | 1.8/ 3/ 18 | 1.8/ 3/ 18 | 1.7/ 3/ 17 | 1.7/ 3/ 17 |
| CO SAMPLE METER/RANGE/PPM | 36.7/ 3/ 1082 | 69.7/ 3/ 2051 | 79.6/ 2/ 5170 | 39.7/ 3/ 1170 |
| CO BCKGRD METER/RANGE/PPM | .6/ 3/ 18 | .7/ 3/ 21 | .1/ 2/ 6 | .7/ 3/ 21 |
| CO2 SAMPLE METER/RANGE/PCT | 16.8/ 3/ .27 | 29.5/ 3/ .49 | 62.0/ 3/ 1.09 | 15.8/ 3/ .25 |
| CO2 BCKGRD METER/RANGE/PCT | 3.0/ 3/ .05 | 2.6/ 3/ .04 | 2.4/ 3/ .04 | 2.2/ 3/ .03 |
| NOX SAMPLE METER/RANGE/PPM | 6.6/ 2/ 7 | 23.1/ 2/ 23 | 90.0/ 2/ 90 | 8.6/ 2/ 9 |
| NOX BCKGRD METER/RANGE/PPM | .5/ 2/ 1 | .6/ 2/ 1 | .8/ 2/ 1 | 1.0/ 2/ 1 |
| DILUTION FACTOR | 32.17 | 18.48 | 8.23 | 34.03 |
| HC CONCENTRATION PPM | 394 | 343 | 332 | 247 |
| CO CONCENTRATION PPM | 1048 | 1990 | 5001 | 1131 |
| CO2 CONCENTRATION PCT | .22 | .45 | 1.06 | .22 |
| NOX CONCENTRATION PPM | 6.1 | 22.5 | 39.3 | 7.6 |
| HC MASS GRAMS | 41.40 | 40.63 | 40.25 | 25.97 |
| CO MASS GRAMS | 222.47 | 476.02 | 1223.87 | 239.71 |
| CO2 MASS GRAMS | 749.6 | 1694.6 | 4085.1 | 731.7 |
| NOX MASS GRAMS | 1.92 | 7.96 | 14.21 | 2.39 |
| FUEL KG (LB) | .388 ( .86) | .811 ( 1.79) | 1.934 ( 4.26) | .375 ( .83) |
| KW HR (HP HR) | .26 ( .35) | 1.43 ( 1.92) | 5.14 ( 6.89) | .56 ( .75) |
| BSHC G/KW HR (G/HP HR) | 157.48 ( 117.44) | 28.33 ( 21.12) | 7.83 ( 5.84) | 46.16 ( 34.42) |
| BSCO G/KW HR (G/HP HR) | 846.32 ( 631.10) | 331.90 ( 247.50) | 238.23 ( 177.65) | 426.05 ( 317.71) |
| BSCO2 G/KW HR (G/HP HR) | 2851.69 (2126.50) | 1181.55 ( 881.08) | 795.18 ( 592.97) | 1300.60 ( 969.86) |
| BSNOX G/KW HR (G/HP HR) | 7.30 ( 5.45) | 5.55 ( 4.14) | 2.77 ( 2.06) | 4.25 ( 3.17) |
| BSFC KG/KW HR (LB/HP HR) | 1.476 ( 2.426) | .565 ( .929) | .377 ( .619) | .667 ( 1.097) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 2.40 ( 3.22) |
| BSHC G/KW HR (G/HP HR) | 20.04 ( 14.95) |
| BSCO G/KW HR (G/HP HR) | 292.29 (217.96) |
| BSCO2 G/KW HR (G/HP HR) | 982 ( 732) |
| BSNOX G/KW HR (G/HP HR) | 3.58 ( 2.67) |
| BSFC KG/KW HR (LB/HP HR) | .474 ( .780) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE B-10A (CONT'D). TEST 5-3 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.CH366
ENGINE MODEL 69 CHEV 366
ENGINE 6.0 L(366 CID) V-8
CVS NO. 9

TEST NO. 5-3 RUN
DATE 12/19/78
TIME 09:06 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 2

BAROMETER 740.92 MM HG(29.17 IN HG)
DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)

RELATIVE HUMIDITY 37 PCT
ABSOLUTE HUMIDITY 7.3 GM/KG( 51.1 GRAINS/LB) — NOX HUMIDITY C.F. .8990

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 668.0 (26.3) | 683.3 (26.9) | 726.4 (28.6) | 685.8 (27.0) |
| BLOWER INLET P MM. H2O(IN. H2O) | 444.5 (17.5) | 457.2 (18.0) | 508.0 (20.0) | 459.7 (18.1) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7165 | 8085 | 8316 | 7162 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 182.3 ( 6439) | 205.4 ( 7255) | 210.1 ( 7419) | 181.9 ( 6425) |
| HC SAMPLE METER/RANGE/PPM | 44.2/ 3/ 442 | 23.4/ 3/ 234 | 30.7/ 3/ 307 | 20.3/ 3/ 203 |
| HC BCKGRD METER/RANGE/PPM | 1.7/ 3/ 17 | 1.8/ 3/ 18 | 1.8/ 3/ 18 | 1.7/ 3/ 17 |
| CO SAMPLE METER/RANGE/PPM | 37.1/ 3/ 1094 | 61.4/ 3/ 1808 | 71.7/ 2/ 4656 | 33.0/ 3/ 974 |
| CO BCKGRD METER/RANGE/PPM | .7/ 3/ 21 | .8/ 3/ 24 | .2/ 2/ 12 | .9/ 3/ 28 |
| CO2 SAMPLE METER/RANGE/PCT | 15.4/ 3/ .25 | 27.7/ 3/ .46 | 61.7/ 3/ 1.09 | 16.4/ 3/ .26 |
| CO2 BCKGRD METER/RANGE/PCT | 1.6/ 3/ .02 | 1.5/ 3/ .02 | 1.7/ 3/ .03 | 1.7/ 3/ .03 |
| NOX SAMPLE METER/RANGE/PPM | 9.2/ 2/ 9 | 19.3/ 2/ 19 | 51.7/ 2/ .52 | 9.5/ 2/ 10 |
| NOX BCKGRD METER/RANGE/PPM | .9/ 2/ 1 | .9/ 2/ 1 | 1.0/ 2/ 1 | 1.0/ 2/ 1 |
| DILUTION FACTOR | 33.73 | 20.40 | 8.54 | 35.42 |
| HC CONCENTRATION PPM | 426 | 217 | 291 | 186 |
| CO CONCENTRATION PPM | 1055 | 1747 | 4492 | 931 |
| CO2 CONCENTRATION PCT | .22 | .43 | 1.06 | .24 |
| NOX CONCENTRATION PPM | 8.3 | 18.4 | 50.8 | 8.5 |
| HC MASS GRAMS | 44.74 | 25.69 | 35.27 | 19.56 |
| CO MASS GRAMS | 223.97 | 417.93 | 1098.81 | 197.22 |
| CO2 MASS GRAMS | 740.7 | 1635.0 | 4096.4 | 789.7 |
| NOX MASS GRAMS | 2.61 | 6.51 | 18.36 | 2.67 |
| FUEL KG (LB) | .389 ( .86) | .748 ( 1.65) | 1.871 ( 4.12) | .366 ( .81) |
| KW HR (HP HR) | .56 ( .75) | 1.46 ( 1.96) | 5.12 ( 6.87) | .56 ( .75) |
| BSHC G/KW HR (G/HP HR) | 80.18 ( 59.79) | 17.58 ( 13.11) | 6.88 ( 5.13) | 34.77 ( 25.93) |
| BSCO G/KW HR (G/HP HR) | 401.37 ( 299.30) | 285.89 ( 213.19) | 214.46 ( 159.93) | 350.54 ( 261.40) |
| BSCO2 G/KW HR (G/HP HR) | 1327.45 ( 989.88) | 1118.42 ( 834.01) | 799.53 ( 596.21) | 1403.60 (1046.67) |
| BSNOX G/KW HR (G/HP HR) | 4.68 ( 3.49) | 4.46 ( 3.32) | 3.58 ( 2.67) | 4.74 ( 3.54) |
| BSFC KG/KW HR (LB/HP HR) | .697 ( 1.147) | .512 ( .841) | .365 ( .600) | .651 ( 1.070) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 7.71 ( 10.33) |
| BSHC G/KW HR (G/HP HR) | 16.26 ( 12.12) |
| BSCO G/KW HR (G/HP HR) | 251.48 (187.53) |
| BSCO2 G/KW HR (G/HP HR) | 942 ( 703) |
| BSNOX G/KW HR (G/HP HR) | 3.91 ( 2.92) |
| BSFC KG/KW HR (LB/HP HR) | .438 ( .720) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE B-10B. TEST 5-4 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.CH366
ENGINE MODEL 69 CHEV 366
ENGINE 6.0 L(366 CID) V-8
CVS NO. 9

TEST NO. 5-4 RUN
DATE 12/20/78
TIME 08:49 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 2

BAROMETER 735.58 MM HG(28.96 IN HG)
DRY BULB TEMP. 29.4 DEG C(85.0 DEG F)

RELATIVE HUMIDITY 38 PCT
ABSOLUTE HUMIDITY 10.1 GM/KG( 71.0 GRAINS/LB) — NOX HUMIDITY C.F. .9815

BAG RESULTS

| | 1 NYNF | 2 LANF | 3 LAF | 4 NYNF |
|---|---|---|---|---|
| BLOWER DIF P MM. H2O(IN. H2O) | 670.6 (26.4) | 685.8 (27.0) | 726.4 (28.6) | 685.8 (27.0) |
| BLOWER INLET P MM. H2O(IN. H2O) | 444.5 (17.5) | 462.3 (18.2) | 508.0 (20.0) | 459.7 (18.1) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7166 | 8086 | 8317 | 7162 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 180.9 ( 6391) | 203.7 ( 7196) | 208.5 ( 7363) | 180.5 ( 6374) |
| HC SAMPLE METER/RANGE/PPM | 41.5/ 3/ 415 | 32.5/ 3/ 325 | 31.6/ 3/ 316 | 18.2/ 3/ 182 |
| HC BCKGRD METER/RANGE/PPM | 1.5/ 3/ 15 | 1.8/ 3/ 18 | 1.8/ 3/ 18 | 1.8/ 3/ 18 |
| CO SAMPLE METER/RANGE/PPM | 39.9/ 3/ 1176 | 74.8/ 3/ 2200 | 78.1/ 2/ 5073 | 36.7/ 3/ 1082 |
| CO BCKGRD METER/RANGE/PPM | .8/ 3/ 24 | .9/ 3/ 28 | .3/ 2/ 18 | .7/ 3/ 21 |
| CO2 SAMPLE METER/RANGE/PCT | 17.2/ 3/ .28 | 31.4/ 3/ .52 | 67.0/ 3/ 1.19 | 17.9/ 3/ .29 |
| CO2 BCKGRD METER/RANGE/PCT | 2.8/ 3/ .04 | 2.6/ 3/ .04 | 2.5/ 3/ .04 | 2.7/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 6.2/ 2/ 6 | 18.4/ 2/ 18 | 58.2/ 2/ 58 | 8.9/ 2/ 9 |
| NOX BCKGRD METER/RANGE/PPM | .1/ 2/ 0 | .1/ 2/ 0 | .4/ 2/ 0 | .6/ 2/ 1 |
| DILUTION FACTOR | 30.97 | 17.42 | 7.82 | 32.53 |
| HC CONCENTRATION PPM | 400 | 308 | 300 | 165 |
| CO CONCENTRATION PPM | 1132 | 2125 | 4878 | 1042 |
| CO2 CONCENTRATION PCT | .23 | .48 | 1.16 | .25 |
| NOX CONCENTRATION PPM | 6.1 | 18.3 | 57.9 | 8.3 |
| HC MASS GRAMS | 41.79 | 36.20 | 36.11 | 17.13 |
| CO MASS GRAMS | 238.45 | 504.10 | 1184.22 | 219.12 |
| CO2 MASS GRAMS | 776.1 | 1807.4 | 4426.6 | 818.0 |
| NOX MASS GRAMS | 2.07 | 7.00 | 22.64 | 2.82 |
| FUEL KG (LB) | .405 ( .89) | .856 ( 1.89) | 2.018 ( 4.45) | .384 ( .85) |
| KW HR (HP HR) | .24 ( .33) | 1.46 ( 1.95) | 5.12 ( 6.86) | .57 ( .76) |
| BSHC G/KW HR (G/HP HR) | 170.99 ( 127.51) | 24.84 ( 18.52) | 7.05 ( 5.26) | 30.20 ( 22.52) |
| BSCO G/KW HR (G/HP HR) | 975.58 ( 727.49) | 345.92 ( 257.95) | 231.34 ( 172.51) | 386.29 ( 288.06) |
| BSCO2 G/KW HR (G/HP HR) | 3175.22 (2367.76) | 1240.28 ( 924.88) | 864.75 ( 644.84) | 1442.07 (1075.35) |
| BSNOX G/KW HR (G/HP HR) | 8.48 ( 6.33) | 4.81 ( 3.58) | 4.42 ( 3.30) | 4.97 ( 3.71) |
| BSFC KG/KW HR (LB/HP HR) | 1.655 ( 2.721) | .587 ( .965) | .394 ( .648) | .676 ( 1.112) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 7.39 ( 9.91) |
| BSHC G/KW HR (G/HP HR) | 17.76 ( 13.25) |
| BSCO G/KW HR (G/HP HR) | 290.46 (216.60) |
| BSCO2 G/KW HR (G/HP HR) | 1060 ( 790) |
| BSNOX G/KW HR (G/HP HR) | 4.68 ( 3.49) |
| BSFC KG/KW HR (LB/HP HR) | .496 ( .815) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE B-10B (CONT'D). TEST 5-4 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.CH366
ENGINE MODEL 69 CHEV 366
ENGINE 6.0 L(366 CID) V-8
CVS NO. 9

TEST NO. 5-4 RUN
DATE 12/20/78
TIME 0814
DYNO NO. 2
GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 735.58 MM HG(28.96 IN HG)
DRY BULB TEMP. 30.6 DEG C(87.0 DEG F)

RELATIVE HUMIDITY 39 PCT
ABSOLUTE HUMIDITY 11.2 GM/KG( 78.2 GRAINS/LB)
NOX HUMIDITY C.F. 1.0151

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 668.0 (26.3) | 683.3 (26.9) | 726.4 (28.6) | 685.8 (27.0) |
| BLOWER INLET P MM. H2O(IN. H2O) | 444.5 (17.5) | 457.2 (18.0) | 508.0 (20.0) | 459.7 (18.1) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7163 | 8085 | 8316 | 7162 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 180.9 ( 6388) | 203.8 ( 7200) | 208.4 ( 7362) | 180.5 ( 6376) |
| HC SAMPLE METER/RANGE/PPM | 19.5/ 3/ 195 | 20.1/ 3/ 201 | 31.1/ 3/ 311 | 16.3/ 3/ 163 |
| HC BCKGRD METER/RANGE/PPM | 1.5/ 3/ 15 | 1.4/ 3/ 14 | 1.6/ 3/ 16 | 1.6/ 3/ 16 |
| CO SAMPLE METER/RANGE/PPM | 32.5/ 3/ 960 | 55.7/ 3/ 1640 | 76.2/ 2/ 4444 | 37.0/ 3/ 1091 |
| CO BCKGRD METER/RANGE/PPM | .7/ 3/ 21 | .7/ 3/ 21 | .3/ 2/ 18 | .7/ 3/ 21 |
| CO2 SAMPLE METER/RANGE/PCT | 18.4/ 3/ .30 | 30.2/ 3/ .50 | 67.2/ 3/ 1.20 | 18.6/ 3/ .30 |
| CO2 BCKGRD METER/RANGE/PCT | 2.4/ 3/ .04 | 2.5/ 3/ .04 | 2.3/ 3/ .04 | 2.6/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 9.7/ 2/ 10 | 21.1/ 2/ 21 | 60.0/ 2/ 60 | 9.2/ 2/ 9 |
| NOX BCKGRD METER/RANGE/PPM | .4/ 2/ 0 | .2/ 2/ 0 | .3/ 2/ 0 | .7/ 2/ 1 |
| DILUTION FACTOR | 32.72 | 19.68 | 7.86 | 31.70 |
| HC CONCENTRATION PPM | 180 | 188 | 297 | 148 |
| CO CONCENTRATION PPM | 921 | 1583 | 4757 | 1050 |
| CO2 CONCENTRATION PCT | .26 | .46 | 1.17 | .26 |
| NOX CONCENTRATION PPM | 9.3 | 20.9 | 59.7 | 8.5 |
| HC MASS GRAMS | 18.82 | 22.07 | 35.71 | 15.36 |
| CO MASS GRAMS | 194.06 | 375.85 | 1154.62 | 220.79 |
| CO2 MASS GRAMS | 862.4 | 1733.1 | 4451.5 | 862.1 |
| NOX MASS GRAMS | 3.27 | 8.28 | 24.18 | 2.99 |
| FUEL KG (LB) | .387 ( .85) | .755 ( 1.66) | 2.011 ( 4.43) | .397 ( .87) |
| 1* HR (HP HR) | .56 ( .75) | 1.48 ( 1.98) | 5.15 ( 6.90) | .60 ( .81) |
| BSHC G/KW HR (G/HP HR) | 33.46 ( 24.95) | 14.95 ( 11.15) | 6.94 ( 5.17) | 25.42 ( 18.96) |
| BSCO G/KW HR (G/HP HR) | 344.92 ( 257.21) | 254.69 ( 189.92) | 224.35 ( 167.30) | 365.48 ( 272.54) |
| BSCO2 G/KW HR (G/HP HR) | 1532.79 (1143.00) | 1174.41 ( 875.75) | 864.94 ( 644.99) | 1427.11 (1064.19) |
| BSNOX G/KW HR (G/HP HR) | 5.81 ( 4.33) | 5.61 ( 4.18) | 4.70 ( 3.50) | 4.94 ( 3.69) |
| BSFC KG/KW HR (LB/HP HR) | .688 ( 1.130) | .511 ( .841) | .391 ( .642) | .656 ( 1.079) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 7.79 ( 10.45) |
| BSHC G/KW HR (G/HP HR) | 11.81 ( 8.80) |
| BSCO G/KW HR (G/HP HR) | 249.75 (186.24) |
| BSCO2 G/KW HR (G/HP HR) | 1015 ( 757) |
| BSNOX G/KW HR (G/HP HR) | 4.97 ( 3.71) |
| BSFC KG/KW HR (LB/HP HR) | .456 ( .749) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE B-11A. TEST 9-1 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.CH366
ENGINE MODEL -U CHEV 366
ENGINE 6.0 L(366 CID) V-8
CVS NO. 9

TEST NO. 9-1 RUN
DATE 3/15/79
TIME 10:01 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 2

BAROMETER 747.78 MM HG(29.44 IN HG)
DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)

RELATIVE HUMIDITY 16 PCT
ABSOLUTE HUMIDITY 3.2 GM/KG( 22.4 GRAINS/LB) — NOX HUMIDITY C.F. .8018

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7169 | 8089 | 8320 | 7165 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 183.9 ( 6495) | 207.1 ( 7316) | 211.4 ( 7467) | 183.6 ( 6485) |
| HC SAMPLE METER/RANGE/PPM | 36.7/ 3/ 367 | 20.6/ 3/ 206 | 22.8/ 3/ 228 | 12.4/ 3/ 124 |
| HC BCKGRD METER/RANGE/PPM | 1.3/ 3/ 13 | 1.4/ 3/ 14 | 1.1/ 3/ 11 | 1.2/ 3/ 12 |
| CO SAMPLE METER/RANGE/PPM | 35.5/ 3/ 1047 | 46.8/ 3/ 1378 | 47.0/ 2/ 3029 | 28.4/ 3/ 840 |
| CO BCKGRD METER/RANGE/PPM | .4/ 3/ 12 | 1.1/ 3/ 34 | .3/ 2/ 18 | .6/ 3/ 18 |
| CO2 SAMPLE METER/RANGE/PCT | 17.4/ 3/ .28 | 28.7/ 3/ .47 | 62.0/ 3/ 1.09 | 16.5/ 3/ .26 |
| CO2 BCKGRD METER/RANGE/PCT | 3.2/ 3/ .05 | 3.0/ 3/ .05 | 3.1/ 3/ .05 | 2.6/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 9.4/ 2/ 9 | 28.4/ 2/ 28 | 86.3/ 2/ 86 | 10.7/ 2/ 11 |
| NOX BCKGRD METER/RANGE/PPM | 0.0/ 3/ 0 | 0.0/ 2/ 0 | 0.0/ 2/ 0 | .4/ 2/ 0 |
| DILUTION FACTOR | 31.95 | 21.25 | 9.49 | 37.28 |
| HC CONCENTRATION PPM | 354 | 193 | 218 | 112 |
| CO CONCENTRATION PPM | 1024 | 1327 | 2934 | 814 |
| CO2 CONCENTRATION PCT | .23 | .43 | 1.05 | .23 |
| NOX CONCENTRATION PPM | 9.4 | 28.4 | 86.3 | 10.3 |
| HC MASS GRAMS | 37.59 | 23.02 | 26.60 | 11.90 |
| CO MASS GRAMS | 219.37 | 320.03 | 722.40 | 173.99 |
| CO2 MASS GRAMS | 779.7 | 1631.9 | 4069.9 | 757.4 |
| NOX MASS GRAMS | 2.65 | 9.02 | 27.98 | 2.90 |
| FUEL KG (LB) | .392 ( .86) | .696 ( 1.53) | 1.667 ( 3.68) | .337 ( .74) |
| KW HR (HP HR) | .59 ( .79) | 1.46 ( 1.96) | 5.02 ( 6.73) | .58 ( .77) |
| BSHC G/KW HR (G/HP HR) | 63.67 ( 47.48) | 15.74 ( 11.74) | 5.30 ( 3.95) | 20.62 ( 15.38) |
| BSCO G/KW HR (G/HP HR) | 371.58 ( 277.09) | 218.85 ( 163.20) | 143.95 ( 107.35) | 301.66 ( 224.95) |
| BSCO2 G/KW HR (G/HP HR) | 1320.71 ( 984.85) | 1115.96 ( 832.17) | 811.01 ( 604.77) | 1313.13 ( 979.20) |
| BSNOX G/KW HR (G/HP HR) | 4.49 ( 3.35) | 6.17 ( 4.60) | 5.58 ( 4.16) | 5.03 ( 3.75) |
| BSFC KG/KW HR (LB/HP HR) | .664 ( 1.092) | .476 ( .782) | .332 ( .546) | .584 ( .960) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 7.65 ( 10.26) |
| BSHC G/KW HR (G/HP HR) | 12.96 ( 9.66) |
| BSCO G/KW HR (G/HP HR) | 187.74 (140.00) |
| BSCO2 G/KW HR (G/HP HR) | 947 ( 706) |
| BSNOX G/KW HR (G/HP HR) | 5.57 ( 4.15) |
| BSFC KG/KW HR (LB/HP HR) | .404 ( .665) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE B-11A (CONT'D). TEST 9-1 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.CH366
ENGINE MODEL -0 CHEV 366
ENGINE 6.0 L(366 CID) V-8
CVS NO. 9

TEST NO. 9-1 RUN
DATE 3/15/79
TIME 10:41 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 2

BAROMETER 747.78 MM HG(29.44 IN HG)
DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)

RELATIVE HUMIDITY 16 PCT
ABSOLUTE HUMIDITY 3.3 GM/KG( 23.3 GRAINS/LB) — NOX HUMIDITY C.F. .8045

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7165 | 8085 | 8318 | 7164 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 183.8 ( 6491) | 207.0 ( 7312) | 211.4 ( 7465) | 183.6 ( 6484) |
| HC SAMPLE METER/RANGE/PPM | 26.1/ 3/ 261 | 16.9/ 3/ 169 | 22.3/ 3/ 223 | 13.4/ 3/ 134 |
| HC BCKGRD METER/RANGE/PPM | 1.0/ 3/ 10 | 1.1/ 3/ 11 | 1.2/ 3/ 12 | 1.2/ 3/ 12 |
| CO SAMPLE METER/RANGE/PPM | 29.7/ 3/ 878 | 44.5/ 3/ 1311 | 94.9/ 3/ 2759 | 28.8/ 3/ 852 |
| CO BCKGRD METER/RANGE/PPM | 1.0/ 3/ 31 | 1.2/ 3/ 37 | 1.3/ 3/ 40 | 1.5/ 3/ 46 |
| CO2 SAMPLE METER/RANGE/PCT | 16.5/ 3/ .26 | 27.5/ 3/ .45 | 61.9/ 3/ 1.09 | 16.1/ 3/ .26 |
| CO2 BCKGRD METER/RANGE/PCT | 2.8/ 3/ .04 | 2.5/ 3/ .04 | 3.3/ 3/ .05 | 2.9/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 12.2/ 2/ 12 | 25.6/ 2/ 26 | 89.6/ 2/ 90 | 11.1/ 2/ 11 |
| NOX BCKGRD METER/RANGE/PPM | .3/ 2/ 0 | .3/ 2/ 0 | .4/ 2/ 0 | .5/ 2/ 1 |
| DILUTION FACTUR | 35.55 | 22.37 | 9.69 | 37.76 |
| HC CONCENTRATION PPM | 251 | 158 | 212 | 122 |
| CO CONCENTRATION PPM | 839 | 1258 | 2651 | 799 |
| CO2 CONCENTRATION PCT | .22 | .42 | 1.05 | .21 |
| NOX CONCENTRATION PPM | 11.9 | 25.3 | 89.2 | 10.6 |
| HC MASS GRAMS | 26.64 | 18.92 | 25.87 | 12.95 |
| CO MASS GRAMS | 179.62 | 303.17 | 652.45 | 170.74 |
| CO2 MASS GRAMS | 748.1 | 1578.6 | 4050.1 | 719.5 |
| NOX MASS GRAMS | 3.37 | 8.06 | 29.03 | 3.00 |
| FUEL KG (LB) | .351 ( .77) | .667 ( 1.47) | 1.626 ( 3.58) | .324 ( .72) |
| KW HR (HP HR) | .59 ( .79) | 1.46 ( 1.96) | 5.02 ( 6.74) | .58 ( .78) |
| BSHC G/KW HR (G/HP HR) | 45.12 ( 33.64) | 12.94 ( 9.65) | 5.15 ( 3.84) | 22.28 ( 16.61) |
| BSCO G/KW HR (G/HP HR) | 304.24 ( 226.87) | 207.32 ( 154.60) | 129.90 ( 96.86) | 293.72 ( 219.02) |
| BSCO2 G/KW HR (G/HP HR) | 1267.19 ( 944.94) | 1079.49 ( 804.97) | 806.35 ( 601.30) | 1237.78 ( 923.01) |
| BSNOX G/KW HR (G/HP HR) | 5.70 ( 4.25) | 5.51 ( 4.11) | 5.78 ( 4.31) | 5.16 ( 3.85) |
| BSFC KG/KW HR (LB/HP HR) | .595 ( .979) | .456 ( .750) | .324 ( .532) | .558 ( .917) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 7.66 ( 10.27) |
| BSHC G/KW HR (G/HP HR) | 11.02 ( 8.22) |
| BSCO G/KW HR (G/HP HR) | 170.56 (127.19) |
| BSCO2 G/KW HR (G/HP HR) | 927 ( 691) |
| BSNOX G/KW HR (G/HP HR) | 5.68 ( 4.23) |
| BSFC KG/KW HR (LB/HP HR) | .388 ( .637) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE B-11B. TEST 9-3 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.CH366
ENGINE MODEL -0 CHEV 366
ENGINE 6.0 L(366 CID) V-8
CVS NO. 9

TEST NO. 9-3 RUN
DATE 3/19/79
TIME 09:11
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 738.12 MM HG(29.06 IN HG)
DRY BULB TEMP. 28.9 DEG C(84.0 DEG F)

RELATIVE HUMIDITY 53 PCT
ABSOLUTE HUMIDITY 13.6 GM/KG( 95.5 GRAINS/LB)

NOX HUMIDITY C.F. 1.1068

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7165 | 8085 | 8319 | 7164 |
| TIME SECONDS | 271.9 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 181.3 ( 6403) | 204.2 ( 7212) | 208.5 ( 7364) | 181.1 ( 6396) |
| HC SAMPLE METER/RANGE/PPM | 46.2/ 3/ 462 | 24.5/ 3/ 245 | 36.5/ 3/ 365 | 14.6/ 3/ 146 |
| HC BCKGRD METER/RANGE/PPM | 4.0/ 3/ 40 | 3.1/ 3/ 31 | 2.7/ 3/ 27 | 2.5/ 3/ 25 |
| CO SAMPLE METER/RANGE/PPM | 33.7/ 3/ 995 | 47.6/ 3/ 1402 | 52.8/ 2/ 3414 | 30.7/ 3/ 907 |
| CO BCKGRD METER/RANGE/PPM | .6/ 3/ 18 | .6/ 3/ 18 | 1.8/ 3/ 55 | 1.0/ 3/ 31 |
| CO2 SAMPLE METER/RANGE/PCT | 18.6/ 3/ .30 | 29.6/ 3/ .49 | 63.0/ 3/ 1.11 | 15.6/ 3/ .25 |
| CO2 BCKGRD METER/RANGE/PCT | 2.8/ 3/ .04 | 2.7/ 3/ .04 | 2.6/ 3/ .04 | 2.3/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 8.7/ 2/ 9 | 25.0/ 2/ 25 | 64.3/ 2/ 64 | 7.6/ 2/ 8 |
| NOX BCKGRD METER/RANGE/PPM | .4/ 2/ 0 | .1/ 2/ 0 | 1.2/ 2/ 1 | 1.3/ 2/ 1 |
| DILUTION FACTOR | 30.27 | 20.59 | 9.07 | 38.05 |
| HC CONCENTRATION PPM | 423 | 216 | 341 | 122 |
| CO CONCENTRATION PPM | 959 | 1347 | 3234 | 858 |
| CO2 CONCENTRATION PCT | .26 | .45 | 1.08 | .21 |
| NOX CONCENTRATION PPM | 8.3 | 24.9 | 63.2 | 6.3 |
| HC MASS GRAMS | 44.26 | 25.38 | 41.00 | 12.71 |
| CO MASS GRAMS | 201.47 | 320.38 | 785.16 | 180.91 |
| CO2 MASS GRAMS | 856.1 | 1685.1 | 4115.7 | 711.9 |
| NOX MASS GRAMS | 3.19 | 10.77 | 27.91 | 2.93 |
| FUEL KG (LB) | .414 ( .91) | .715 ( 1.58) | 1.727 ( 3.81) | .327 ( .72) |
| KW HR (HP HR) | .64 ( .86) | 1.47 ( 1.97) | 4.91 ( 6.58) | .57 ( .77) |
| BSHC G/KW HR (G/HP HR) | 69.12 ( 51.54) | 17.25 ( 12.86) | 8.35 ( 6.23) | 22.21 ( 16.56) |
| BSCO G/KW HR (G/HP HR) | 314.63 ( 234.62) | 217.74 ( 162.37) | 159.93 ( 119.26) | 316.16 ( 235.76) |
| BSCO2 G/KW HR (G/HP HR) | 1336.93 ( 996.95) | 1145.22 ( 853.99) | 838.36 ( 625.17) | 1244.08 ( 927.71) |
| BSNOX G/KW HR (G/HP HR) | 4.98 ( 3.72) | 7.32 ( 5.46) | 5.69 ( 4.24) | 4.24 ( 3.16) |
| BSFC KG/KW HR (LB/HP HR) | .646 ( 1.063) | .486 ( .799) | .352 ( .578) | .571 ( .939) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 7.59 ( 10.18) |
| BSHC G/KW HR (G/HP HR) | 16.24 ( 12.11) |
| BSCO G/KW HR (G/HP HR) | 195.95 (146.12) |
| BSCO2 G/KW HR (G/HP HR) | 970 ( 724) |
| BSNOX G/KW HR (G/HP HR) | 5.83 ( 4.35) |
| BSFC KG/KW HR (LB/HP HR) | .419 ( .689) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE B-11B (CONT'D). TEST 9-3 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.CH366
ENGINE MODEL -0 CHEV 366
ENGINE 6.0 L(366 CID) V-8
CVS NO. 4

TEST NO. 9-3 RUN
DATE 3/19/79
TIME 09:50 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 2

BAROMETER 738.12 MM HG(29.06 IN HG)
DRY BULB TEMP. 31.1 DEG C(88.0 DEG F)

RELATIVE HUMIDITY 44 PCT
ABSOLUTE HUMIDITY 13.0 GM/KG( 90.8 GRAINS/LB) — NOX HUMIDITY C.F. 1.0805

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 469.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 52.2 (126.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7163 | 8084 | 8316 | 7162 |
| TIME SECONDS | 272.0 | 306.9 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 181.2 ( 6401) | 205.5 ( 7257) | 208.4 ( 7361) | 181.0 ( 6394) |
| HC SAMPLE METER/RANGE/PPM | 16.9/ 3/ 169 | 17.3/ 3/ 173 | 26.0/ 3/ 260 | 16.5/ 3/ 165 |
| HC BCKGRD METER/RANGE/PPM | 1.9/ 3/ 19 | 2.0/ 3/ 20 | 1.6/ 3/ 16 | 1.8/ 3/ 18 |
| CO SAMPLE METER/RANGE/PPM | 27.0/ 3/ 799 | 44.0/ 3/ 1296 | 51.9/ 2/ 3354 | 29.5/ 3/ 872 |
| CO BCKGRD METER/RANGE/PPM | .8/ 3/ 24 | .8/ 3/ 24 | 1.0/ 3/ 31 | .9/ 3/ 28 |
| CO2 SAMPLE METER/RANGE/PCT | 18.0/ 3/ .29 | 29.1/ 3/ .48 | 63.5/ 3/ 1.12 | 16.4/ 3/ .26 |
| CO2 BCKGRD METER/RANGE/PCT | 2.6/ 3/ .04 | 3.0/ 3/ .05 | 3.4/ 3/ .05 | 2.7/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 10.6/ 2/ 11 | 23.1/ 2/ 23 | 70.3/ 2/ 70 | 8.0/ 2/ 8 |
| NOX BCKGRD METER/RANGE/PPM | .2/ 2/ 0 | .5/ 2/ 1 | .6/ 2/ 1 | .9/ 2/ 1 |
| DILUTION FACTOR | 34.86 | 21.44 | 9.10 | 36.79 |
| HC CONCENTRATION PPM | 151 | 154 | 246 | 147 |
| CO CONCENTRATION PPM | 760 | 1242 | 3207 | 829 |
| CO2 CONCENTRATION PCT | .25 | .44 | 1.08 | .22 |
| NOX CONCENTRATION PPM | 10.4 | 22.6 | 69.8 | 7.1 |
| HC MASS GRAMS | 15.74 | 18.24 | 29.54 | 15.40 |
| CO MASS GRAMS | 160.35 | 297.27 | 778.22 | 174.71 |
| CO2 MASS GRAMS | 831.5 | 1645.4 | 4109.8 | 736.2 |
| NOX MASS GRAMS | 3.90 | 4.61 | 30.05 | 2.67 |
| FUEL KG (LB) | .357 ( .79) | .684 ( 1.51) | 1.711 ( 3.77) | .334 ( .74) |
| KW HR (HP HR) | .61 ( .82) | 1.44 ( 1.93) | 4.91 ( 6.58) | .58 ( .77) |
| BSHC G/KW HR (G/HP HR) | 25.86 ( 19.28) | 12.67 ( 9.45) | 6.02 ( 4.49) | 26.70 ( 19.91) |
| BSCO G/KW HR (G/HP HR) | 263.50 ( 196.49) | 206.49 ( 153.98) | 158.52 ( 118.21) | 302.92 ( 225.89) |
| BSCO2 G/KW HR (G/HP HR) | 1366.39 (1018.92) | 1142.91 ( 852.27) | 837.14 ( 624.26) | 1276.52 ( 951.90) |
| BSNOX G/KW HR (G/HP HR) | 6.40 ( 4.78) | 6.67 ( 4.98) | 6.12 ( 4.56) | 4.62 ( 3.45) |
| BSFC KG/KW HR (LB/HP HR) | .587 ( .965) | .475 ( .781) | .348 ( .573) | .579 ( .952) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 7.53 ( 10.10) |
| BSHC G/KW HR (G/HP HR) | 10.47 ( 7.81) |
| BSCO G/KW HR (G/HP HR) | 187.22 (139.61) |
| BSCO2 G/KW HR (G/HP HR) | 972 ( 725) |
| BSNOX G/KW HR (G/HP HR) | 6.14 ( 4.57) |
| BSFC KG/KW HR (LB/HP HR) | .410 ( .673) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE B-12A. TEST 13-2 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.F 360
ENGINE MODEL -U FORD 360
ENGINE 5.9 L(360 CID) V-8
CVS NO. 9

TEST NO. 13-2 RUN
DATE 6/26/79
TIME 09:06
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 1

BAROMETER 744.73 MM HG(29.32 IN HG)
DRY BULB TEMP. 27.8 DEG C(82.0 DEG F)

RELATIVE HUMIDITY 53 PCT
ABSOLUTE HUMIDITY 12.5 GM/KG( 87.8 GRAINS/LB)

NOX HUMIDITY C.F. 1.0639

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7163 | 8083 | 8313 | 7162 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 182.9 ( 6461) | 206.1 ( 7279) | 210.3 ( 7428) | 182.7 ( 6454) |
| HC SAMPLE METER/RANGE/PPM | 32.7/ 3/ 327 | 20.2/ 3/ 202 | 24.3/ 3/ 243 | 12.7/ 3/ 127 |
| HC BCKGRD METER/RANGE/PPM | 2.5/ 3/ 25 | 2.4/ 3/ 24 | 2.5/ 3/ 25 | 2.3/ 3/ 23 |
| CO SAMPLE METER/RANGE/PPM | 40.3/ 3/ 962 | 45.7/ 3/ 1097 | 59.6/ 2/ 3022 | 34.4/ 3/ 811 |
| CO BCKGRD METER/RANGE/PPM | .1/ 3/ 2 | .1/ 3/ 2 | .2/ 2/ 8 | .4/ 3/ 9 |
| CO2 SAMPLE METER/RANGE/PCT | 20.8/ 3/ .34 | 32.1/ 3/ .53 | 73.9/ 3/ 1.34 | 20.6/ 3/ .33 |
| CO2 BCKGRD METER/RANGE/PCT | 3.4/ 3/ .05 | 3.6/ 3/ .06 | 4.3/ 3/ .07 | 4.1/ 3/ .06 |
| NOX SAMPLE METER/RANGE/PPM | 7.3/ 2/ 7 | 21.8/ 2/ 22 | 92.1/ 2/ 92 | 13.4/ 2/ 13 |
| NOX BCKGRD METER/RANGE/PPM | .9/ 2/ 1 | 1.0/ 2/ 1 | 1.5/ 2/ 2 | 1.7/ 2/ 2 |
| DILUTION FACTOR | 29.01 | 20.30 | 8.08 | 31.62 |
| HC CONCENTRATION PPM | 303 | 179 | 221 | 105 |
| CO CONCENTRATION PPM | 938 | 1065 | 2886 | 783 |
| CO2 CONCENTRATION PCT | .28 | .48 | 1.29 | .27 |
| NOX CONCENTRATION PPM | 6.4 | 20.8 | 90.8 | 11.8 |
| HC MASS GRAMS | 31.96 | 21.30 | 26.82 | 11.04 |
| CO MASS GRAMS | 199.72 | 255.65 | 706.76 | 166.71 |
| CO2 MASS GRAMS | 954.6 | 1814.4 | 4953.2 | 906.5 |
| NOX MASS GRAMS | 2.39 | 8.74 | 38.86 | 4.37 |
| FUEL KG (LB) | .432 ( .95) | .720 ( 1.59) | 1.938 ( 4.27) | .379 ( .84) |
| KW HR (HP HR) | .60 ( .81) | 1.60 ( 2.15) | 5.35 ( 7.18) | .73 ( .98) |
| BSHC G/KW HR (G/HP HR) | 53.14 ( 39.63) | 13.30 ( 9.92) | 5.01 ( 3.74) | 15.14 ( 11.29) |
| BSCO G/KW HR (G/HP HR) | 332.12 ( 247.66) | 159.66 ( 119.06) | 132.05 ( 98.47) | 228.63 ( 170.49) |
| BSCO2 G/KW HR (G/HP HR) | 1587.44 (1183.75) | 1139.19 ( 845.02) | 925.45 ( 690.11) | 1243.26 ( 927.10) |
| BSNOX G/KW HR (G/HP HR) | 3.98 ( 2.97) | 5.46 ( 4.07) | 7.26 ( 5.41) | 5.99 ( 4.47) |
| BSFC KG/KW HR (LB/HP HR) | .718 ( 1.181) | .450 ( .739) | .362 ( .595) | .520 ( .855) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.28 ( 11.11) |
| BSHC G/KW HR (G/HP HR) | 11.00 ( 8.20) |
| BSCO G/KW HR (G/HP HR) | 160.41 (119.62) |
| BSCO2 G/KW HR (G/HP HR) | 1042 ( 777) |
| BSNOX G/KW HR (G/HP HR) | 6.56 ( 4.89) |
| BSFC KG/KW HR (LB/HP HR) | .419 ( .689) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

*20 X 20 FILTERS*

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE B-12A (CONT'D). TEST 13-2 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.F 360
ENGINE MODEL -0 FORD 360
ENGINE 5.9 L(360 CID) V-8
CVS NO. 9

TEST NO. 13-2 RUN
DATE 6/26/79
TIME 09:46 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 1

BAROMETER 744.73 MM HG(29.32 IN HG)
DRY BULB TEMP. 28.3 DEG C(83.0 DEG F)

RELATIVE HUMIDITY 54 PCT
ABSOLUTE HUMIDITY 13.3 GM/KG( 93.4 GRAINS/LB) — NOX HUMIDITY C.F. 1.0444

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7161 | 8081 | 8313 | 7161 |
| TIME SECONDS | 272.0 | 305.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 182.9 ( 6460) | 206.0 ( 7277) | 210.3 ( 7428) | 182.7 ( 6454) |
| HC SAMPLE METER/RANGE/PPM | 13.8/ 3/ 138 | 14.3/ 3/ 143 | 22.4/ 3/ 224 | 12.2/ 3/ 122 |
| HC BCKGRD METER/RANGE/PPM | 2.5/ 3/ 25 | 2.2/ 3/ 22 | 2.2/ 3/ 22 | 2.6/ 3/ 26 |
| CO SAMPLE METER/RANGE/PPM | 29.7/ 3/ 572 | 29.6/ 3/ 691 | 92.5/ 3/ 2631 | 30.7/ 3/ 719 |
| CO BCKGRD METER/RANGE/PPM | .2/ 3/ 5 | .4/ 3/ 9 | .3/ 3/ 7 | .5/ 3/ 11 |
| CO2 SAMPLE METER/RANGE/PCT | 19.7/ 3/ .32 | 32.4/ 3/ .54 | 71.9/ 3/ 1.30 | 19.3/ 3/ .31 |
| CO2 BCKGRD METER/RANGE/PCT | .2/ 3/ .06 | 3.8/ 3/ .06 | 3.8/ 3/ .06 | .2/ 3/ .06 |
| NOX SAMPLE METER/RANGE/PPM | 11.9/ 2/ 12 | 27.3/ 2/ 27 | 96.6/ 2/ 97 | 12.4/ 2/ 12 |
| NOX BCKGRD METER/RANGE/PPM | 1.4/ 2/ 1 | 1.4/ 2/ 1 | 1.6/ 2/ 2 | 1.8/ 2/ 2 |
| DILUTION FACTOR | 34.70 | 21.61 | 8.50 | 34.17 |
| HC CONCENTRATION PPM | 114 | 122 | 205 | 97 |
| CO CONCENTRATION PPM | 554 | 664 | 2513 | 691 |
| CO2 CONCENTRATION PCT | .25 | .48 | 1.25 | .25 |
| NOX CONCENTRATION PPM | 10.5 | 26.0 | 95.2 | 10.7 |
| HC MASS GRAMS | 12.00 | 14.50 | 24.82 | 10.20 |
| CO MASS GRAMS | 118.04 | 154.23 | 615.42 | 147.01 |
| CO2 MASS GRAMS | 850.4 | 1822.7 | 4820.4 | 827.0 |
| NOX MASS GRAMS | 4.04 | 11.20 | 41.91 | 4.08 |
| FUEL KG (LB) | .339 ( .75) | .668 ( 1.47) | 1.849 ( 4.08) | .344 ( .76) |
| KW HR (HP HR) | .74 ( .99) | 1.62 ( 2.18) | 5.34 ( 7.17) | .74 ( 1.00) |
| BSHC G/KW HR (G/HP HR) | 16.28 ( 12.14) | 8.93 ( 6.66) | 4.64 ( 3.46) | 13.70 ( 10.22) |
| BSCO G/KW HR (G/HP HR) | 160.23 ( 119.49) | 98.07 ( 73.13) | 115.15 ( 85.86) | 197.54 ( 147.30) |
| BSCO2 G/KW HR (G/HP HR) | 1154.34 ( 860.79) | 1122.56 ( 837.09) | 901.90 ( 672.55) | 1111.30 ( 828.70) |
| BSNOX G/KW HR (G/HP HR) | 5.48 ( 4.09) | 6.90 ( 5.14) | 7.84 ( 5.85) | 5.48 ( 4.08) |
| BSFC KG/KW HR (LB/HP HR) | .460 ( .755) | .411 ( .676) | .346 ( .569) | .462 ( .759) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.45 ( 11.33) |
| BSHC G/KW HR (G/HP HR) | 7.28 ( 5.43) |
| BSCO G/KW HR (G/HP HR) | 123.05 ( 91.76) |
| BSCO2 G/KW HR (G/HP HR) | 985 ( 734) |
| BSNOX G/KW HR (G/HP HR) | 7.25 ( 5.40) |
| BSFC KG/KW HR (LB/HP HR) | .379 ( .623) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE B-12B. TEST 13-3 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.F 360
ENGINE MODEL -0 FORD 360
ENGINE 5.9 L(360 CID) V-8
CVS NO. 9

TEST NO. 13-3 RUN
DATE 6/27/79
TIME 08:51 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 1

BAROMETER 745.29 MM HG(29.34 IN HG)
DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)

RELATIVE HUMIDITY 53 PCT
ABSOLUTE HUMIDITY 11.1 GM/KG( 78.0 GRAINS/LB) — NOX HUMIDITY C.F. 1.0141

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7163 | 8084 | 8313 | 7160 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 183.1 ( 6466) | 206.2 ( 7285) | 210.5 ( 7434) | 182.8 ( 6457) |
| HC SAMPLE METER/RANGE/PPM | 42.5/ 3/ 425 | 22.1/ 3/ 221 | 25.3/ 3/ 253 | 13.9/ 3/ 139 |
| HC BCKGRD METER/RANGE/PPM | 2.2/ 3/ 22 | 2.2/ 3/ 22 | 2.3/ 3/ 23 | 2.1/ 3/ 21 |
| CO SAMPLE METER/RANGE/PPM | 42.7/ 3/ 1025 | 48.8/ 3/ 1190 | 61.0/ 2/ 3119 | 34.2/ 3/ 806 |
| CO BCKGRD METER/RANGE/PPM | .1/ 3/ 2 | .2/ 3/ 5 | .1/ 2/ 4 | .4/ 3/ 9 |
| CO2 SAMPLE METER/RANGE/PCT | 20.0/ 3/ .32 | 32.0/ 3/ .53 | 72.5/ 3/ 1.32 | 19.6/ 3/ .31 |
| CO2 BCKGRD METER/RANGE/PCT | 3.5/ 3/ .05 | 3.7/ 3/ .06 | 4.1/ 3/ .06 | 3.9/ 3/ .06 |
| NOX SAMPLE METER/RANGE/PPM | 8.0/ 2/ 8 | 23.2/ 2/ 23 | 94.9/ 2/ 95 | 13.2/ 2/ 13 |
| NOX BCKGRD METER/RANGE/PPM | 1.1/ 2/ 1 | 1.1/ 2/ 1 | 1.3/ 2/ 1 | 1.1/ 2/ 1 |
| DILUTION FACTOR | 28.86 | 20.02 | 8.17 | 32.89 |
| HC CONCENTRATION PPM | 404 | 200 | 233 | 119 |
| CO CONCENTRATION PPM | 999 | 1153 | 2983 | 779 |
| CO2 CONCENTRATION PCT | .27 | .48 | 1.26 | .26 |
| NOX CONCENTRATION PPM | 6.9 | 22.2 | 93.8 | 12.1 |
| HC MASS GRAMS | 42.63 | 23.80 | 28.26 | 12.51 |
| CO MASS GRAMS | 212.99 | 276.91 | 731.20 | 165.75 |
| CO2 MASS GRAMS | 904.7 | 1803.7 | 4856.4 | 859.9 |
| NOX MASS GRAMS | 2.96 | 8.86 | 38.28 | 4.30 |
| FUEL KG (LB) | .433 ( .96) | .730 ( 1.61) | 1.921 ( 4.24) | .366 ( .81) |
| KW HR (HP HR) | .67 ( .90) | 1.63 ( 2.19) | 5.37 ( 7.21) | .75 ( 1.01) |
| BSHC G/KW HR (G/HP HR) | 63.72 ( 47.52) | 14.59 ( 10.88) | 5.26 ( 3.92) | 16.64 ( 12.41) |
| BSCO G/KW HR (G/HP HR) | 318.36 ( 237.40) | 164.76 ( 126.59) | 136.04 ( 101.45) | 220.49 ( 164.42) |
| BSCO2 G/KW HR (G/HP HR) | 1352.29 (1008.40) | 1105.76 ( 824.56) | 903.56 ( 673.79) | 1143.91 ( 853.01) |
| BSNOX G/KW HR (G/HP HR) | 3.68 ( 2.75) | 5.43 ( 4.05) | 7.12 ( 5.31) | 5.72 ( 4.27) |
| BSFC KG/KW HR (LB/HP HR) | .648 ( 1.065) | .447 ( .735) | .357 ( .588) | .486 ( .800) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.43 ( 11.30) |
| BSHC G/KW HR (G/HP HR) | 12.72 ( 9.49) |
| BSCO G/KW HR (G/HP HR) | 164.58 (122.73) |
| BSCO2 G/KW HR (G/HP HR) | 1000 ( 746) |
| BSNOX G/KW HR (G/HP HR) | 6.40 ( 4.77) |
| BSFC KG/KW HR (LB/HP HR) | .409 ( .673) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE B-12B (CONT'D). TEST 13-3 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.F 360
ENGINE MODEL -0 FORD 360
ENGINE 5.9 L(360 CID) V-8
CVS NO. 9

TEST NO. 13-3 RUN
DATE 6/27/79
TIME 09:31 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 1

BAROMETER 745.24 MM HG(29.34 IN HG)
DRY BULB TEMP. 28.3 DEG C(83.0 DEG F)

RELATIVE HUMIDITY 51 PCT
ABSOLUTE HUMIDITY 12.5 GM/KG( 87.7 GRAINS/LB) — NOX HUMIDITY C.F. 1.0633

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7161 | 8082 | 8312 | 7160 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 183.0 ( 6464) | 206.2 ( 7283) | 210.4 ( 7433) | 182.8 ( 6457) |
| HC SAMPLE METER/RANGE/PPM | 14.8/ 3/ 148 | 15.3/ 3/ 153 | 24.0/ 3/ 240 | 13.0/ 3/ 130 |
| HC BCKGRD METER/RANGE/PPM | 2.3/ 3/ 23 | 2.1/ 3/ 21 | 2.1/ 3/ 21 | 2.4/ 3/ 24 |
| CO SAMPLE METER/RANGE/PPM | 25.1/ 3/ 582 | 29.7/ 3/ 694 | 95.5/ 3/ 2752 | 31.7/ 3/ 743 |
| CO BCKGRD METER/RANGE/PPM | .4/ 3/ 9 | .4/ 3/ 9 | .5/ 3/ 11 | .8/ 3/ 18 |
| CO2 SAMPLE METER/RANGE/PCT | 19.0/ 3/ .30 | 32.2/ 3/ .54 | 70.9/ 3/ 1.28 | 19.1/ 3/ .31 |
| CO2 BCKGRD METER/RANGE/PCT | 3.7/ 3/ .06 | 3.7/ 3/ .06 | 3.8/ 3/ .06 | 3.9/ 3/ .06 |
| NOX SAMPLE METER/RANGE/PPM | 11.6/ 2/ 12 | 27.4/ 2/ 27 | 95.1/ 2/ 95 | 12.3/ 2/ 12 |
| NOX BCKGRD METER/RANGE/PPM | .9/ 2/ 1 | 1.0/ 2/ 1 | 1.1/ 2/ 1 | 1.5/ 2/ 2 |
| DILUTION FACTOR | 35.60 | 21.69 | 8.53 | 34.18 |
| HC CONCENTRATION PPM | 126 | 133 | 221 | 107 |
| CO CONCENTRATION PPM | 560 | 667 | 2629 | 709 |
| CO2 CONCENTRATION PCT | .25 | .48 | 1.23 | .25 |
| NOX CONCENTRATION PPM | 10.7 | 26.4 | 94.1 | 10.8 |
| HC MASS GRAMS | 13.26 | 15.81 | 26.88 | 11.25 |
| CO MASS GRAMS | 119.37 | 160.11 | 699.37 | 151.04 |
| CO2 MASS GRAMS | 836.4 | 1816.0 | 4744.5 | 831.3 |
| NOX MASS GRAMS | 3.99 | 11.09 | 40.29 | 4.03 |
| FUEL KG (LB) | .336 ( .74) | .668 ( 1.47) | 1.842 ( 4.06) | .348 ( .77) |
| KW HR (HP HR) | .73 ( .98) | 1.62 ( 2.18) | 5.36 ( 7.19) | .74 ( .99) |
| BSHC G/KW HR (G/HP HR) | 18.19 ( 13.56) | 9.74 ( 7.26) | 5.02 ( 3.74) | 15.27 ( 11.39) |
| BSCO G/KW HR (G/HP HR) | 163.70 ( 122.07) | 98.61 ( 73.53) | 120.22 ( 89.65) | 205.03 ( 152.89) |
| BSCO2 G/KW HR (G/HP HR) | 1147.10 ( 855.39) | 1118.46 ( 834.03) | 885.21 ( 660.10) | 1128.49 ( 841.51) |
| BSNOX G/KW HR (G/HP HR) | 5.48 ( 4.08) | 6.83 ( 5.09) | 7.52 ( 5.61) | 5.47 ( 4.08) |
| BSFC KG/KW HR (LB/HP HR) | .461 ( .758) | .411 ( .676) | .344 ( .565) | .473 ( .777) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.45 ( 11.33) |
| BSHC G/KW HR (G/HP HR) | 7.95 ( 5.93) |
| BSCO G/KW HR (G/HP HR) | 127.22 ( 94.87) |
| BSCO2 G/KW HR (G/HP HR) | 974 ( 726) |
| BSNOX G/KW HR (G/HP HR) | 7.03 ( 5.24) |
| BSFC KG/KW HR (LB/HP HR) | .378 ( .621) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE B-13A. ENGINE 2 NINE-MODE EMISSIONS RESULTS

10 11 78 TEST 21 DUR HRS 1969 IH304 --- PROJECT 11-5044-001 BAR= 29.10 K= 1.076 HUM= 14.1 G/KG IH304

| MODE | CONCENTRATION AS MEASURED HC-FID | CO | CO2 | NOX-CL | TOTAL CARBON | FUEL G/HR | CALCULATED HC | G/HR CO | / NOX | WT. FACT. | -----MODAL G/KWHR----- HC-FID | CO | NOX-CL | KW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | 22480 | 9.220 | 6.56 | 0 | 18.272 | 2767 | 377 | 2820 | 0 | .232 | R | R | I | 0.0 |
| 2 25 PCT T | 2880 | 2.000 | 13.22 | 573 | 15.549 | 7711 | 163 | 2004 | 102 | .077 | 7.646 | 93.952 | 4.761 | 15.9 |
| 3 55 PCT T | 2560 | .920 | 13.84 | 1849 | 15.052 | 10886 | 211 | 1344 | 478 | .147 | 4.584 | 29.170 | 10.370 | 34.4 |
| 4 25 PCT T | 2000 | 1.940 | 13.47 | 677 | 15.639 | 7303 | 107 | 1830 | 113 | .077 | 5.194 | 88.991 | 5.493 | 15.3 |
| 5 10 PCT T | 1800 | 2.570 | 13.10 | 250 | 15.876 | 5670 | 74 | 1854 | 32 | .057 | 8.395 | 211.685 | 3.642 | 6.5 |
| 6 25 PCT T | 1880 | 1.890 | 13.39 | 746 | 15.495 | 7257 | 101 | 1788 | 125 | .077 | 4.985 | 88.600 | 6.186 | 15.1 |
| 7 90 PCT T | 2080 | 3.080 | 12.90 | 1190 | 16.218 | 17146 | 252 | 6577 | 450 | .113 | 3.425 | 89.495 | 6.116 | 54.8 |
| 8 25 PCT T | 1880 | 2.000 | 13.42 | 768 | 15.635 | 7121 | 98 | 1840 | 125 | .077 | 4.851 | 91.174 | 6.193 | 15.1 |
| 9 C.T. | 137600 | 5.450 | 3.72 | 10 | 23.806 | 2858 | 1757 | 1322 | 0 | .143 | R | R | R | 0.0 |
| 1 25 PCT T | 2200 | 1.980 | 13.34 | 704 | 15.571 | 7212 | 116 | 1852 | 117 | .077 | 5.559 | 88.447 | 5.563 | 15.6 |
| 2 55 PCT T | 2000 | 1.060 | 13.66 | 1973 | 14.948 | 10569 | 161 | 1514 | 498 | .147 | 3.498 | 32.855 | 10.817 | 34.4 |
| 3 25 PCT T | 2000 | 2.050 | 13.34 | 684 | 15.619 | 7121 | 104 | 1888 | 111 | .077 | 5.069 | 91.818 | 5.419 | 15.3 |
| 4 10 PCT T | 2000 | 2.770 | 12.97 | 211 | 15.969 | 5488 | 79 | 1923 | 26 | .057 | 8.976 | 219.573 | 2.959 | 6.5 |
| 5 25 PCT T | 1920 | 2.030 | 13.34 | 677 | 15.589 | 7212 | 102 | 1897 | 112 | .077 | 4.760 | 88.958 | 5.248 | 15.9 |
| 6 90 PCT T | 2080 | 3.180 | 12.80 | 1081 | 16.218 | 17191 | 252 | 6809 | 409 | .113 | 3.381 | 91.227 | 5.486 | 55.7 |
| 7 25 PCT T | 1920 | 2.120 | 13.34 | 677 | 15.680 | 7076 | 99 | 1933 | 109 | .077 | 4.730 | 92.273 | 5.212 | 15.6 |
| 8 C.T. | 143360 | 5.360 | 3.71 | 12 | 24.312 | 2812 | 1763 | 1252 | 0 | .143 | R | R | R | 0.0 |
| 9 IDLE | 21000 | 9.960 | 7.08 | 7 | 19.385 | 2676 | 324 | 2777 | 0 | .232 | R | R | R | 0.0 |

| MODE | ID | ----UNITS AS SPECIFIED IN THE 9-08-77 PROCEDURE---- HP | TQ | FC | BSFC | BSNOX | F/A | SFC KG/KW HR | RPM | CALC A/F | --------PERCENT OF TOTAL------- HC | CO | NOX | FUEL | POWER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | | 0.0 | 0 | 6.1 | R | I | .093 | R | 600 | 10.7 | 20.0 | 26.6 | 0.0 | 8.9 | 0.0 |
| 2 25 PCT T | | 21.3 | 56 | 17.0 | .797 | 4.8 | .071 | .485 | 2000 | 14.1 | 2.9 | 6.3 | 4.9 | 8.3 | 7.5 |
| 3 55 PCT T | | 46.1 | 121 | 24.0 | .521 | 10.4 | .068 | .317 | 2000 | 14.7 | 7.1 | 8.0 | 44.3 | 22.3 | 30.9 |
| 4 25 PCT T | | 20.6 | 54 | 16.1 | .783 | 5.5 | .071 | .476 | 2000 | 14.0 | 1.9 | 5.7 | 5.5 | 7.8 | 7.2 |
| 5 10 PCT T | | 8.8 | 23 | 12.5 | 1.427 | 3.6 | .073 | .868 | 2000 | 13.8 | 1.0 | 4.3 | 1.1 | 4.5 | 2.3 |
| 6 25 PCT T | | 20.2 | 53 | 16.0 | .793 | 6.2 | .071 | .482 | 2000 | 14.2 | 1.8 | 5.6 | 6.1 | 7.8 | 7.1 |
| 7 90 PCT T | | 73.5 | 193 | 37.8 | .514 | 6.1 | .075 | .313 | 2000 | 13.4 | 6.5 | 30.2 | 32.0 | 27.0 | 37.9 |
| 8 25 PCT T | | 20.2 | 53 | 15.7 | .778 | 6.2 | .071 | .473 | 2000 | 14.0 | 1.7 | 5.7 | 6.1 | 7.6 | 7.1 |
| 9 C.T. | | 0.0 | 0 | 6.3 | R | R | .137 | R | 2000 | 7.3 | 57.3 | 7.7 | .0 | 5.7 | 0.0 |
| 1 25 PCT T | | 20.9 | 55 | 15.9 | .759 | 5.6 | .071 | .462 | 2000 | 14.1 | 2.2 | 5.7 | 5.8 | 7.9 | 7.3 |
| 2 55 PCT T | | 46.1 | 121 | 23.3 | .506 | 10.8 | .068 | .308 | 2000 | 14.7 | 5.7 | 8.9 | 47.0 | 22.1 | 30.6 |
| 3 25 PCT T | | 20.6 | 54 | 15.7 | .763 | 5.4 | .071 | .464 | 2000 | 14.0 | 1.9 | 5.8 | 5.5 | 7.8 | 7.1 |
| 4 10 PCT T | | 8.8 | 23 | 12.1 | 1.381 | 3.0 | .073 | .840 | 2000 | 13.6 | 1.1 | 4.4 | .9 | 4.4 | 2.3 |
| 5 25 PCT T | | 21.3 | 56 | 15.9 | .746 | 5.2 | .071 | .454 | 2000 | 14.1 | 1.9 | 5.8 | 5.5 | 7.9 | 7.4 |
| 6 90 PCT T | | 74.6 | 196 | 37.9 | .508 | 5.5 | .075 | .309 | 2000 | 13.4 | 6.8 | 30.7 | 29.7 | 27.6 | 38.1 |
| 7 25 PCT T | | 20.9 | 55 | 15.6 | .745 | 5.2 | .072 | .453 | 2000 | 14.0 | 1.8 | 5.9 | 5.4 | 7.7 | 7.3 |
| 8 C.T. | | 0.0 | 0 | 6.2 | R | R | .141 | R | 2000 | 7.1 | 60.6 | 7.1 | .0 | 5.7 | 0.0 |
| 9 IDLE | | 0.0 | 0 | 5.9 | R | R | .099 | R | 690 | 10.1 | 18.0 | 25.7 | .1 | 8.8 | 0.0 |

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 26.8 151 9.7

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 25.2 152 9.4

T40 CYCLE COMPOSITE -

| | | | | | | |
|---|---|---|---|---|---|---|
| HC- FID | 0.35( 26.8) + 0.65( 25.2) = | 25.774 | G/KW | HR | ( 19.219 | BS) |
| CO- NDIR | 0.35( 150.8) + 0.65( 151.8) = | 151.450 | G/KW | HR | (112.936 | BS) |
| NOX-CL | 0.35( 9.7) + 0.65( 9.4) = | 9.526 | G/KW | HR | ( 7.103 | BS) |
| | HC + NOX = | 35.299 | G/KW | HR | ( 26.323 | BS) |
| | SFC = | .430 | KG/KW | HR | ( .708 | BS) |

# TABLE B-13B. ENGINE 2 NINE-MODE EMISSIONS RESULTS

1969 IH304 --- PROJECT 11-5044-001 BAR=29.00

10 11 78 0330 PM TEST 23 DUR HRS K= 1.083 HUM= 14.4 G/KG

| MODE | | CONCENTRATION AS MEASURED HC-FID | CO | CO2 | NOX-CL | TOTAL CARBON | FUEL G/HR | CALCULATED G/HR HC | CO | NOX | WT. FACT. | MODAL G/KWHR HC-FID | CO | NOX-CL | KW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | IDLE | 19920 | 9.100 | 6.64 | 0 | 17.950 | 2722 | 335 | 2787 | 0 | .232 | R | R | I | 0.0 |
| 2 | 25 PCT T | 2360 | 2.070 | 13.02 | 568 | 15.359 | 7711 | 135 | 2099 | 103 | .077 | 6.336 | 98.441 | 4.808 | 15.9 |
| 3 | 55 PCT T | 2000 | .890 | 13.59 | 1871 | 14.708 | 10750 | 166 | 1314 | 492 | .147 | 3.642 | 28.756 | 10.760 | 34.1 |
| 4 | 25 PCT T | 2000 | 1.890 | 13.22 | 711 | 15.338 | 7212 | 107 | 1795 | 120 | .077 | 5.219 | 87.297 | 5.845 | 15.3 |
| 5 | 10 PCT T | 1800 | 2.570 | 12.85 | 236 | 15.626 | 5625 | 74 | 1869 | 31 | .057 | 8.830 | 223.054 | 3.646 | 6.2 |
| 6 | 25 PCT T | 1800 | 1.860 | 13.22 | 684 | 15.285 | 7167 | 96 | 1762 | 115 | .077 | 4.771 | 87.283 | 5.713 | 15.1 |
| 7 | 90 PCT T | 2000 | 3.070 | 12.68 | 1105 | 15.979 | 17191 | 246 | 6672 | 427 | .113 | 3.312 | 89.850 | 5.756 | 55.4 |
| 8 | 25 PCT T | 1800 | 2.030 | 13.22 | 689 | 15.456 | 6940 | 92 | 1841 | 111 | .077 | 4.489 | 89.541 | 5.409 | 15.3 |
| 9 | C.T. | 133760 | 5.260 | 3.56 | 10 | 23.017 | 2767 | 1707 | 1277 | 0 | .143 | R | R | R | 0.0 |
| 1 | 25 PCT T | 2120 | 2.020 | 13.10 | 702 | 15.362 | 7348 | 116 | 1952 | 121 | .077 | 5.330 | 89.921 | 5.562 | 16.2 |
| 2 | 55 PCT T | 1880 | .870 | 13.47 | 2020 | 14.554 | 10659 | 157 | 1287 | 532 | .147 | 3.399 | 27.934 | 11.544 | 34.4 |
| 3 | 25 PCT T | 1720 | 2.000 | 13.10 | 679 | 15.296 | 7167 | 92 | 1893 | 114 | .077 | 4.470 | 92.050 | 5.562 | 15.3 |
| 4 | 10 PCT T | 1920 | 2.760 | 12.73 | 211 | 15.709 | 5488 | 77 | 1948 | 27 | .057 | 8.744 | 222.395 | 3.026 | 6.5 |
| 5 | 25 PCT T | 1800 | 1.920 | 13.22 | 709 | 15.345 | 7212 | 97 | 1823 | 120 | .077 | 4.695 | 88.641 | 5.826 | 15.3 |
| 6 | 90 PCT T | 2000 | 3.120 | 12.68 | 1100 | 16.029 | 17282 | 247 | 6795 | 426 | .113 | 3.320 | 91.508 | 5.742 | 55.4 |
| 7 | 25 PCT T | 1800 | 2.030 | 13.22 | 726 | 15.456 | 7212 | 96 | 1913 | 122 | .077 | 4.580 | 91.360 | 5.816 | 15.6 |
| 8 | C.T. | 151360 | 5.200 | 3.44 | 12 | 24.680 | 2812 | 1828 | 1197 | 0 | .143 | R | R | R | 0.0 |
| 9 | IDLE | 20720 | 9.750 | 6.90 | 10 | 18.959 | 2676 | 326 | 2780 | 1 | .232 | R | R | R | 0.0 |

| MODE | ID | ----UNITS AS SPECIFIED IN THE 9-08-77 PROCEDURE---- HP | TQ | FC | BSFC | BSNOX | F/A | SFC KG/KW HR | RPM | CALC A/F | --------PERCENT OF TOTAL-------- HC | CO | NOX | FUEL | POWER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | IDLE | 0.0 | 0 | 6.0 | R | I | .091 | R | 600 | 11.0 | 18.9 | 26.3 | 0.0 | 8.9 | 0.0 |
| 2 | 25 PCT T | 21.3 | 56 | 17.0 | .797 | 4.8 | .070 | .485 | 2000 | 14.2 | 2.5 | 6.6 | 5.0 | 8.4 | 7.5 |
| 3 | 55 PCT T | 45.7 | 120 | 23.7 | .519 | 10.8 | .067 | .315 | 2000 | 15.0 | 5.9 | 7.9 | 46.0 | 22.2 | 30.6 |
| 4 | 25 PCT T | 20.6 | 54 | 15.9 | .773 | 5.8 | .070 | .470 | 2000 | 14.3 | 2.0 | 5.6 | 5.9 | 7.8 | 7.2 |
| 5 | 10 PCT T | 8.4 | 22 | 12.4 | 1.480 | 3.6 | .072 | .900 | 2000 | 14.0 | 1.0 | 4.3 | 1.1 | 4.5 | 2.2 |
| 6 | 25 PCT T | 20.2 | 53 | 15.8 | .783 | 5.7 | .070 | .476 | 2000 | 14.3 | 1.8 | 5.5 | 5.7 | 7.8 | 7.1 |
| 7 | 90 PCT T | 74.3 | 195 | 37.9 | .510 | 5.8 | .074 | .310 | 2000 | 13.6 | 6.8 | 30.6 | 30.8 | 27.3 | 38.2 |
| 8 | 25 PCT T | 20.6 | 54 | 15.3 | .744 | 5.4 | .071 | .453 | 2000 | 14.2 | 1.7 | 5.8 | 5.5 | 7.5 | 7.2 |
| 9 | C.T. | 0.0 | 0 | 6.1 | R | R | .132 | R | 2000 | 7.6 | 59.3 | 7.4 | .0 | 5.6 | 0.0 |
| 1 | 25 PCT T | 21.7 | 57 | 16.2 | .746 | 5.6 | .070 | .454 | 2000 | 14.2 | 2.1 | 6.1 | 5.6 | 8.0 | 7.6 |
| 2 | 55 PCT T | 46.1 | 121 | 23.5 | .510 | 11.5 | .066 | .310 | 2000 | 15.1 | 5.4 | 7.7 | 47.5 | 22.1 | 30.6 |
| 3 | 25 PCT T | 20.6 | 54 | 15.8 | .768 | 5.6 | .070 | .467 | 2000 | 14.3 | 1.7 | 5.9 | 5.3 | 7.8 | 7.2 |
| 4 | 10 PCT T | 8.8 | 23 | 12.1 | 1.381 | 3.0 | .072 | .840 | 2000 | 13.9 | 1.0 | 4.5 | .9 | 4.4 | 2.3 |
| 5 | 25 PCT T | 20.6 | 54 | 15.9 | .773 | 5.8 | .070 | .470 | 2000 | 14.3 | 1.8 | 5.7 | 5.6 | 7.8 | 7.2 |
| 6 | 90 PCT T | 74.3 | 195 | 38.1 | .513 | 5.7 | .074 | .312 | 2000 | 13.6 | 6.6 | 31.1 | 29.2 | 27.6 | 37.9 |
| 7 | 25 PCT T | 20.9 | 55 | 15.9 | .759 | 5.8 | .071 | .462 | 2000 | 14.2 | 1.7 | 6.0 | 5.7 | 7.8 | 7.3 |
| 8 | C.T. | 0.0 | 0 | 6.2 | R | R | .145 | R | 2000 | 6.9 | 61.8 | 6.9 | .0 | 5.7 | 0.0 |
| 9 | IDLE | 0.0 | 0 | 5.9 | R | R | .097 | R | 690 | 10.3 | 17.9 | 26.1 | .1 | 8.8 | 0.0 |

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 25.1 150 9.6

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 25.7 150 10.0

TWO CYCLE COMPOSITE -

HC- FID 0.35( 25.1) + 0.65( 25.7) = 25.472 G/KW HR ( 18.995 BS)

CO- NDIR 0.35( 150.3) + 0.65( 149.7) = 149.885 G/KW HR (111.769 BS)

NOX-CL 0.35( 9.6) + 0.65( 10.0) = 9.852 G/KW HR ( 7.347 BS)

HC + NOX = 35.324 G/KW HR ( 26.341 BS)

SFC = .431 KG/KW HR ( .709 BS)

# TABLE B-14A. ENGINE 3 NINE-MODE EMISSIONS RESULTS

1969 IH345 --- PROJECT 11-5044-001 BAR=29.33

10 30 78 1210 PM TEST 31 K= .866 HUM= 6.2 G/KG

| MODE | CONCENTRATION AS MEASURED HC-FID | CO | CO2 | NOX-CL | TOTAL CARBON | FUEL G/HR | CALCULATED G/HR HC | CO | NOX | WT. FACT. | -----MODAL G/KWHR----- HC-FID | CO | NOX-CL | KW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | 10200 | 3.830 | 8.73 | 10 | 13.691 | 1724 | 142 | 974 | 0 | .232 | R | R | R | 0.0 |
| 2 25 PCT T | 2300 | 1.680 | 13.42 | 1204 | 15.363 | 9525 | 163 | 2104 | 215 | .077 | 6.785 | 87.708 | 8.949 | 17.9 |
| 3 55 PCT T | 2100 | 1.350 | 13.64 | 2213 | 15.230 | 13608 | 214 | 2437 | 569 | .147 | 4.018 | 45.703 | 10.666 | 39.8 |
| 4 25 PCT T | 2050 | 1.600 | 13.47 | 1323 | 15.304 | 8936 | 137 | 1887 | 222 | .077 | 5.520 | 76.239 | 8.975 | 18.5 |
| 5 10 PCT T | 2000 | 1.130 | 13.55 | 578 | 14.908 | 6804 | 104 | 1042 | 76 | .057 | 9.754 | 97.703 | 7.115 | 8.0 |
| 6 25 PCT T | 1940 | 1.570 | 13.47 | 1302 | 15.261 | 8890 | 129 | 1847 | 218 | .077 | 5.376 | 77.007 | 9.092 | 17.9 |
| 7 90 PCT T | 1600 | 1.710 | 13.59 | 2064 | 15.483 | 19641 | 232 | 4382 | 753 | .113 | 2.684 | 50.689 | 8.710 | 64.5 |
| 8 25 PCT T | 1930 | 1.570 | 13.47 | 1344 | 15.260 | 8800 | 127 | 1829 | 223 | .077 | 5.054 | 72.762 | 8.868 | 18.7 |
| 9 C.T. | 38400 | 3.090 | 7.90 | 15 | 15.203 | 1724 | 478 | 708 | 0 | .143 | R | R | R | 0.0 |
| 1 25 PCT T | 2150 | 1.520 | 13.47 | 1279 | 15.235 | 8845 | 142 | 1783 | 214 | .077 | 5.936 | 74.302 | 8.901 | 17.9 |
| 2 55 PCT T | 2030 | 1.270 | 13.66 | 2311 | 15.162 | 13290 | 203 | 2249 | 583 | .147 | 3.809 | 42.180 | 10.927 | 39.8 |
| 3 25 PCT T | 1850 | 1.560 | 13.47 | 1284 | 15.241 | 8845 | 123 | 1829 | 214 | .077 | 4.950 | 73.882 | 8.657 | 18.5 |
| 4 10 PCT T | 1900 | 1.100 | 13.59 | 535 | 14.907 | 6804 | 99 | 1014 | 70 | .057 | 9.268 | 95.118 | 6.586 | 8.0 |
| 5 25 PCT T | 1920 | 1.510 | 13.47 | 1258 | 15.199 | 8709 | 126 | 1748 | 207 | .077 | 5.232 | 72.851 | 8.641 | 17.9 |
| 6 90 PCT T | 1650 | 1.770 | 13.54 | 2070 | 15.499 | 19504 | 237 | 4500 | 749 | .113 | 2.746 | 52.052 | 8.666 | 64.5 |
| 7 25 PCT T | 1880 | 1.600 | 13.47 | 1316 | 15.285 | 8754 | 123 | 1851 | 217 | .077 | 4.890 | 73.653 | 8.624 | 18.7 |
| 8 C.T. | 28800 | 2.850 | 8.67 | 18 | 14.698 | 1724 | 373 | 675 | 1 | .143 | R | R | R | 0.0 |
| 9 IDLE | 8900 | 4.340 | 9.77 | 12 | 15.108 | 1588 | 105 | 921 | 0 | .232 | R | R | R | 0.0 |

| MODE | ID | ----UNITS AS SPECIFIED IN THE 9-08-77 PROCEDURE---- HP | TQ | FC | BSFC | BSNOX | F/A | SFC KG/KW HR | RPM | CALC A/F | --------PERCENT OF TOTAL------- HC | CO | NOX | FUEL | POWER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | IDLE | 0.0 | 0 | 3.8 | R | R | .065 | R | 400 | 15.4 | 15.9 | 12.3 | .0 | 5.0 | 0.0 |
| 2 | 25 PCT T | 24.0 | 63 | 21.0 | .875 | 8.9 | .070 | .532 | 2000 | 14.3 | 6.0 | 8.9 | 6.9 | 9.1 | 7.2 |
| 3 | 55 PCT T | 53.3 | 140 | 30.0 | .563 | 10.7 | .069 | .342 | 2000 | 14.5 | 15.2 | 19.6 | 34.7 | 24.9 | 30.4 |
| 4 | 25 PCT T | 24.8 | 65 | 19.7 | .796 | 9.0 | .070 | .484 | 2000 | 14.4 | 5.1 | 7.9 | 7.1 | 8.6 | 7.4 |
| 5 | 10 PCT T | 10.7 | 28 | 15.0 | 1.407 | 7.1 | .068 | .856 | 2000 | 14.8 | 2.9 | 3.2 | 1.8 | 4.8 | 2.4 |
| 6 | 25 PCT T | 24.0 | 63 | 19.6 | .817 | 9.1 | .069 | .497 | 2000 | 14.4 | 4.8 | 7.8 | 7.0 | 8.5 | 7.2 |
| 7 | 90 PCT T | 86.4 | 227 | 43.3 | .501 | 8.7 | .070 | .305 | 2000 | 14.2 | 12.6 | 27.1 | 35.3 | 27.6 | 37.9 |
| 8 | 25 PCT T | 25.1 | 66 | 19.4 | .772 | 8.9 | .069 | .470 | 2000 | 14.4 | 4.7 | 7.7 | 7.1 | 8.4 | 7.5 |
| 9 | C.T. | 0.0 | 0 | 3.8 | R | R | .074 | R | 2000 | 13.4 | 32.9 | 5.5 | .0 | 3.1 | 0.0 |
| 1 | 25 PCT T | 24.0 | 63 | 19.5 | .813 | 8.9 | .069 | .494 | 2000 | 14.4 | 6.1 | 7.8 | 6.8 | 8.7 | 7.2 |
| 2 | 55 PCT T | 53.3 | 140 | 29.3 | .550 | 10.9 | .069 | .334 | 2000 | 14.5 | 16.6 | 18.8 | 35.7 | 24.8 | 30.4 |
| 3 | 25 PCT T | 24.8 | 65 | 19.5 | .788 | 8.7 | .069 | .479 | 2000 | 14.4 | 5.3 | 8.0 | 6.9 | 8.7 | 7.4 |
| 4 | 10 PCT T | 10.7 | 28 | 15.0 | 1.407 | 6.6 | .068 | .856 | 2000 | 14.8 | 3.1 | 3.3 | 1.7 | 4.9 | 2.4 |
| 5 | 25 PCT T | 24.0 | 63 | 19.2 | .800 | 8.6 | .069 | .487 | 2000 | 14.5 | 5.4 | 7.6 | 6.6 | 8.5 | 7.2 |
| 6 | 90 PCT T | 86.4 | 227 | 43.0 | .497 | 8.7 | .071 | .303 | 2000 | 14.2 | 14.9 | 28.9 | 35.3 | 28.0 | 37.9 |
| 7 | 25 PCT T | 25.1 | 66 | 19.3 | .768 | 8.6 | .070 | .467 | 2000 | 14.4 | 5.3 | 8.1 | 7.0 | 8.6 | 7.5 |
| 8 | C.T. | 0.0 | 0 | 3.8 | R | R | .071 | R | 460 | 14.1 | 29.7 | 5.5 | .0 | 3.1 | 0.0 |
| 9 | IDLE | 0.0 | 0 | 3.5 | R | R | .072 | R | 460 | 14.0 | 13.6 | 12.1 | .0 | 4.7 | 0.0 |

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 10.8 95 12.5

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 9.3 92 12.5

TWO CYCLE COMPOSITE -

HC- FID 0.35( 10.8) + 0.65( 9.3) = 9.862 G/KW HR ( 7.354 BS)

CO- NDIR 0.35( 95.3) + 0.65( 91.8) = 93.021 G/KW HR ( 69.366 BS)

NOX-CL 0.35( 12.5) + 0.65( 12.5) = 12.515 G/KW HR ( 9.332 BS)

HC + NOX = 22.377 G/KW HR ( 16.687 BS)

SFC = .413 KG/KW HR ( .679 BS)

# TABLE B-14B. ENGINE 3 NINE-MODE EMISSIONS RESULTS

1969 IH345 --- PROJECT 11-5044-001 BAR=29.45

10 31 78 TEST #2 K= .933 HUM= 8.3 G/KG

| MODE | CONCENTRATION AS MEASURED HC-FID | CO | CO2 | NOX-CL | TOTAL CARBON | FUEL G/HR | CALCULATED G/HR HC | CO | NOX | WT. FACT. | MODAL G/KWHR HC-FID | CO | NOX-CL | KW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | 5112 | 1.110 | 11.79 | 50 | 13,474 | 3130 | 133 | 521 | 4 | .232 | R | R | R | 0.0 |
| 2 25 PCT T | 2004 | 1.460 | 13.33 | 1242 | 15,018 | 9299 | 141 | 1826 | 238 | .077 | 5,805 | 74,922 | 9,773 | 18.2 |
| 3 55 PCT T | 1924 | 1.210 | 13.57 | 2311 | 15,000 | 13517 | 198 | 2203 | 645 | .147 | 3,711 | 41,315 | 12,100 | 34.8 |
| 4 25 PCT T | 1740 | 1.440 | 13.44 | 1300 | 15,079 | 8845 | 116 | 1706 | 236 | .077 | 4,705 | 68,934 | 9,543 | 18.5 |
| 5 10 PCT T | 1680 | .890 | 13.40 | 508 | 14,481 | 6804 | 90 | 845 | 74 | .057 | 8,420 | 79,220 | 6,934 | 8.0 |
| 6 25 PCT T | 1680 | 1.300 | 13.22 | 1253 | 14,711 | 8754 | 114 | 1563 | 231 | .077 | 4,669 | 64,119 | 9,476 | 18.2 |
| 7 90 PCT T | 1584 | 1.540 | 13.57 | 2113 | 15,291 | 19504 | 231 | 3968 | 835 | .113 | 2,683 | 46,106 | 9,700 | 64.2 |
| 8 25 PCT T | 1608 | 1.410 | 13.44 | 1242 | 15,033 | 8618 | 105 | 1633 | 221 | .077 | 4,249 | 65,965 | 8,910 | 18.5 |
| 9 C.T. | 19200 | 2.220 | 8.97 | 18 | 13,309 | 1678 | 267 | 565 | 1 | .143 | R | R | R | 0.0 |
| 1 25 PCT T | 1780 | 1.330 | 13.34 | 1183 | 14,873 | 8709 | 119 | 1573 | 215 | .077 | 4,951 | 65,574 | 8,944 | 17.9 |
| 2 55 PCT T | 1828 | 1.230 | 13.47 | 2351 | 14,908 | 13154 | 184 | 2192 | 643 | .147 | 3,449 | 41,120 | 12,052 | 34.8 |
| 3 25 PCT T | 1600 | 1.340 | 13.22 | 1207 | 14,742 | 8618 | 106 | 1582 | 219 | .077 | 4,237 | 62,960 | 8,696 | 18.7 |
| 4 10 PCT T | 1600 | .930 | 13.22 | 503 | 14,332 | 6804 | 86 | 892 | 74 | .057 | 7,813 | 80,759 | 6,698 | 8.2 |
| 5 25 PCT T | 1720 | 1.410 | 13.44 | 1230 | 15,046 | 8573 | 112 | 1623 | 217 | .077 | 4,661 | 67,643 | 9,048 | 17.9 |
| 6 90 PCT T | 1600 | 1.670 | 13.57 | 1230 | 15,423 | 19278 | 229 | 4217 | 476 | .113 | 2,646 | 48,778 | 5,509 | 64.5 |
| 7 25 PCT T | 1588 | 1.430 | 13.47 | 1277 | 15,081 | 8528 | 102 | 1633 | 224 | .077 | 4,140 | 65,987 | 9,036 | 18.5 |
| 8 C.T. | 22400 | 2.150 | 8.87 | 15 | 13,489 | 1633 | 299 | 526 | 1 | .143 | R | R | R | 0.0 |
| 9 IDLE | 15840 | 2.850 | 9.80 | 12 | 14,416 | 1542 | 189 | 616 | 0 | .232 | R | R | R | 0.0 |

| MODE | ID | ----UNITS AS SPECIFIED IN THE 9-08-77 PROCEDURE---- HP | TQ | FC | BSFC | BSNOX | F/A | SFC KG/KW HR | RPM | CALC A/F | --------PERCENT OF TOTAL------- HC | CO | NOX | FUEL | POWER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | | 0.0 | 0 | 6.9 | R | R | .062 | R | 900 | 16.2 | 18.6 | 7.8 | .3 | 8.8 | 0.0 |
| 2 25 PCT T | | 24.4 | 64 | 20.5 | .841 | 9.8 | .068 | .512 | 2000 | 14.6 | 6.6 | 9.1 | 6.9 | 8.6 | 7.3 |
| 3 55 PCT T | | 53.3 | 140 | 29.8 | .559 | 12.1 | .068 | .340 | 2000 | 14.7 | 17.5 | 21.0 | 35.7 | 24.0 | 30.5 |
| 4 25 PCT T | | 24.8 | 65 | 19.5 | .788 | 9.5 | .069 | .479 | 2000 | 14.6 | 5.4 | 8.5 | 6.8 | 8.2 | 7.4 |
| 5 10 PCT T | | 10.9 | 28 | 15.0 | 1.407 | 6.9 | .066 | .856 | 2000 | 15.2 | 3.1 | 3.1 | 1.6 | 4.7 | 2.4 |
| 6 25 PCT T | | 24.4 | 64 | 19.3 | .792 | 9.5 | .067 | .482 | 2000 | 14.9 | 5.3 | 7.8 | 6.7 | 8.1 | 7.3 |
| 7 90 PCT T | | 86.1 | 226 | 43.0 | .500 | 9.7 | .070 | .304 | 2000 | 14.4 | 15.7 | 29.1 | 35.5 | 26.6 | 37.8 |
| 8 25 PCT T | | 24.8 | 65 | 19.0 | .768 | 8.9 | .068 | .467 | 2000 | 14.6 | 4.9 | 8.2 | 6.4 | 8.0 | 7.4 |
| 9 C.T. | | 0.0 | 0 | 3.7 | R | R | .063 | R | 2000 | 15.8 | 23.0 | 5.3 | .0 | 2.9 | 0.0 |
| 1 25 PCT T | | 24.0 | 63 | 19.2 | .800 | 8.9 | .068 | .487 | 2000 | 14.8 | 5.1 | 7.8 | 7.5 | 8.7 | 7.2 |
| 2 55 PCT T | | 53.3 | 140 | 29.0 | .544 | 12.1 | .068 | .331 | 2000 | 14.8 | 15.2 | 20.6 | 42.9 | 25.0 | 30.4 |
| 3 25 PCT T | | 25.1 | 66 | 19.0 | .756 | 8.7 | .067 | .460 | 2000 | 14.9 | 4.6 | 7.8 | 7.7 | 8.6 | 7.5 |
| 4 10 PCT T | | 11.0 | 29 | 15.0 | 1.358 | 6.7 | .065 | .826 | 2000 | 15.4 | 2.8 | 3.3 | 1.9 | 5.0 | 2.4 |
| 5 25 PCT T | | 24.0 | 63 | 18.9 | .788 | 9.0 | .068 | .479 | 2000 | 14.6 | 4.8 | 8.0 | 7.6 | 8.5 | 7.2 |
| 6 90 PCT T | | 86.4 | 227 | 42.5 | .492 | 5.5 | .070 | .299 | 2000 | 14.3 | 14.5 | 30.5 | 24.5 | 28.1 | 37.9 |
| 7 25 PCT T | | 24.8 | 65 | 18.8 | .760 | 9.0 | .069 | .462 | 2000 | 14.6 | 4.4 | 8.1 | 7.8 | 8.5 | 7.4 |
| 8 C.T. | | 0.0 | 0 | 3.6 | R | R | .064 | R | 2000 | 15.6 | 24.0 | 4.8 | .0 | 3.0 | 0.0 |
| 9 IDLE | | 0.0 | 0 | 3.4 | R | R | .068 | R | 480 | 14.7 | 24.6 | 9.2 | .0 | 4.6 | 0.0 |

| | | | | | |
|---|---|---|---|---|---|
| SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- | 8.7 | 80 | 13.8 | | |
| SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- | 9.3 | 81 | 11.4 | | |
| TWO CYCLE COMPOSITE - HC- FID 0.35( 8.7) + 0.65( 9.3) = | 9.059 | G/KW HR | ( 6.755 BS) | | |
| CO- NDIR 0.35( 80.3) + 0.65( 81.2) = | 80.898 | G/KW HR | ( 60.326 BS) | | |
| NOX-CL 0.35( 13.8) + 0.65( 11.4) = | 12.283 | G/KW HR | ( 9.160 BS) | | |
| HC + NOX = | 21.342 | G/KW HR | ( 15.915 BS) | | |
| SFC = | .413 | KG/KW HR | ( .679 BS) | | |

# TABLE B-15A. ENGINE 4 NINE-MODE EMISSIONS RESULTS

11 20 78 TEST #3 1969 IH304#2-- PROJECT 11-5044-001 IH304 PAR=2940 K= .922 HUM= 7.9 G/KG

| MODE | CONCENTRATION AS MEASURED HC-FID | CO | CO2 | NOX-CL | TOTAL CARBON | FUEL G/HR | CALCULATED G/HR HC | CO | NOX | WT. FACT. | -----MODAL G/KWHR----- HC-FID | CO | NOX-CL | KW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | 29952 | 8.100 | 7.08 | 8 | 18,509 | 1905 | 343 | 1684 | 0 | .232 | R | R | R | 0.0 |
| 2 25 PCT T | 2680 | 2.610 | 12.92 | 753 | 15,836 | 7802 | 151 | 2597 | 114 | .077 | 7.079 | 121.797 | 5.326 | 15.9 |
| 3 55 PCT T | 2392 | 1.930 | 13.32 | 2028 | 15,523 | 11929 | 210 | 2996 | 477 | .147 | 4.415 | 62.940 | 10.025 | 35.5 |
| 4 25 PCT T | 2432 | 2.670 | 12.90 | 877 | 15,848 | 7484 | 131 | 2547 | 127 | .077 | 6.271 | 121.609 | 6.055 | 15.6 |
| 5 10 PCT T | 2144 | 2.630 | 12.90 | 346 | 15,775 | 5443 | 85 | 1833 | 37 | .057 | 9.254 | 200.569 | 4.000 | 6.8 |
| 6 25 PCT T | 2368 | 2.750 | 12.90 | 814 | 15,921 | 7348 | 125 | 2564 | 115 | .077 | 5.970 | 122.413 | 5.492 | 15.6 |
| 7 90 PCT T | 2200 | 3.700 | 12.56 | 1106 | 16,512 | 18280 | 279 | 8274 | 375 | .113 | 3.721 | 110.293 | 4.997 | 55.9 |
| 8 25 PCT T | 2512 | 2.980 | 12.78 | 836 | 16,047 | 7394 | 132 | 2773 | 118 | .077 | 6.101 | 127.772 | 5.433 | 16.2 |
| 9 C.T. | 239440 | 3.820 | 2.28 | 9 | 30,840 | 2268 | 1819 | 567 | 0 | .143 | R | R | R | 0.0 |
| 1 25 PCT T | 3448 | 2.950 | 12.76 | 811 | 16,104 | 7348 | 180 | 2719 | 113 | .077 | 8.592 | 129.820 | 5.410 | 15.6 |
| 2 55 PCT T | 2648 | 2.290 | 13.17 | 1903 | 15,763 | 11657 | 224 | 3421 | 431 | .147 | 4.783 | 73.036 | 9.200 | 34.9 |
| 3 25 PCT T | 2640 | 2.970 | 12.85 | 850 | 16,122 | 7348 | 138 | 2734 | 119 | .077 | 6.459 | 128.224 | 5.563 | 15.9 |
| 4 10 PCT T | 1968 | 2.150 | 13.22 | 400 | 15,595 | 5262 | 76 | 1465 | 91 | .057 | 7.669 | 147.995 | 4.174 | 7.4 |
| 5 25 PCT T | 2496 | 2.860 | 12.85 | 836 | 15,996 | 7257 | 130 | 2621 | 116 | .077 | 6.301 | 127.469 | 5.648 | 15.3 |
| 6 90 PCT T | 2296 | 3.730 | 12.49 | 1148 | 16,483 | 18370 | 293 | 8397 | 392 | .113 | 3.849 | 110.258 | 5.144 | 56.8 |
| 7 25 PCT T | 2440 | 2.900 | 12.85 | 905 | 16,029 | 7439 | 130 | 2719 | 129 | .077 | 5.672 | 118.984 | 5.628 | 17.0 |
| 8 C.T. | 233600 | 3.750 | 2.10 | 16 | 30,134 | 2132 | 1718 | 536 | 0 | .143 | R | R | R | 0.0 |
| 9 IDLE | 38272 | 9.450 | 6.59 | 16 | 20,289 | 1905 | 399 | 1792 | 0 | .232 | R | R | R | 0.0 |

| MODE | ID | ----UNITS AS SPECIFIED IN THE 9-08-77 PROCEDURE---- HP | TQ | FC | BSFC | BSNOX | F/A | SFC KG/KW HR | RPM | CALC A/F | --------PERCENT OF TOTAL------- HC | CO | NOX | FUEL | POWER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | | 0.0 | 0 | 4.2 | R | R | .094 | R | 480 | 10.7 | 17.7 | 14.2 | .0 | 6.1 | 0.0 |
| 2 25 PCT T | | 21.3 | 56 | 17.2 | .807 | 5.3 | .073 | .491 | 2000 | 13.8 | 2.6 | 7.2 | 5.8 | 8.3 | 7.3 |
| 3 55 PCT T | | 47.6 | 125 | 26.3 | .553 | 10.0 | .071 | .336 | 2000 | 14.1 | 6.9 | 16.0 | 46.4 | 24.3 | 31.1 |
| 4 25 PCT T | | 20.9 | 55 | 16.9 | .788 | 6.1 | .073 | .479 | 2000 | 13.7 | 2.3 | 7.1 | 6.5 | 8.0 | 7.2 |
| 5 10 PCT T | | 9.1 | 24 | 12.0 | 1.313 | 4.0 | .072 | .799 | 2000 | 13.8 | 1.1 | 3.8 | 1.4 | 4.3 | 2.3 |
| 6 25 PCT T | | 20.9 | 55 | 16.2 | .773 | 5.5 | .073 | .470 | 2000 | 13.7 | 2.1 | 7.2 | 5.9 | 7.8 | 7.2 |
| 7 90 PCT T | | 75.0 | 197 | 40.3 | .537 | 5.0 | .076 | .327 | 2000 | 13.1 | 7.0 | 33.9 | 28.0 | 28.7 | 37.6 |
| 8 25 PCT T | | 21.9 | 57 | 16.3 | .751 | 5.4 | .074 | .457 | 2000 | 13.5 | 2.3 | 7.7 | 6.0 | 7.9 | 7.4 |
| 9 C.T. | | 0.0 | 0 | 5.0 | R | R | .201 | R | 2000 | 5.0 | 58.0 | 2.9 | .0 | 4.5 | 0.0 |
| 1 25 PCT T | | 20.9 | 55 | 16.2 | .773 | 5.4 | .074 | .470 | 2000 | 13.5 | 3.1 | 7.3 | 5.9 | 8.0 | 7.1 |
| 2 55 PCT T | | 46.8 | 123 | 25.9 | .549 | 9.2 | .072 | .334 | 2000 | 13.9 | 7.3 | 17.6 | 43.1 | 24.1 | 30.4 |
| 3 25 PCT T | | 21.3 | 56 | 16.2 | .760 | 5.6 | .074 | .462 | 2000 | 13.5 | 2.3 | 7.4 | 6.2 | 8.0 | 7.2 |
| 4 10 PCT T | | 9.9 | 26 | 11.6 | 1.172 | 4.2 | .071 | .713 | 2000 | 14.0 | 1.0 | 2.9 | 1.6 | 4.2 | 2.5 |
| 5 25 PCT T | | 20.6 | 54 | 16.0 | .778 | 5.6 | .074 | .473 | 2000 | 13.6 | 2.2 | 7.1 | 6.1 | 7.9 | 7.0 |
| 6 90 PCT T | | 76.2 | 200 | 40.5 | .532 | 5.1 | .076 | .323 | 2000 | 13.1 | 7.3 | 33.2 | 30.1 | 29.2 | 38.0 |
| 7 25 PCT T | | 22.8 | 60 | 16.4 | .718 | 5.6 | .074 | .437 | 2000 | 13.6 | 2.2 | 7.3 | 6.7 | 8.1 | 7.8 |
| 8 C.T. | | 0.0 | 0 | 4.7 | R | R | .196 | R | 2000 | 5.1 | 54.2 | 2.7 | .0 | 4.3 | 0.0 |
| 9 IDLE | | 0.0 | 0 | 4.2 | R | R | .106 | R | 500 | 9.5 | 20.4 | 14.5 | .1 | 6.2 | 0.0 |

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 26.7 164 9.0

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 26.8 169 8.7

TWO CYCLE COMPOSITE -

HC- FID 0.35( 26.7) + 0.65( 26.8) = 26.773 G/KW HR ( 19.965 BS)

CO- NDIR 0.35( 164.2) + 0.65( 169.2) = 167.466 G/KW HR (124.879 BS)

NOX-CL 0.35( 9.0) + 0.65( 8.7) = 8.798 G/KW HR ( 6.560 BS)

HC + NOX = 35.571 G/KW HR ( 26.525 BS)

SFC = .423 KG/KW HR ( .696 BS)

# TABLE B-15B. ENGINE 4 NINE-MODE EMISSIONS RESULTS

1969 IH304#2-- PROJECT 11-5044-001 BAR=29.15
11 21 78 TEST 45 IH304 K= .915 HUM= 7.7 G/KG

| MODE | CONCENTRATION AS MEASURED HC-FID | CO | CO2 | NOX-CL | TOTAL CARBON | FUEL G/HR | CALCULATED G/HR HC | CO | NOX | WT. FACT. | MODAL G/KWHR HC-FID | CO | NOX-CL | KW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | 34304 | 8,060 | 6,95 | 0 | 18,816 | 1769 | 358 | 1531 | 0 | ,232 | R | R | I | 0,0 |
| 2 25 PCT T | 2944 | 2,950 | 12,73 | 669 | 16,017 | 7711 | 162 | 2869 | 98 | ,077 | 7,736 | 136,978 | 4,671 | 15,6 |
| 3 55 PCT T | 2448 | 2,110 | 13,10 | 1842 | 15,490 | 11703 | 211 | 3220 | 423 | ,147 | 4,436 | 67,650 | 8,880 | 35,5 |
| 4 25 PCT T | 2472 | 2,840 | 12,73 | 805 | 15,852 | 7439 | 133 | 2692 | 115 | ,077 | 6,106 | 124,023 | 5,286 | 16,2 |
| 5 10 PCT T | 2160 | 2,230 | 13,10 | 336 | 15,577 | 5398 | 86 | 1561 | 35 | ,057 | 8,637 | 157,657 | 3,572 | 7,4 |
| 6 25 PCT T | 2640 | 2,870 | 12,73 | 790 | 15,902 | 7394 | 140 | 2696 | 112 | ,077 | 6,577 | 126,401 | 5,232 | 15,9 |
| 7 90 PCT T | 2400 | 3,700 | 12,44 | 1116 | 16,415 | 18280 | 306 | 8323 | 377 | ,113 | 3,997 | 108,740 | 4,932 | 57,1 |
| 8 25 PCT T | 2664 | 2,850 | 12,73 | 850 | 15,884 | 7303 | 140 | 2647 | 119 | ,077 | 6,562 | 124,115 | 5,566 | 15,9 |
| 9 C.T. | 314880 | 3,220 | 1,81 | 6 | 37,589 | 2268 | 1964 | 392 | 0 | ,143 | R | R | R | 0,0 |
| 1 25 PCT T | 3984 | 2,920 | 12,68 | 736 | 16,055 | 7394 | 210 | 2716 | 103 | ,077 | 10,008 | 129,690 | 4,915 | 15,6 |
| 2 55 PCT T | 2920 | 2,240 | 12,97 | 1871 | 15,543 | 11703 | 251 | 3407 | 428 | ,147 | 5,229 | 71,001 | 8,917 | 35,8 |
| 3 25 PCT T | 2824 | 2,950 | 12,61 | 796 | 15,882 | 7348 | 149 | 2757 | 112 | ,077 | 7,124 | 131,634 | 5,341 | 15,6 |
| 4 10 PCT T | 2384 | 2,560 | 12,85 | 323 | 15,682 | 5352 | 93 | 1765 | 33 | ,057 | 9,761 | 185,390 | 3,517 | 7,1 |
| 5 25 PCT T | 2680 | 2,840 | 12,66 | 849 | 15,806 | 7484 | 145 | 2716 | 121 | ,077 | 6,918 | 129,697 | 5,789 | 15,6 |
| 6 90 PCT T | 2400 | 3,360 | 12,61 | 1304 | 16,245 | 18144 | 307 | 7581 | 442 | ,113 | 4,027 | 99,534 | 5,808 | 56,8 |
| 7 25 PCT T | 2628 | 2,690 | 12,73 | 919 | 15,709 | 7257 | 133 | 2510 | 129 | ,077 | 6,143 | 116,657 | 5,941 | 16,2 |
| 8 C.T. | 191360 | 4,610 | 3,02 | 12 | 27,782 | 2268 | 1645 | 760 | 0 | ,143 | R | R | R | 0,0 |
| 9 IDLE | 36096 | 9,680 | 6,56 | 12 | 20,248 | 2132 | 422 | 2059 | 0 | ,232 | R | R | R | 0,0 |

| MODE | ID | ----UNITS AS SPECIFIED IN THE 9-08-77 PROCEDURE---- HP | TQ | FC | BSFC | BSNOX | F/A | SFC KG/KW HR | RPM | CALC A/F | --------PERCENT OF TOTAL------- HC | CO | NOX | FUEL | POWER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | | 0,0 | 0 | 3,9 | R | I | ,096 | R | 470 | 10,4 | 17,3 | 12,9 | 0,0 | 5,8 | 0,0 |
| 2 25 PCT T | | 20,9 | 55 | 17,0 | ,812 | 4,7 | ,074 | ,494 | 2000 | 13,6 | 2,6 | 8,0 | 5,3 | 8,3 | 7,1 |
| 3 55 PCT T | | 47,6 | 125 | 25,8 | ,542 | 8,9 | ,071 | ,330 | 2000 | 14,1 | 6,5 | 17,2 | 44,1 | 24,1 | 30,7 |
| 4 25 PCT T | | 21,7 | 57 | 16,4 | ,756 | 5,3 | ,073 | ,460 | 2000 | 13,7 | 2,1 | 7,5 | 6,3 | 8,0 | 7,3 |
| 5 10 PCT T | | 9,9 | 26 | 11,9 | 1,202 | 3,6 | ,071 | ,731 | 2000 | 14,0 | 1,0 | 3,2 | 1,4 | 4,3 | 2,5 |
| 6 25 PCT T | | 21,3 | 56 | 16,9 | ,764 | 5,2 | ,073 | ,468 | 2000 | 13,7 | 2,3 | 7,5 | 6,1 | 8,0 | 7,2 |
| 7 90 PCT T | | 96,5 | 201 | 40,9 | ,526 | 4,9 | ,076 | ,320 | 2000 | 13,2 | 7,2 | 34,2 | 30,3 | 29,0 | 38,0 |
| 8 25 PCT T | | 21,3 | 56 | 16,1 | ,755 | 5,6 | ,073 | ,459 | 2000 | 13,7 | 2,3 | 7,4 | 6,5 | 7,9 | 7,2 |
| 9 C.T. | | 0,0 | 0 | 5,0 | R | R | ,274 | R | 2000 | 3,7 | 58,7 | 2,0 | ,0 | 4,6 | 0,0 |
| 1 25 PCT T | | 20,9 | 55 | 16,3 | ,778 | 4,9 | ,074 | ,473 | 2000 | 13,5 | 3,5 | 7,3 | 5,3 | 7,9 | 7,1 |
| 2 55 PCT T | | 48,0 | 126 | 25,8 | ,538 | 8,9 | ,071 | ,327 | 2000 | 14,0 | 8,0 | 17,5 | 41,7 | 24,0 | 31,1 |
| 3 25 PCT T | | 20,9 | 55 | 16,2 | ,773 | 5,3 | ,073 | ,470 | 2000 | 13,7 | 2,5 | 7,4 | 5,7 | 7,9 | 7,1 |
| 4 10 PCT T | | 9,5 | 25 | 11,8 | 1,239 | 3,5 | ,072 | ,754 | 2000 | 13,9 | 1,2 | 3,5 | 1,3 | 4,3 | 2,4 |
| 5 25 PCT T | | 20,9 | 55 | 16,5 | ,788 | 5,8 | ,073 | ,479 | 2000 | 13,8 | 2,4 | 7,3 | 6,2 | 8,0 | 7,1 |
| 6 90 PCT T | | 96,2 | 200 | 40,0 | ,525 | 5,8 | ,075 | ,319 | 2000 | 13,3 | 7,6 | 29,9 | 33,2 | 28,6 | 37,9 |
| 7 25 PCT T | | 21,9 | 57 | 16,0 | ,737 | 5,9 | ,072 | ,448 | 2000 | 13,9 | 2,2 | 6,7 | 6,6 | 7,8 | 7,4 |
| 8 C.T. | | 0,0 | 0 | 5,0 | R | R | ,171 | R | 2000 | 5,8 | 51,2 | 3,8 | ,0 | 4,5 | 0,0 |
| 9 IDLE | | 0,0 | 0 | 4,7 | R | R | ,105 | R | 450 | 9,5 | 21,3 | 16,7 | ,1 | 6,9 | 0,0 |

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 28,2 162 8,3
SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 27,1 169 8,9

TWO CYCLE COMPOSITE =

| | | | | | | |
|---|---|---|---|---|---|---|
| HC- FID | 0,35( 28,2) + 0,65( 27,1) = | 27,481 | G/KW HR | ( 20,493 BS) |
| CO- NDIR | 0,35( 162,1) + 0,65( 169,4) = | 166,821 | G/KW HR | (124,398 BS) |
| NOX-CL | 0,35( 8,3) + 0,65( 8,9) = | 8,688 | G/KW HR | ( 6,479 BS) |
| | HC + NOX = | 36,169 | G/KW HR | ( 26,972 BS) |
| | SFC = | ,422 | KG/KW HR | ( ,693 BS) |

# TABLE B-16A. ENGINE 5 NINE-MODE EMISSIONS RESULTS

1969 CHEV 366 -- PROJECT 11-5044-0 BAR=29.04

12 19 78 336 PM TEST 53 CHEV 366 K= .976 HUM= 9.8 G/KG

| MODE | CONCENTRATION AS MEASURED HC-FID | CO | CO2 | NOX-CL | TOTAL CARBON | FUEL G/HR | CALCULATED G/HR HC | CO | NOX | WT. FACT. | MODAL G/KWHR HC-FID | CO | NOX-CL | KW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | 12832 | 4.640 | 9.90 | 21 | 15.984 | 1814 | 164 | 1064 | 1 | .232 | R | R | R | 0.0 |
| 2 25 PCT T | 2160 | 3.740 | 12.49 | 331 | 16.477 | 10841 | 163 | 4490 | 71 | .077 | 6.382 | 194.812 | 2.765 | 19.0 |
| 3 55 PCT T | 8064 | 3.550 | 12.73 | 836 | 16.517 | 16103 | 231 | 6991 | 264 | .147 | 4.041 | 122.392 | 4.623 | 42.6 |
| 4 25 PCT T | 1880 | 3.460 | 12.80 | 411 | 16.476 | 10433 | 137 | 4426 | 84 | .077 | 5.352 | 173.460 | 3.305 | 19.0 |
| 5 10 PCT T | 1360 | 2.030 | 13.66 | 290 | 15.846 | 7711 | 76 | 1995 | 46 | .057 | 7.120 | 187.145 | 4.288 | 8.0 |
| 6 25 PCT T | 1944 | 3.740 | 12.49 | 386 | 16.453 | 10659 | 144 | 4895 | 81 | .077 | 5.413 | 183.618 | 3.039 | 19.9 |
| 7 90 PCT T | 2176 | 4.310 | 12.25 | 787 | 16.809 | 22680 | 337 | 11747 | 344 | .113 | 3.638 | 126.940 | 3.718 | 69.0 |
| 8 25 PCT T | 2000 | 4.030 | 12.37 | 386 | 16.629 | 10750 | 148 | 5263 | 81 | .077 | 5.559 | 197.422 | 3.033 | 19.9 |
| 9 C.T. | 80000 | 4.200 | 6.73 | 12 | 19.665 | 2495 | 1108 | 1076 | 0 | .143 | R | R | R | 0.0 |
| 1 25 PCT T | 2480 | 4.800 | 11.79 | 300 | 16.874 | 10886 | 183 | 6255 | 63 | .077 | 6.870 | 234.667 | 2.352 | 19.9 |
| 2 55 PCT T | 2000 | 3.600 | 12.61 | 836 | 16.439 | 15876 | 221 | 7023 | 262 | .147 | 3.875 | 122.945 | 4.579 | 42.6 |
| 3 25 PCT T | 2344 | 5.230 | 11.67 | 263 | 17.169 | 11113 | 174 | 6838 | 55 | .077 | 6.521 | 256.536 | 2.069 | 19.9 |
| 4 10 PCT T | 1960 | 3.490 | 12.61 | 209 | 16.302 | 7849 | 97 | 3394 | 33 | .057 | 8.495 | 297.051 | 2.853 | 8.5 |
| 5 25 PCT T | 2120 | 4.750 | 11.79 | 310 | 16.783 | 10886 | 157 | 6224 | 65 | .077 | 5.904 | 233.485 | 2.444 | 19.9 |
| 6 90 PCT T | 2120 | 4.410 | 12.18 | 725 | 16.833 | 22226 | 321 | 11762 | 310 | .113 | 3.468 | 127.110 | 3.351 | 69.0 |
| 7 25 PCT T | 2400 | 5.100 | 11.65 | 271 | 17.025 | 10795 | 174 | 6593 | 56 | .077 | 6.536 | 245.064 | 2.089 | 19.9 |
| 8 C.T. | 84800 | 4.100 | 6.56 | 12 | 19.901 | 2495 | 1158 | 1098 | 0 | .143 | R | R | R | 0.0 |
| 9 IDLE | 24800 | 5.610 | 9.38 | 24 | 17.780 | 1724 | 270 | 1099 | 1 | .232 | R | R | R | 0.0 |

| MODE | ID | ----UNITS AS SPECIFIED IN THE 9-08-77 PROCEDURE---- HP | TQ | FC | BSFC | BSNOX | F/A | SFC KG/KW HR | RPM | CALC A/F | PERCENT OF TOTAL HC | CO | NOX | FUEL | POWER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | | 0.0 | 0 | 4.0 | R | R | .076 | R | 470 | 13.1 | 11.9 | 5.6 | .2 | 4.5 | 0.0 |
| 2 25 PCT T | | 25.4 | 67 | 23.4 | .937 | 2.8 | .076 | .570 | 2000 | 13.1 | 3.9 | 8.7 | 5.2 | 8.8 | 7.1 |
| 3 55 PCT T | | 57.1 | 150 | 35.5 | .621 | 4.6 | .076 | .378 | 2000 | 13.1 | 10.7 | 23.5 | 37.0 | 25.1 | 30.5 |
| 4 25 PCT T | | 25.6 | 67 | 23.0 | .901 | 3.3 | .076 | .548 | 2000 | 13.2 | 3.3 | 7.8 | 6.2 | 8.5 | 7.1 |
| 5 10 PCT T | | 10.9 | 28 | 17.0 | 1.594 | 4.3 | .072 | .970 | 2000 | 13.9 | 1.4 | 2.6 | 2.5 | 4.7 | 2.2 |
| 6 25 PCT T | | 26.9 | 70 | 23.5 | .882 | 3.0 | .076 | .536 | 2000 | 13.1 | 3.5 | 8.6 | 5.9 | 8.7 | 7.5 |
| 7 90 PCT T | | 92.5 | 243 | 50.0 | .540 | 3.7 | .078 | .329 | 2000 | 12.8 | 11.9 | 30.3 | 37.0 | 27.2 | 38.0 |
| 8 25 PCT T | | 26.9 | 70 | 23.7 | .889 | 3.0 | .077 | .541 | 2000 | 13.0 | 3.6 | 9.3 | 5.9 | 8.8 | 7.5 |
| 9 C.T. | | 0.0 | 0 | 5.5 | R | R | .102 | R | 2000 | 9.8 | 49.8 | 3.5 | .1 | 3.8 | 0.0 |
| 1 25 PCT T | | 26.9 | 70 | 24.0 | .900 | 2.4 | .079 | .548 | 2000 | 12.7 | 4.0 | 9.7 | 5.1 | 8.9 | 7.4 |
| 2 55 PCT T | | 57.1 | 150 | 35.0 | .613 | 4.6 | .076 | .373 | 2000 | 13.2 | 9.1 | 20.9 | 40.9 | 24.8 | 30.3 |
| 3 25 PCT T | | 26.9 | 70 | 24.5 | .919 | 2.1 | .080 | .559 | 2000 | 12.4 | 3.8 | 10.6 | 4.5 | 9.1 | 7.4 |
| 4 10 PCT T | | 11.4 | 30 | 17.3 | 1.514 | 2.9 | .075 | .921 | 2000 | 13.3 | 1.6 | 3.9 | 2.0 | 4.8 | 2.3 |
| 5 25 PCT T | | 26.9 | 70 | 24.0 | .900 | 2.4 | .078 | .548 | 2000 | 12.8 | 3.4 | 9.7 | 5.3 | 8.9 | 7.4 |
| 6 90 PCT T | | 92.5 | 243 | 49.0 | .530 | 3.4 | .078 | .322 | 2000 | 12.8 | 10.2 | 26.9 | 37.3 | 26.7 | 37.7 |
| 7 25 PCT T | | 26.9 | 70 | 23.8 | .893 | 2.1 | .080 | .543 | 2000 | 12.5 | 3.8 | 10.2 | 4.6 | 8.8 | 7.4 |
| 8 C.T. | | 0.0 | 0 | 5.5 | R | R | .104 | R | 2000 | 9.6 | 46.6 | 3.0 | .1 | 3.8 | 0.0 |
| 9 IDLE | | 0.0 | 0 | 3.8 | R | R | .087 | R | 500 | 11.5 | 17.6 | 5.2 | .2 | 4.2 | 0.0 |

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 15.5 213 5.1

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 17.2 239 4.5

TWO CYCLE COMPOSITE -

HC- FID 0.35( 15.5) + 0.65( 17.2) = 16.623 G/KW HR ( 12.396 BS)

CO- NDIR 0.35( 213.4) + 0.65( 239.5) = 230.329 G/KW HR (171.756 BS)

NOX-CL 0.35( 5.1) + 0.65( 4.5) = 4.747 G/KW HR ( 3.540 BS)

HC + NOX = 21.370 G/KW HR ( 15.936 BS)

SFC = .457 KG/KW HR ( .751 BS)

# TABLE B-16B. ENGINE 5 NINE-MODE EMISSIONS RESULTS

1969 CHEV 366 -- PROJECT 11-5044-0 BAR=28.95

12 20 78 139 PM TEST 54 K= .979 HUM= 9.9 G/KG

| MODE | CONCENTRATION AS MEASURED HC-FID | CO | CO2 | NOX-CL | TOTAL CARBON | FUEL G/HR | CALCULATED G/HR HC | CO | NOX | WT. FACT. | MODAL G/KWHR HC-FID | CO | NOX-CL | KW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | 9888 | 5.580 | 9.69 | 24 | 16,386 | 2268 | 154 | 1560 | 1 | .232 | R | R | R | 0.0 |
| 2 25 PCT T | 2000 | 3.870 | 12.37 | 295 | 16,469 | 10433 | 145 | 4962 | 61 | .077 | 5.605 | 191.237 | 2.347 | 19.3 |
| 3 55 PCT T | 2080 | 3.610 | 12.61 | 803 | 16,458 | 16420 | 238 | 7275 | 261 | .147 | 4.083 | 124.867 | 4.471 | 43.4 |
| 4 25 PCT T | 2000 | 3.930 | 12.49 | 333 | 16,649 | 10206 | 141 | 4866 | 66 | .077 | 5.431 | 187.923 | 2.563 | 19.3 |
| 5 10 PCT T | 1560 | 2.580 | 13.22 | 230 | 15,979 | 7802 | 87 | 2545 | 37 | .057 | 7.166 | 208.816 | 2.997 | 9.1 |
| 6 25 PCT T | 2000 | 3.990 | 12.37 | 322 | 16,589 | 10297 | 142 | 5003 | 65 | .077 | 5.495 | 193.186 | 2.510 | 19.3 |
| 7 90 PCT T | 2184 | 4.470 | 12.14 | 750 | 16,860 | 23133 | 344 | 12389 | 335 | .113 | 3.653 | 131.712 | 3.558 | 70.1 |
| 8 25 PCT T | 2024 | 4.080 | 12.37 | 342 | 16,682 | 10795 | 150 | 5393 | 72 | .077 | 5.800 | 205.963 | 2.779 | 19.3 |
| 9 C.T. | 98560 | 4.200 | 6.06 | 10 | 20,956 | 2631 | 1343 | 1065 | 0 | .143 | R | R | R | 0.0 |
| 1 25 PCT T | 2584 | 4.390 | 12.02 | 299 | 16,706 | 10523 | 186 | 5586 | 61 | .077 | 7.197 | 215.718 | 2.365 | 19.3 |
| 2 55 PCT T | 2136 | 3.640 | 12.61 | 852 | 16,495 | 16239 | 241 | 7259 | 273 | .147 | 4.111 | 123.431 | 4.651 | 43.7 |
| 3 25 PCT T | 2216 | 4.510 | 12.02 | 287 | 16,784 | 10523 | 159 | 5712 | 59 | .077 | 6.058 | 217.388 | 2.227 | 19.6 |
| 4 10 PCT T | 1960 | 3.060 | 12.73 | 215 | 15,991 | 7847 | 99 | 3033 | 34 | .057 | 7.866 | 241.367 | 2.730 | 9.4 |
| 5 25 PCT T | 2120 | 4.210 | 12.14 | 309 | 16,593 | 10569 | 155 | 5417 | 64 | .077 | 5.972 | 209.181 | 2.472 | 19.3 |
| 6 90 PCT T | 2200 | 4.430 | 12.02 | 748 | 16,702 | 23133 | 349 | 12394 | 337 | .113 | 3.665 | 130.190 | 3.839 | 71.0 |
| 7 25 PCT T | 2264 | 4.940 | 11.77 | 259 | 16,969 | 10659 | 163 | 6268 | 52 | .077 | 6.291 | 242.066 | 2.027 | 19.3 |
| 8 C.T. | 99360 | 4.660 | 6.47 | 10 | 19,792 | 2948 | 1290 | 1402 | 0 | .143 | R | R | R | 0.0 |
| 9 IDLE | 24960 | 5.440 | 10.44 | 20 | 18,713 | 1633 | 247 | 959 | 1 | .232 | R | R | R | 0.0 |

| MODE | ID | ----UNITS AS SPECIFIED IN THE 4-08-72 PROCEDURE---- HP | TQ | FC | BSFC | BSNOX | F/A | SFC KG/KW HR | RPM | CALC A/F | --------PERCENT OF TOTAL------- HC | CO | NOX | FUEL | POWER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | | 0.0 | 0 | 5.0 | R | R | .078 | R | 500 | 12.8 | 10.2 | 7.7 | .3 | 5.5 | 0.0 |
| 2 25 PCT T | | 25.9 | 68 | 23.0 | .888 | 2.3 | .076 | .540 | 2000 | 13.1 | 3.2 | 8.1 | 4.7 | 8.4 | 7.2 |
| 3 55 PCT T | | 58.3 | 153 | 36.2 | .621 | 4.5 | .076 | .378 | 2000 | 13.2 | 10.0 | 22.8 | 38.7 | 25.2 | 30.7 |
| 4 25 PCT T | | 25.9 | 68 | 22.5 | .869 | 2.6 | .077 | .529 | 2000 | 13.0 | 3.1 | 8.0 | 5.2 | 8.2 | 7.2 |
| 5 10 PCT T | | 12.2 | 32 | 17.2 | 1.411 | 3.0 | .073 | .859 | 2000 | 13.7 | 1.4 | 3.1 | 2.1 | 4.6 | 2.5 |
| 6 25 PCT T | | 25.9 | 68 | 22.7 | .877 | 2.5 | .077 | .533 | 2000 | 13.0 | 3.1 | 8.2 | 5.1 | 8.3 | 7.2 |
| 7 90 PCT T | | 94.1 | 247 | 51.0 | .542 | 3.6 | .078 | .330 | 2000 | 12.8 | 11.1 | 29.9 | 38.3 | 27.3 | 38.1 |
| 8 25 PCT T | | 25.9 | 68 | 23.8 | .919 | 2.8 | .077 | .559 | 2000 | 12.9 | 3.3 | 8.8 | 5.6 | 8.7 | 7.2 |
| 9 C.T. | | 0.0 | 0 | 5.8 | R | R | .112 | R | 2000 | 8.9 | 54.7 | 3.3 | .1 | 3.9 | 0.0 |
| 1 25 PCT T | | 25.4 | 68 | 23.2 | .896 | 2.4 | .078 | .545 | 2000 | 12.9 | 3.8 | 8.9 | 4.8 | 8.5 | 7.1 |
| 2 55 PCT T | | 58.4 | 154 | 35.8 | .610 | 4.7 | .076 | .371 | 2000 | 13.1 | 9.5 | 22.0 | 40.7 | 25.1 | 30.7 |
| 3 25 PCT T | | 26.3 | 69 | 23.2 | .883 | 2.2 | .078 | .537 | 2000 | 12.8 | 3.3 | 9.1 | 4.6 | 8.5 | 7.2 |
| 4 10 PCT T | | 12.6 | 33 | 17.3 | 1.377 | 2.7 | .074 | .837 | 2000 | 13.6 | 1.5 | 3.6 | 2.0 | 4.7 | 2.5 |
| 5 25 PCT T | | 25.9 | 68 | 23.3 | .900 | 2.5 | .077 | .547 | 2000 | 13.0 | 3.2 | 8.6 | 5.0 | 8.6 | 7.1 |
| 6 90 PCT T | | 95.2 | 250 | 51.0 | .536 | 3.5 | .078 | .326 | 2000 | 12.9 | 10.6 | 29.0 | 38.6 | 27.5 | 38.3 |
| 7 25 PCT T | | 25.9 | 68 | 23.5 | .907 | 2.0 | .079 | .552 | 2000 | 12.6 | 3.4 | 10.0 | 4.1 | 8.6 | 7.1 |
| 8 C.T. | | 0.0 | 0 | 6.5 | R | R | .104 | R | 2000 | 9.7 | 49.4 | 4.2 | .1 | 4.4 | 0.0 |
| 9 IDLE | | 0.0 | 0 | 3.6 | R | R | .091 | R | 440 | 11.0 | 15.4 | 4.6 | .1 | 4.0 | 0.0 |

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 16.9 225 4.8

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 17.8 231 4.7

TWO CYCLE COMPOSITE -

| | | | | | | |
|---|---|---|---|---|---|---|
| HC- FID | 0.35( 16.9) + 0.65( 17.8) = | 17.499 | G/KW | HR | ( 13.049 | BS) |
| CO- NDIR | 0.35( 225.3) + 0.65( 230.5) = | 228.677 | G/KW | HR | (170.525 | BS) |
| NOX-CL | 0.35( 4.8) + 0.65( 4.7) = | 4.721 | G/KW | HR | ( 3.520 | BS) |
| | HC + NOX = | 22.220 | G/KW | HR | ( 16.569 | BS) |
| | SFC = | .456 | KG/KW | HR | ( .750 | BS) |

# TABLE B-17A. ENGINE 9 NINE-MODE EMISSIONS RESULTS

03 16 79 TEST 92 1969 CH366 -- PROJECT 11-5044-0 BAR= 29.39
K= .855 HUM= 5.8 G/KG

| MODE | CONCENTRATION AS MEASURED HC-FID | CO | CO2 | NOX-CL | TOTAL CARBON | FUEL G/HR | CALCULATED G/HR HC | CO | NOX | WT. FACT. | MODAL G/KWHR HC-FID | CO | NOX-CL | KW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | 19648 | 4.330 | 7.35 | 10 | 13.839 | 2498 | 389 | 1577 | 1 | .232 | R | R | R | 0.0 |
| 2 25 PCT T | 2880 | 4.750 | 11.10 | 184 | 16.178 | 11567 | 234 | 6860 | 37 | .077 | 10,985 | 321,694 | 1.751 | 15.9 |
| 3 55 PCT T | 2584 | 5.750 | 11.15 | 375 | 17.195 | 18325 | 315 | 12378 | 113 | .147 | 5,368 | 211,071 | 1.934 | 43.7 |
| 4 25 PCT T | 1960 | 3.900 | 12.02 | 315 | 16.144 | 11476 | 159 | 5600 | 64 | .077 | 6,056 | 213,128 | 2.419 | 19.6 |
| 5 10 PCT T | 1040 | 1.510 | 13.22 | 240 | 14.849 | 8255 | 66 | 1696 | 38 | .057 | 6,410 | 164,935 | 3.683 | 7.7 |
| 6 25 PCT T | 2024 | 4.450 | 11.56 | 271 | 16.241 | 11793 | 168 | 6527 | 56 | .077 | 6,200 | 241,423 | 2.066 | 20.2 |
| 7 90 PCT T | 2304 | 5.070 | 11.61 | 610 | 16.944 | 24948 | 388 | 15079 | 255 | .113 | 3,997 | 155,287 | 2.625 | 72.4 |
| 8 25 PCT T | 1880 | 3.900 | 12.02 | 325 | 16.135 | 11294 | 150 | 5515 | 65 | .077 | 5,720 | 209,877 | 2.457 | 19.6 |
| 9 C.T. | 47360 | 2.830 | 5.57 | 5 | 13.487 | 2722 | 1027 | 1154 | 0 | .143 | R | R | R | 0.0 |
| 1 25 PCT T | 1968 | 2.490 | 12.73 | 470 | 15.445 | 10886 | 158 | 3545 | 94 | .077 | 5,937 | 132,999 | 3.527 | 19.9 |
| 2 55 PCT T | 2376 | 4.640 | 11.67 | 570 | 16.581 | 17690 | 290 | 9999 | 173 | .147 | 5,004 | 172,754 | 2.982 | 43.2 |
| 3 25 PCT T | 1720 | 2.660 | 12.61 | 455 | 15.466 | 10886 | 138 | 3782 | 91 | .077 | 5,333 | 146,053 | 3.510 | 19.3 |
| 4 10 PCT T | 960 | 1.290 | 13.22 | 250 | 14.619 | 7983 | 60 | 1423 | 39 | .057 | 6,269 | 149,468 | 4.070 | 7.1 |
| 5 25 PCT T | 1760 | 3.120 | 12.25 | 410 | 15.571 | 11249 | 145 | 4553 | 84 | .077 | 5,438 | 170,810 | 3.154 | 19.9 |
| 6 90 PCT T | 2320 | 5.510 | 11.44 | 535 | 17.216 | 25764 | 397 | 16657 | 227 | .113 | 4,061 | 170,199 | 2.322 | 73.0 |
| 7 25 PCT T | 1744 | 3.160 | 12.34 | 400 | 15.699 | 10886 | 138 | 4426 | 79 | .077 | 5,252 | 168,457 | 2.996 | 19.6 |
| 8 C.T. | 51200 | 2.750 | 6.06 | 5 | 14.332 | 2722 | 1049 | 1055 | 0 | .143 | R | R | R | 0.0 |
| 9 IDLE | 18240 | 5.180 | 7.72 | 10 | 14.918 | 2449 | 331 | 1718 | 0 | .232 | R | R | R | 0.0 |

| MODE | ID | ----UNITS AS SPECIFIED IN THE 9-08-77 PROCEDURE---- HP | TQ | FC | BSFC | BSNOX | F/A | SFC KG/KW HR | RPM | CALC A/F | --------PERCENT OF TOTAL------- HC | CO | NOX | FUEL | POWER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | | 0.0 | 0 | 5.5 | R | R | .067 | R | 430 | 14.9 | 23.4 | 6.1 | .2 | 5.5 | 0.0 |
| 2 25 PCT T | | 21.3 | 56 | 25.5 | 1,196 | 1.8 | .076 | .727 | 2000 | 13.2 | 4.7 | 8.7 | 4.4 | 8.5 | 5.9 |
| 3 55 PCT T | | 58.6 | 154 | 40.4 | .689 | 1.9 | .081 | .419 | 2000 | 12.3 | 12.0 | 30.1 | 25.7 | 25.6 | 30.8 |
| 4 25 PCT T | | 26.3 | 69 | 25.3 | .963 | 2.4 | .075 | .586 | 2000 | 13.4 | 3.2 | 7.1 | 7.5 | 8.4 | 7.2 |
| 5 10 PCT T | | 10.3 | 27 | 18.2 | 1.770 | 3.7 | .068 | 1.077 | 2000 | 14.8 | 1.0 | 1.6 | 3.3 | 4.5 | 2.1 |
| 6 25 PCT T | | 27.0 | 71 | 26.0 | .962 | 2.1 | .076 | .585 | 2000 | 13.2 | 3.3 | 8.3 | 6.6 | 8.6 | 7.4 |
| 7 90 PCT T | | 97.1 | 255 | 55.0 | .566 | 2.6 | .079 | .345 | 2000 | 12.6 | 11.4 | 28.2 | 44.4 | 26.8 | 39.3 |
| 8 25 PCT T | | 26.3 | 69 | 24.9 | .948 | 2.5 | .075 | .576 | 2000 | 13.4 | 3.0 | 7.0 | 7.7 | 8.3 | 7.2 |
| 9 C.T. | | 0.0 | 0 | 6.0 | R | R | .067 | R | 2000 | 14.8 | 38.1 | 2.7 | .1 | 3.7 | 0.0 |
| 1 25 PCT T | | 26.7 | 70 | 24.0 | .900 | 3.5 | .071 | .548 | 2000 | 14.1 | 3.4 | 5.2 | 9.0 | 8.1 | 7.3 |
| 2 55 PCT T | | 57.9 | 152 | 39.0 | .674 | 3.0 | .077 | .410 | 2000 | 12.9 | 11.8 | 28.1 | 31.6 | 25.2 | 30.1 |
| 3 25 PCT T | | 25.9 | 68 | 24.0 | .927 | 3.5 | .071 | .564 | 2000 | 14.1 | 2.9 | 5.6 | 8.7 | 8.1 | 7.1 |
| 4 10 PCT T | | 9.9 | 25 | 17.6 | 1.849 | 4.1 | .066 | 1.125 | 2000 | 15.1 | .9 | 1.5 | 2.8 | 4.4 | 1.9 |
| 5 25 PCT T | | 26.7 | 70 | 24.8 | .930 | 3.2 | .072 | .566 | 2000 | 13.9 | 3.1 | 6.7 | 8.1 | 8.4 | 7.3 |
| 6 90 PCT T | | 97.9 | 259 | 56.8 | .580 | 2.3 | .081 | .353 | 2000 | 12.4 | 12.4 | 35.9 | 32.0 | 28.3 | 39.2 |
| 7 25 PCT T | | 26.9 | 69 | 24.0 | .913 | 3.0 | .072 | .556 | 2000 | 13.8 | 2.9 | 6.5 | 7.6 | 8.1 | 7.2 |
| 8 C.T. | | 0.0 | 0 | 6.0 | R | R | .072 | R | 2000 | 13.9 | 41.4 | 2.9 | .0 | 3.8 | 0.0 |
| 9 IDLE | | 0.0 | 0 | 5.4 | R | R | .073 | R | 480 | 13.8 | 21.2 | 7.6 | .1 | 5.5 | 0.0 |

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 18.5 290 3.1
SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 17.2 249 3.8

TWO CYCLE COMPOSITE =

| | | | | | | |
|---|---|---|---|---|---|---|
| HC- FID | 0.35( 18.5) + 0.65( 17.2) = | 17.665 | G/KW | HR | ( 13.172 | BS) |
| CO- NDIR | 0.35( 289.7) + 0.65( 248.8) = | 263.118 | G/KW | HR | (196.207 | BS) |
| NOX-CL | 0.35( 3.1) + 0.65( 3.8) = | 3.564 | G/KW | HR | ( 2.658 | BS) |
| | HC + NOX = | 21.229 | G/KW | HR | ( 15.830 | BS) |
| | SFC = | .495 | KG/KW | HR | ( .813 | BS) |

# TABLE B-17B. ENGINE 9 NINE-MODE EMISSIONS RESULTS

1969 CH366 -- PROJECT 11-5044-0 BAR=29.06

03 19 79 TEST 93 K= 1.003 HUM= 10.8 G/KG

| MODE | CONCENTRATION AS MEASURED HC-FID | CO | CO2 | NOX-CL | TOTAL CARBON | FUEL G/HR | CALCULATED G/HR HC | CO | NOX | WT. FACT. | MODAL G/KWHR HC-FID | CO | NOX-CL | KW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | 15552 | 3.970 | 7.53 | 10 | 13.210 | 2722 | 352 | 1652 | 1 | .232 | R | R | R | 0.0 |
| 2 25 PCT T | 2440 | 5.360 | 10.88 | 169 | 16.518 | 12247 | 206 | 8028 | 42 | .077 | 7.960 | 310.009 | 1.611 | 19.3 |
| 3 55 PCT T | 2480 | 5.440 | 11.33 | 393 | 17.054 | 18144 | 302 | 11691 | 139 | .147 | 5.285 | 204.673 | 2.436 | 42.6 |
| 4 25 PCT T | 2280 | 5.310 | 11.21 | 187 | 16.780 | 11703 | 182 | 7480 | 43 | .077 | 7.014 | 288.877 | 1.676 | 19.3 |
| 5 10 PCT T | 1160 | 1.620 | 13.22 | 210 | 14.972 | 7983 | 71 | 1745 | 37 | .057 | 7.415 | 183.277 | 3.915 | 7.1 |
| 6 25 PCT T | 2032 | 4.270 | 11.78 | 245 | 16.282 | 11476 | 164 | 6079 | 57 | .077 | 6.413 | 238.272 | 2.253 | 19.0 |
| 7 90 PCT T | 2400 | 5.650 | 11.44 | 473 | 17.365 | 25855 | 410 | 16993 | 234 | .113 | 4.355 | 180.660 | 2.492 | 70.1 |
| 8 25 PCT T | 1920 | 3.470 | 12.25 | 300 | 15.939 | 10886 | 150 | 4787 | 68 | .077 | 5.787 | 184.872 | 2.634 | 19.3 |
| 9 C.T. | 48000 | 3.080 | 6.73 | 10 | 15.030 | 3039 | 1055 | 1258 | 1 | .143 | R | R | R | 0.0 |
| 1 25 PCT T | 2224 | 3.300 | 12.37 | 300 | 15.924 | 11068 | 177 | 4633 | 69 | .077 | 6.823 | 178.916 | 2.680 | 19.3 |
| 2 55 PCT T | 2480 | 5.400 | 11.44 | 405 | 17.124 | 17690 | 293 | 11269 | 139 | .147 | 5.136 | 197.276 | 2.438 | 42.6 |
| 3 25 PCT T | 2096 | 4.100 | 11.93 | 265 | 16.270 | 10977 | 162 | 5588 | 60 | .077 | 6.243 | 215.787 | 2.298 | 19.3 |
| 4 10 PCT T | 1280 | 1.820 | 13.10 | 198 | 15.066 | 7893 | 77 | 1926 | 35 | .057 | 8.039 | 202.298 | 3.626 | 7.1 |
| 5 25 PCT T | 2000 | 3.800 | 12.02 | 280 | 16.048 | 11068 | 158 | 5294 | 64 | .077 | 6.085 | 204.429 | 2.482 | 19.3 |
| 6 90 PCT T | 2400 | 5.580 | 11.56 | 490 | 17.415 | 25174 | 398 | 16293 | 236 | .113 | 4.336 | 177.538 | 2.569 | 68.4 |
| 7 25 PCT T | 2000 | 3.900 | 12.14 | 300 | 16.269 | 10795 | 152 | 5228 | 66 | .077 | 5.951 | 204.891 | 2.597 | 19.0 |
| 8 C.T. | 52480 | 2.990 | 6.73 | 12 | 15.425 | 2268 | 839 | 888 | 1 | .143 | R | R | R | 0.0 |
| 9 IDLE | 20160 | 4.470 | 8.09 | 15 | 14.793 | 1950 | 294 | 1191 | 1 | .232 | R | R | R | 0.0 |

| MODE | ID | UNITS AS SPECIFIED IN THE 9-08-77 PROCEDURE HP | TQ | FC | BSFC | BSNOX | F/A | SFC KG/KW HR | RPM | CALC A/F | PERCENT OF TOTAL HC | CO | NOX | FUEL | POWER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | | 0.0 | 0 | 6.0 | R | R | .064 | R | 450 | 15.7 | 21.4 | 6.1 | .2 | 5.9 | 0.0 |
| 2 25 PCT T | | 25.9 | 68 | 27.0 | 1.043 | 1.6 | .078 | .634 | 2000 | 12.9 | 4.2 | 9.8 | 4.9 | 8.8 | 7.2 |
| 3 55 PCT T | | 57.1 | 150 | 40.0 | .700 | 2.4 | .080 | .426 | 2000 | 12.5 | 11.6 | 27.1 | 31.2 | 25.0 | 30.5 |
| 4 25 PCT T | | 25.9 | 68 | 25.8 | .996 | 1.7 | .079 | .606 | 2000 | 12.7 | 3.7 | 9.1 | 5.1 | 8.4 | 7.2 |
| 5 10 PCT T | | 9.5 | 25 | 17.6 | 1.849 | 3.9 | .068 | 1.125 | 2000 | 14.7 | 1.1 | 1.6 | 3.2 | 4.3 | 2.0 |
| 6 25 PCT T | | 25.5 | 67 | 25.3 | .992 | 2.3 | .076 | .603 | 2000 | 13.2 | 3.3 | 7.4 | 6.8 | 8.3 | 7.1 |
| 7 90 PCT T | | 94.1 | 247 | 57.0 | .606 | 2.5 | .082 | .369 | 2000 | 12.2 | 12.1 | 30.3 | 40.4 | 27.4 | 38.6 |
| 8 25 PCT T | | 25.9 | 68 | 24.0 | .927 | 2.6 | .074 | .564 | 2000 | 13.6 | 3.0 | 5.8 | 8.0 | 7.9 | 7.2 |
| 9 C.T. | | 0.0 | 0 | 6.7 | R | R | .075 | R | 2000 | 13.4 | 39.6 | 2.8 | .1 | 4.1 | 0.0 |
| 1 25 PCT T | | 25.9 | 68 | 24.4 | .942 | 2.7 | .073 | .573 | 2000 | 13.6 | 4.1 | 6.4 | 7.7 | 8.5 | 7.3 |
| 2 55 PCT T | | 57.1 | 150 | 39.0 | .683 | 2.4 | .080 | .415 | 2000 | 12.4 | 13.0 | 29.5 | 29.5 | 25.9 | 30.8 |
| 3 25 PCT T | | 25.9 | 68 | 24.2 | .935 | 2.3 | .076 | .568 | 2000 | 13.2 | 3.8 | 7.7 | 6.6 | 8.4 | 7.3 |
| 4 10 PCT T | | 9.5 | 25 | 17.4 | 1.828 | 3.6 | .069 | 1.112 | 2000 | 14.6 | 1.3 | 2.0 | 2.8 | 4.5 | 2.0 |
| 5 25 PCT T | | 25.9 | 68 | 24.4 | .942 | 2.5 | .074 | .573 | 2000 | 13.4 | 3.7 | 7.3 | 7.1 | 8.5 | 7.3 |
| 6 90 PCT T | | 91.8 | 241 | 55.5 | .605 | 2.6 | .082 | .368 | 2000 | 12.2 | 13.6 | 32.8 | 38.4 | 28.3 | 38.0 |
| 7 25 PCT T | | 25.5 | 67 | 23.8 | .933 | 2.6 | .075 | .567 | 2000 | 13.3 | 3.5 | 7.2 | 7.4 | 8.3 | 7.2 |
| 8 C.T. | | 0.0 | 0 | 5.0 | R | R | .077 | R | 2000 | 13.0 | 36.3 | 2.3 | .1 | 3.2 | 0.0 |
| 9 IDLE | | 0.0 | 0 | 4.3 | R | R | .072 | R | 520 | 14.0 | 20.7 | 4.9 | .2 | 4.5 | 0.0 |

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 18.6 309 3.2

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 16.3 276 3.4

TWO CYCLE COMPOSITE =

HC- FID 0.35( 18.6) + 0.65( 16.3) = 17.077 G/KW HR ( 12.735 BS)

CO- NDIR 0.35( 308.6) + 0.65( 275.9) = 287.357 G/KW HR (214.282 BS)

NOX-CL 0.35( 3.2) + 0.65( 3.4) = 3.334 G/KW HR ( 2.486 BS)

HC + NOX = 20.412 G/KW HR ( 15.221 BS)

SFC = .504 KG/KW HR ( .828 BS)

## APPENDIX C

## $NO_x$ BASELINE SUMMARIES OF THE RESULTS

| Table Number | Engine Number | Description Summary of the Results |
|---|---|---|
| C-1 | 14 | 1971 Ford 361 |
| C-2 | 15 | 1972 Dodge 413 |
| C-3 | 16 | 1973 Chevrolet 454 |
| C-4 | 17 | 1973 GMC 427 |
| C-5 | 18 | 1972 Chevrolet 350 |
| C-6 | 19 | 1972 IHC 345 |
| C-7 | 20 | 1972 Ford 300 |
| C-8 | 21 | 1973 IHC 304 |
| C-9 | 22 | 1973 GMC 366 |
| C-10 | 11[a] | 1973 GMC 366 |

[a] Engine 11 was retested as Engine 22.

TABLE C-1. ENGINE 14 SUMMARY OF RESULTS
1971 Ford 361

TRANSIENT CYCLE

| | | TEST 14-2 | | | TEST 14-4 | | | Avg. of |
|---|---|---|---|---|---|---|---|---|
| | | Cold | Hot | Composite | Cold | Hot | Composite | 3 Tests |
| HC, | g/kW-hr | 22.78 | 12.94 | 14.35 | 21.40 | 14.23 | 15.25 | 14.73 |
| CO, | g/kW-hr | 245.31 | 203.35 | 209.34 | 243.45 | 206.81 | 212.04 | 215.83 |
| $CO_2$, | g/kW-hr | 971 | 990 | 987 | 960 | 870 | 883 | 937 |
| NOX, | g/kW-hr | 5.99 | 6.82 | 6.70 | 6.18 | 6.06 | 6.08 | 6.24 |
| SFC, | kg/kW-hr | 0.450 | 0.426 | 0.429 | 0.445 | 0.391 | 0.399 | 0.417 |
| WORK, | kW-hr | 7.5 | 7.55 | 7.54 | 7.56 | 7.60 | 7.59 | 7.60 |
| POWER, | kW | 23.14 | 23.29 | 23.27 | 23.32 | 23.45 | 23.43 | 23.44 |

NINE MODE

| | | Test 14-1 | Test 14-3 | Test 14-4 | Avg. |
|---|---|---|---|---|---|
| HC, | g/kW-hr | 10.97 | 10.10 | 11.49 | 10.85 |
| CO, | g/kW-hr | 117.78 | 121.96 | 121.03 | 120.26 |
| $CO_2$, | g/kW-hr | 997.13 | 982.28 | 987.6 | 989.00 |
| NOX, | g/kW-hr | 7.97 | 9.04 | 8.73 | 8.58 |
| SFC, | kg/kW-hr | 0.424 | 0.413 | 0.407 | 0.415 |
| POWER, | kW | 21.5 | 21.2 | 21.4 | 21.4 |

IDLE

| | | Test 14-5C | Test 14-6 | Average |
|---|---|---|---|---|
| RPM | | 550 | 550 | 550 |
| HC, | ppmC | 13460 | 10620 | 12040 |
| CO, | % | 4.5 | 4.2 | 4.4 |
| $CO_2$, | % | 11.0 | 10.6 | 10.8 |
| Fuel, | kg/hr | 1.9 | 1.8 | 1.9 |

TRANSIENT CYCLE AVERAGE VALUES

| | | | | | g/kg Fuel | g/km[a] |
|---|---|---|---|---|---|---|
| HC, | g/kW-hr | (g/hp-hr) | 14.73 | (10.98) | HC | 35.32 | 10.75 |
| CO, | g/kW-hr | (g/hp-hr) | 215.83 | (160.94) | CO | 517.58 | 157.57 |
| NOX, | g/kW-hr | (g/hp-hr) | 6.24 | (4.65) | NOX | 14.96 | 4.56 |
| SFC, | kg/kW-hr | (lb/hp-hr) | 0.417 | (0.686) | FUEL CONS. | --- | 304. |
| WORK, | kW-hr | (hp-hr) | 7.60 | (10.19) | | | |

[a] Using a composite value of 10.41 km for the Transient Cycle.

TABLE C-1 (Cont'd.) ENGINE 14 SUMMARY OF RESULTS
1971 Ford 361

TRANSIENT CYCLE STATISTICS

| | Cold Cycle | | | Hot Cycle | | |
|---|---|---|---|---|---|---|
| TEST 14-2 | Speed | Torque | Power | Speed | Torque | Power |
| Standard Error | 40. | 11.% | 6.% | 38. | 9.% | 4.% |
| Slope | 1.001 | .973 | .999 | .995 | .968 | .998 |
| Corr. Coef. | .9980 | .9055 | .9652 | .9981 | .9300 | .9770 |
| Intercept | -6. | 4.4 | .6 | 10. | 2.0 | -.1 |
| Points Used | 1094 | 1041 | 1041 | 1144 | 1116 | 1116 |
| kW-hr Dev.[b] | ---------- | -1.0 | ---------- | ---------- | -0.4 | ---------- |
| TEST 14-4 | | | | | | |
| Standard Error | 38. | 10.% | 6.% | 38. | 8.% | 4.% |
| Slope | 1.001 | .994 | 1.007 | .998 | .996 | 1.006 |
| Corr. Coef. | .9981 | .9178 | .9618 | .9981 | .9410 | .9735 |
| Intercept | -6. | 3.1 | .6 | 5. | .3 | -.1 |
| Points Used | 1144 | 1071 | 1071 | 1144 | 1107 | 1107 |
| kW-hr Dev.[b] | ---------- | -0.2 | ---------- | ---------- | 0.3 | ---------- |

TRANSIENT CYCLE MODAL RESULTS[c]

| | Cold Cycle | | | | Hot Cycle | | | |
|---|---|---|---|---|---|---|---|---|
| Test 14-2 | NYNF | LANF | LAF | NYNF | NYNF | LANF | LAF | NYNF |
| HC, gram | 58.60 | 52.97 | 39.35 | 20.85 | 20.15 | 27.17 | 33.32 | 17.04 |
| CO, gram | 226.91 | 420.00 | 993.80 | 199.63 | 182.46 | 282.28 | 888.50 | 181.49 |
| $CO_2$, gram | 860.3 | 1591.0 | 4091.8 | 742.2 | 729.4 | 1527.0 | 4234.3 | 981.49 |
| NOX, gram | 4.42 | 10.19 | 26.25 | 4.08 | 4.14 | 13.07 | 30.35 | 3.93 |
| FUEL, kg | 0.442 | 0.762 | 1.822 | 0.354 | 0.340 | 0.648 | 1.808 | 0.417 |
| KW-HR | 0.60 | 1.43 | 4.86 | 0.61 | 0.62 | 1.45 | 4.87 | 0.61 |
| TEST 14-4 | | | | | | | | |
| HC, gram | 48.08 | 48.36 | 40.10 | 25.32 | 24.08 | 30.85 | 32.93 | 20.26 |
| CO, gram | 216.72 | 415.14 | 1001.05 | 208.14 | 196.35 | 307.08 | 871.26 | 197.04 |
| $CO_2$ gram | 843.6 | 1550.3 | 4111.7 | 744.1 | 739.0 | 1472.5 | 3698.6 | 704.5 |
| NOX, gram | 4.43 | 10.56 | 27.12 | 4.59 | 4.30 | 12.65 | 24.85 | 4.28 |
| FUEL, kg | .421 | 0.746 | 1.832 | 0.363 | 0.354 | 0.647 | 1.630 | 0.340 |
| KW-HR | 0.61 | 1.44 | 4.89 | 0.63 | 0.62 | 1.46 | 4.89 | 0.63 |

[b]Test kW-hr minus Reference kW-hr divided by the Reference kW-hr times 100%.
[c]Barometric Pressure: Test 14-2= 743 mm Hg Test 14-4 = 740 mm Hg.

TABLE C-1 (Cont'd.) ENGINE 14 SUMMARY OF RESULTS
1971 Ford 361

ENGINE DESCRIPTION

Engine: 1972 Ford 361 CID
Carburetor: Holley 2-barrel No. D3HF-9510-CA
Distributor: No. C8TF 12102 A 961
Rated Power: 153 hp @ 3600 rpm
Maximum Torque: 278 ft. lbs @ 2400 rpm
Comments:

ENGINE DATA

| | Mfg. Spec. | Measured |
|---|---|---|
| Max. Engine Torque, Ft-Lb @ RPM | 278 @ 2400 | 282 @ 2100 |
| Max. Engine Power, HP @ RPM | 153 @ 3600 | 156 @ 3400 |
| Cylinder Compression, psi min.-max. (avg.) | | 80 - 120 (109) |
| Idle RPM | 550 | 550 |
| Comments: | | |

POWER MAPPING (TQ in ft-lb) @ Temp. - 76 Baro. - 29.25

| RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ |
|---|---|---|---|---|---|---|---|---|---|
| - | | 1100 | 241 | 2100 | 282 | 3100 | 252 | 4100 | |
| - | | 1200 | 249 | 2200 | 281 | 3200 | 248 | 4200 | |
| - | | 1300 | 255 | 2300 | 280 | 3300 | 246 | 4300 | |
| 400 | 148 | 1400 | 262 | 2400 | 278 | 3400 | 241 | 4400 | |
| 500 | 187 | 1500 | 267 | 2500 | 277 | 3500 | 220 | 4500 | |
| 600 | 213 | 1600 | 272 | 2600 | 274 | 3600 | 166 | 4600 | |
| 700 | 225 | 1700 | 276 | 2700 | 271 | 3700 | 27 | 4700 | |
| 800 | 231 | 1800 | 277 | 2800 | 267 | 3800 | 0 | 4800 | |
| 900 | 232 | 1900 | 279 | 2900 | 262 | 3900 | | 4900 | |
| 1000 | 236 | 2000 | 282 | 3000 | 257 | 4000 | | 5000 | |

TABLE C-1 (Cont'd.) ENGINE 14 SUMMARY OF RESULTS
1971 Ford 361

NINE-MODE MODAL RESULTS[d]

| | | Torque N.m | Weighting Factor | Weighted Emissions, grams/hour HC | CO | $CO_2$ | $NO_x$ | Weighted Fuel & Power kg/hr | kW |
|---|---|---|---|---|---|---|---|---|---|
| Test 14-1 | | | | | | | | | |
| 1 | Idle | 0 | 0.232 | 17.15 | 184.64 | 1195.7 | 0.56 | 0.526 | 0.00 |
| 2 | 25% | 98 | 0.077 | 7.66 | 57.52 | 1847.8 | 14.06 | 0.716 | 1.58 |
| 3 | 55% | 207 | 0.147 | 23.14 | 109.37 | 5628.7 | 92.62 | 2.067 | 6.46 |
| 4 | 25% | 96 | 0.077 | 5.86 | 58.26 | 1820.2 | 14.66 | 0.699 | 1.56 |
| 5 | 10% | 45 | 0.057 | 2.42 | 14.04 | 723.7 | 3.51 | 0.401 | 0.54 |
| 6 | 25% | 100 | 0.077 | 6.51 | 62.18 | 2037.0 | 17.23 | 0.727 | 1.64 |
| 7 | 90% | 338 | 0.113 | 52.79 | 1954.54 | 5607.1 | 12.55 | 2.896 | 8.17 |
| 8 | 25% | 92 | 0.077 | 5.75 | 58.12 | 1897.3 | 15.52 | 0.695 | 1.51 |
| 9 | CT | 0 | 0.143 | 113.84 | 27.44 | 627.5 | 0.14 | 0.363 | 0.00 |
| Test 14-3 | | | | | | | | | |
| 1 | Idle | 0 | 0.232 | 23.11 | 240.79 | 833.0 | 0.45 | 0.474 | 0.00 |
| 2 | 25% | 95 | 0.077 | 6.25 | 56.41 | 1823.14 | 13.49 | 0.681 | 1.53 |
| 3 | 55% | 210 | 0.147 | 24.86 | 124.73 | 5663.15 | 106.14 | 2.040 | 6.51 |
| 4 | 25% | 95 | 0.077 | 5.91 | 62.21 | 1822.5 | 15.10 | 0.681 | 1.54 |
| 5 | 10% | 34 | 0.057 | 3.16 | 16.51 | 971.3 | 3.80 | 0.367 | 0.40 |
| 6 | 25% | 100 | 0.077 | 6.54 | 63.30 | 1880.5 | 16.50 | 0.699 | 1.63 |
| 7 | 90% | 339 | 0.113 | 53.02 | 1925.89 | 5358.0 | 18.32 | 2.819 | 8.12 |
| 8 | 25% | 88 | 0.077 | 6.37 | 66.79 | 1944.9 | 17.32 | 0.681 | 1.43 |
| 9 | CT | 0 | 0.143 | 84.44 | 23.75 | 484.6 | 0.14 | 0.292 | 0.00 |

IDLE RESULTS[e]

| | Bagged Undiluted | | Calc. from Bagged Dilute |
|---|---|---|---|
| Test 14-5C | | | |
| HC, ppm | -- | | 13460 |
| CO, % | -- | | 4.5 |
| $CO_2$, % | 10.92 | | -- |
| FUEL, kg/hr | 1.9 | D.R.[f] | 136 |
| Test 14-6 | | | |
| HC, ppm | -- | | 10620 |
| CO, % | -- | | 4.5 |
| $CO_2$, % | 10.60 | | -- |
| FUEL, kg/hr | 1.8 | D.R.[f] | 118 |

[d]Barometric Pressure: Test 14-1 = 744 mm Hg Test 14-3 = 741 mm Hg
[e]Idle Speed: Test 14-5C = 550 rpm Test 14-6 = 550 rpm
[f]Calculated Dilution Ratio based on carbon dioxide values minus background for Dilute and Undiluted.

TABLE C-1 (Cont'd.) ENGINE 14 SUMMARY OF RESULTS
1971 Ford 361

TRANSIENT CYCLE

| | | TEST 14-6 | | | TEST | | | |
|---|---|---|---|---|---|---|---|---|
| | | Cold | Hot | Composite | Cold | Hot | Composite | Average |
| HC, | g/kW-hr | 19.07 | 13.85 | 14.60 | | | | |
| CO, | g/kW-hr | 243.81 | 223.17 | 226.12 | | | | |
| $CO_2$, | g/kW-hr | 913 | 947 | 942 | | | | |
| NOX, | g/kW-hr | 5.26 | 6.06 | 5.95 | | | | |
| SFC, | kg/kW-hr | 0.428 | 0.423 | 0.424 | | | | |
| WORK, | kW-hr | 7.71 | 7.65 | 7.66 | | | | |
| POWER, | kW | 23.79 | 23.60 | 23.63 | | | | |

TRANSIENT CYCLE STATISTICS

| | Cold Cycle | | | Hot Cycle | | |
|---|---|---|---|---|---|---|
| TEST 14-6 | Speed | Torque | Power | Speed | Torque | Power |
| Standard Error | 32. | 10.% | 7.% | 32. | 10.% | 5.% |
| Slope | 1.006 | .979 | 1.012 | 1.004 | .953 | 1.003 |
| Corr. Coef. | .9986 | .9202 | .9684 | .9987 | .9240 | .9781 |
| Intercept | 4. | 5.9 | 1.3 | 7. | 3.5 | .3 |
| Points Used | 1144 | 1084 | 1084 | 1144 | 1116 | 1116 |
| kW-hr Dev.[g] | | 1.7 | | | 1.0 | |

TRANSIENT CYCLE MODAL RESULTS[h]

| | Cold Cycle | | | | Hot Cycle | | | |
|---|---|---|---|---|---|---|---|---|
| Test 14-6 | NYNF | LANF | LAF | NYNF | NYNF | LANF | LAF | NYNF |
| HC, gram | 45.63 | 46.61 | 37.07 | 17.65 | 25.26 | 30.05 | 35.61 | 15.05 |
| CO, gram | 227.67 | 415.19 | 1035.14 | 200.55 | 191.64 | 315.24 | 1000.27 | 200.36 |
| $CO_2$, gram | 804.3 | 1494.8 | 4018.0 | 716.5 | 792.5 | 156.51 | 4144.8 | 743.7 |
| NOX, gram | 4.12 | 10.09 | 22.52 | 3.82 | 3.29 | 13.03 | 25.26 | 3.82 |
| FUEL, kg | 0.412 | 0.724 | 1.816 | 0.343 | 0.370 | 0.680 | 1.838 | 0.349 |
| KW-HR | 0.62 | 1.49 | 4.96 | 0.63 | 0.65 | 1.47 | 4.94 | 0.59 |

[g] Test kW-hr minus Reference kW-hr divided by the Reference kW-hr times 100%.
[h] Barometric Pressure: Test 14-6 = 741 mm Hg.

TABLE C-1 (Cont'd.) ENGINE 14 SUMMARY OF RESULTS
1971 Ford 361

NINE-MODE MODAL RESULTS[i]

| Test | 14-4 | Torque N.m | Weighting Factor | Weighted Emissions, grams/hour HC | CO | $CO_2$ | $NO_x$ | Weighted Fuel & Power kg/hr | kW |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Idle | 0 | 0.232 | 16.20 | 249.89 | 947.4 | 0.33 | 0.432 | 0.00 |
| 2 | 25% | 95 | 0.077 | 6.27 | 59.18 | 1917.7 | 13.84 | 0.664 | 1.54 |
| 3 | 55% | 210 | 0.147 | 24.20 | 120.09 | 5616.8 | 101.25 | 2.020 | 6.51 |
| 4 | 25% | 95 | 0.077 | 6.16 | 63.05 | 1901.7 | 15.79 | 0.664 | 1.53 |
| 5 | 10% | 38 | 0.057 | 3.76 | 18.28 | 1047.3 | 3.87 | 0.362 | 0.45 |
| 6 | 25% | 95 | 0.077 | 6.17 | 64.95 | 1887.5 | 15.63 | 0.664 | 1.54 |
| 7 | 90% | 343 | 0.113 | 53.78 | 1925.94 | 5108.9 | 18.32 | 2.747 | 8.24 |
| 8 | 25% | 95 | 0.077 | 6.27 | 64.99 | 1872.0 | 17.21 | 0.671 | 1.54 |
| 9 | CT | 0 | 0.143 | 122.57 | 17.57 | 786.6 | 0.27 | 0.454 | 0.00 |

| Test | |
|---|---|
| 1 | Idle |
| 2 | 25% |
| 3 | 55% |
| 4 | 25% |
| 5 | 10% |
| 6 | 25% |
| 7 | 90% |
| 8 | 25% |
| 9 | CT |

[i] Barometric Pressure: Test 14-4 = 739 mm Hg

TABLE C-2. ENGINE 15 SUMMARY OF RESULTS
1972 Dodge 413

TRANSIENT CYCLE

| | | TEST 15-1 | | | TEST 15-2 | | | |
|---|---|---|---|---|---|---|---|---|
| | | Cold | Hot | Composite | Cold | Hot | Composite | Average |
| HC, | g/kW-hr | 15.05 | 10.01 | 10.73 | 12.79 | 7.58 | 8.32 | 9.53 |
| CO, | g/kW-hr | 232.2 | 209.0 | 211.3 | 231.5 | 208.5 | 211.8 | 211.6 |
| $CO_2$, | g/kW-hr | 1009. | 959. | 966. | 1029. | 993. | 998. | 982. |
| NOX, | g/kW-hr | 6.13 | 7.67 | 7.45 | 6.11 | 6.99 | 6.86 | 7.16 |
| SFC, | kg/kW-hr | 0.448 | 0.416 | 0.421 | 0.442 | 0.424 | 0.428 | 0.424 |
| WORK, | kW-hr | 8.80 | 8.74 | 8.75 | 8.76 | 8.68 | 8.69 | 8.72 |
| POWER, | kW | 27.1 | 27.0 | 27.1 | 27.0 | 26.8 | 26.9 | 27.0 |

NINE MODE

| | | Test 15-2 | Test 15-3 | Average |
|---|---|---|---|---|
| HC, | g/kW-hr | 10.70 | 10.77 | 10.74 |
| CO, | g/kW-hr | 74.5 | 66.5 | 70.5 |
| $CO_2$, | g/kW-hr | 1140. | 1124. | 1132. |
| NOX, | g/kW-hr | 9.16 | 9.36 | 9.26 |
| SFC, | kg/kW-hr | 0.424 | 0.422 | 0.423 |
| POWER, | kW | 23.1 | 23.2 | 23.2 |

IDLE[a]

| | | Test 15-4 | Test 15-5 | Average |
|---|---|---|---|---|
| RPM | | 700 | 700 | 700 |
| HC, | ppmC | 11600 | 12350 | 12000 |
| CO, | % | 8.5 | 8.5 | 8.5 |
| $CO_2$, | % | 8.4 | 8.6 | 8.5 |
| Fuel, | kg/hr | 2.9 | 3.1 | 3.0 |

TRANSIENT CYCLE AVERAGE VALUES

| | | | | | g/kg Fuel | g/km[a] |
|---|---|---|---|---|---|---|
| HC, | g/kW-hr (g/hp-hr) | 9.53 | ( 7.11) | HC | 22.48 | 7.98 |
| CO, | g/kW-hr (g/hp-hr) | 211.6 | (157.8 ) | CO | 499.1 | 177.3 |
| NOX, | g/kW-hr (g/hp-hr) | 7.16 | ( 5.34) | NOX | 16.89 | 6.00 |
| SFC, | kg/kW-hr(lb/hp-hr) | 0.424 | ( 0.697) | FUEL CONS. | - | 355. |
| WORK, | kW-hr (hp-hr) | 8.72 | ( 11.69) | | | |

[a] Using a composite value of 10.41 km for the Transient Cycle.

TABLE C-2 (Cont'd). ENGINE 15 SUMMARY OF RESULTS
1972 Dodge 413

TRANSIENT CYCLE STATISTICS

| | Cold Cycle | | | Hot Cycle | | |
|---|---|---|---|---|---|---|
| TEST 15-1 | Speed | Torque | Power | Speed | Torque | Power |
| Standard Error | 32. | 8.% | 6.% | 36. | 6.% | 4.% |
| Slope | 1.003 | 0.972 | 0.988 | 1.003 | 0.973 | 0.992 |
| Corr. Coef. | .9987 | .9509 | .9727 | .9983 | .9700 | .9810 |
| Intercept | 18. | 2.1 | 0.8 | 22. | -.2 | -.2 |
| Points Used | 1144 | 1104 | 1104 | 1144 | 1143 | 1143 |
| kW-hr Dev.[b] | ---------- | -1.3% | ---------- | ---------- | -1.9% | ---------- |
| TEST 15-2 | | | | | | |
| Standard Error | 36. | 10.% | 6.% | 34. | 11.% | 5.% |
| Slope | 0.997 | 0.947 | 0.989 | .997 | .895 | .975 |
| Corr. Coef. | .9983 | .9168 | .9670 | .9985 | .9021 | .9688 |
| Intercept | 11. | 4.5 | .5 | 15. | 6.7 | .1 |
| Points Used | 1144 | 1107 | 1107 | 1144 | 1144 | 1144 |
| kW-hr Dev.[b] | ---------- | -1.8% | ---------- | ---------- | -2.6% | ---------- |

TRANSIENT CYCLE MODAL RESULTS[c]

| | Cold Cycle | | | | Hot Cycle | | | |
|---|---|---|---|---|---|---|---|---|
| TEST 15-1 | NYNF | LANF | LAF | NYNF | NYNF | LANF | LAF | NYNF |
| HC, gram | 50.81 | 28.36 | 31.32 | 21.85 | 18.08 | 20.65 | 29.46 | 19.33 |
| CO, gram | 339.45 | 366.34 | 1086.05 | 249.99 | 222.19 | 265.38 | 1072.61 | 266.54 |
| $CO_2$, gram | 1051.5 | 1924.7 | 5006.0 | 891.6 | 869.0 | 1742.4 | 4921.1 | 854.3 |
| NOX, gram | 3.29 | 12.97 | 33.59 | 4.10 | 5.60 | 16.50 | 39.77 | 5.21 |
| FUEL, kg | 0.550 | 0.817 | 2.147 | 0.427 | 0.402 | 0.701 | 2.112 | 0.421 |
| KW-HR | 0.73 | 1.71 | 5.63 | 0.72 | 0.72 | 1.68 | 5.62 | 0.72 |
| TEST 15-2 | | | | | | | | |
| HC, gram | 48.67 | 23.46 | 27.97 | 11.87 | 9.77 | 16.12 | 27.57 | 12.38 |
| CO, gram | 343.67 | 381.82 | 1085.22 | 216.63 | 216.60 | 258.78 | 1101.43 | 233.74 |
| $CO_2$, gram | 1070.8 | 1953.1 | 5107.4 | 875.8 | 899.5 | 1879.0 | 4933.2 | 912.4 |
| NOX, gram | 3.61 | 12.26 | 33.22 | 4.41 | 4.88 | 15.79 | 35.17 | 4.81 |
| FUEL, kg | 0.556 | 0.828 | 2.176 | 0.395 | 0.401 | 0.737 | 2.128 | 0.416 |
| KW-HR | 0.73 | 1.71 | 5.63 | 0.68 | 0.71 | 1.67 | 5.62 | 0.68 |

[b]Test kW-hr minus Reference kW-hr divided by the Reference kW-hr times 100%.
[c]Barometric Pressure: Test 15-1 = 740 mm Hg Test 15-2 = 738 mm Hg.

TABLE C-2 (Cont'd). ENGINE 15 SUMMARY OF RESULTS
1972 Dodge 413

ENGINE DESCRIPTION

Engine: 1972 Dodge 413
Carburetor: Holley 4-bore No. 3698395
Distributor: No. 3656839 (Electronic Ignition)
Rated Power : 238 hp at 3600 rpm
Maximum Torque : 407 ft-lb at 2000 rpm
Comments:

ENGINE TUNE-UP DATA

| | Mfg. Spec. | Measured |
|---|---|---|
| Total Advance, Deg. @ RPM & In. Hg. | -- | -- |
| Mech. Advance, Deg. @ RPM | 13.5 @ 1900 | 13.5 @ 1900 |
| Vac. Advance, Deg. @ In. Hg. | 9.5 @ 13.5 | 9.5 @ 13.5 |
| Max. Engine Torque, Ft-Lb @ RPM | N.A. | 300 @ 2400 |
| Max. Engine Power, HP @ RPM | N.A. | 164 @ 3600 |
| Cylinder Compression, psi min.-max.(avg.) | 100-140 | 100-110 (105) |
| Idle RPM | 700 | 700 |

Comments: Rated Power and Maximum Torque are not applicable.

POWER MAPPING @ Temp - 84°F Baro - 29.10"Hg

| RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ |
|---|---|---|---|---|---|---|---|---|---|
| - | -- | 1100 | 279 | 2100 | 294 | 3100 | 276 | 4100 | 199 |
| - | -- | 1200 | 289 | 2200 | 297 | 3200 | 268 | 4200 | 192 |
| - | -- | 1300 | 295 | 2300 | 298 | 3300 | 259 | 4300 | |
| 400 | -- | 1400 | 292 | 2400 | 300 | 3400 | 253 | 4400 | |
| 500 | 200 | 1500 | 292 | 2500 | 299 | 3500 | 245 | 4500 | |
| 600 | 215 | 1600 | 293 | 2600 | 297 | 3600 | 239 | 4600 | |
| 700 | 238 | 1700 | 291 | 2700 | 295 | 3700 | 231 | 4700 | |
| 800 | 243 | 1800 | 292 | 2800 | 292 | 3800 | 224 | 4800 | |
| 900 | 255 | 1900 | 292 | 2900 | 289 | 3900 | 215 | 4900 | |
| 1000 | 269 | 2000 | 292 | 3000 | 283 | 4000 | 207 | 5000 | |

VEHICLE DESCRIPTION

1973 Concorde M30 Motor Home
Serial Number: M39CN3S060736
Transmission: Automatic GVW: 11,000 lbs

TABLE C-2 (Cont'd). ENGINE 15 SUMMARY OF RESULTS
1972 Dodge 413

NINE-MODE MODAL RESULTS [d]

| | | Torque | Weighting | Weighted Emissions, grams/hour | | | | Weighted Fuel & Power | |
|---|---|---|---|---|---|---|---|---|---|
| Test 15-2 | | N.m | Factor | HC | CO | $CO_2$ | $NO_x$ | kg/hr | kW |
| 1 | Idle | 0 | 0.232 | 43.57 | 646.95 | 1173.5 | 0.00 | 0.758 | 0.000 |
| 2 | 25% | 102 | 0.077 | 1.79 | 39.25 | 2356.1 | 8.46 | 0.803 | 1.644 |
| 3 | 55% | 228 | 0.147 | 12.98 | 185.22 | 6671.1 | 72.13 | 2.327 | 7.076 |
| 4 | 25% | 102 | 0.077 | 1.67 | 42.99 | 2374.6 | 8.94 | 0.800 | 1.653 |
| 5 | 10% | 41 | 0.057 | 0.75 | 34.34 | 1336.7 | 2.16 | 0.543 | 0.488 |
| 6 | 25% | 106 | 0.077 | 2.00 | 48.81 | 2421.0 | 9.86 | 0.810 | 1.725 |
| 7 | 90% | 369 | 0.113 | 21.91 | 454.7 | 7180.7 | 100.82 | 2.553 | 8.850 |
| 8 | 25% | 100 | 0.077 | 1.89 | 55.06 | 2316.7 | 8.65 | 0.793 | 1.630 |
| 9 | CT | 0 | 0.143 | 160.40 | 209.97 | 465.7 | 0.14 | 0.487 | 0.000 |
| Test 15-3 | | | | | | | | | |
| 1 | Idle | 0 | 0.232 | 46.41 | 618.10 | 1081.0 | 0.33 | 0.737 | 0.000 |
| 2 | 25% | 106 | 0.077 | 1.19 | 35.24 | 2368.0 | 9.30 | 0.814 | 1.705 |
| 3 | 55% | 228 | 0.147 | 11.43 | 161.28 | 6533.7 | 71.41 | 2.300 | 7.059 |
| 4 | 25% | 102 | 0.077 | 1.57 | 40.57 | 2359.9 | 9.57 | 0.796 | 1.655 |
| 5 | 10% | 36 | 0.057 | 0.75 | 25.68 | 1299.7 | 2.15 | 0.445 | 0.423 |
| 6 | 25% | 106 | 0.077 | 1.57 | 34.51 | 2419.2 | 10.49 | 0.821 | 1.717 |
| 7 | 90% | 370 | 0.113 | 19.91 | 361.70 | 7148.8 | 103.65 | 2.563 | 8.927 |
| 8 | 25% | 102 | 0.077 | 1.79 | 42.13 | 2375.5 | 9.51 | 0.803 | 1.661 |
| 9 | CT | 0 | 0.143 | 164.74 | 220.52 | 437.6 | 0.14 | 0.480 | 0.000 |

TWO-SPEED IDLE RESULTS [e]

| | Garage-Type Analyzer (ppmH) | | Bagged Undiluted | | | Calc. from Bagged Dilute | |
|---|---|---|---|---|---|---|---|
| Test 15-4 | Low | High | Low | High | | Low | High |
| HC, ppm | -- | | -- | | | 11600 | |
| CO, % | 8.2 | | -- | | | 8.5 | |
| $CO_2$, % | -- | | 8.4 | | | -- | |
| NOX, ppm | -- | | 20 | | | -- | |
| FUEL, kg/hr | 2.9 | | -- | | D.R. [f] | 93 | |
| Test 15-5 | | | | | | | |
| HC, ppm | -- | | -- | | | 12350 | |
| CO, % | 8.1 | | -- | | | 8.5 | |
| $CO_2$, % | -- | | 8.6 | | | -- | |
| NOX, ppm | -- | | -- | | | -- | |
| FUEL, kg/hr | 3.1 | | -- | | D.R. [g] | 90 | |

[d] Barometric Pressure: Test 15-2 = 738.4 mm Hg Test 15-3 = 742.4 mm Hg
[e] Low Idle = 700 RPM High Idle = 2500 RPM
[f] Calculated Dilution Ratio based on carbon dioxide values minus background for Dilute and Undiluted.

TABLE C-3. ENGINE 16 SUMMARY OF RESULTS
1973 Chevrolet 454

TRANSIENT CYCLE

| | | Test 16-1 | | | Test 16-2 | | | |
|---|---|---|---|---|---|---|---|---|
| | | Cold | Hot | Composite | Cold | Hot | Composite | Average |
| HC, | g/kW-hr | 4.65 | 3.98 | 4.08 | 4.41 | 3.63 | 3.74 | 3.91 |
| CO, | g/kW-hr | 111.30 | 102.53 | 103.78 | 106.85 | 95.51 | 97.13 | 100.46 |
| $CO_2$, | g/kW-hr | 1227. | 1142. | 1154. | 1222. | 1155. | 1165. | 1160. |
| NOX, | g/kW-hr | 6.08 | 6.13 | 6.12 | 6.17 | 6.15 | 6.15 | 6.14 |
| SFC, | kg/kW-hr | 0.447 | 0.415 | 0.420 | 0.443 | 0.415 | 0.419 | 0.420 |
| WORK, | kW-hr | 8.89 | 8.95 | 8.94 | 8.87 | 8.87 | 8.87 | 8.91 |
| POWER, | kW | 27.4 | 27.6 | 27.6 | 27.4 | 27.4 | 27.4 | 27.5 |

NINE MODE

| | | Test 16-1 | Test 16-3 | Average |
|---|---|---|---|---|
| HC, | g/kW-hr | 6.26 | 7.15 | 6.71 |
| CO, | g/kW-hr | 32.81 | 29.68 | 31.25 |
| $CO_2$, | g/kW-hr | 1299.3 | 1284.9 | 1292.1 |
| NOX, | g/kW-hr | 5.82 | 6.21 | 6.02 |
| SFC, | kg/kW-hr | 0.455 | 0.467 | 0.461 |
| POWER, | kW | 22.0 | 22.0 | 22.0 |

IDLE

| | | Test 16-1 | Test 16-2 | Average |
|---|---|---|---|---|
| RPM | | 700 | 700 | 700 |
| HC, | ppmC | 4459 | 5734 | 5097 |
| CO, | % | 1.03 | 0.79 | 0.91 |
| $CO_2$, | % | 13.65 | 13.10 | 13.38 |
| Fuel, | kg/hr | 2.7 | 2.7 | 2.7 |

TRANSIENT CYCLE AVERAGE VALUES

| | | | | g/kg Fuel | g/km[a] |
|---|---|---|---|---|---|
| HC, | g/kW-hr (g/hp-hr) | 3.91 | ( 2.92) | 9.31 | 3.35 |
| CO, | g/kW-hr (g/hp-hr) | 100.46 | (74.91) | 239.19 | 85.98 |
| NOX, | g/kW-hr (g/hp-hr) | 6.14 | ( 4.58) | 14.62 | 5.26 |
| SFC, | kg/kW-hr (lb/hp-hr) | 0.420 | ( 0.691) | FUEL CONS. | -- 359. |
| WORK, | kW-hr (hp-hr) | 8.91 | (11.95) | | |

[a] Using a composite value of 10.41 km for the Transient Cycle.

TABLE C-3 (Cont'd). ENGINE 16 SUMMARY OF RESULTS
1973 Chevrolet 454

TRANSIENT CYCLE STATISTICS

| | Cold Cycle | | | Hot Cycle | | |
|---|---|---|---|---|---|---|
| TEST 16-1 | Speed | Torque | Power | Speed | Torque | Power |
| Standard Error | 54. | 7.% | 4.% | 55. | 5.% | 3.% |
| Slope | .999 | .935 | .983 | .998 | .973 | .994 |
| Corr. Coef. | .9968 | .9426 | .9742 | .9968 | .9769 | .9854 |
| Intercept | -5. | 6.8 | .7 | 0. | 2.7 | .2 |
| Points Used | 1144 | 1089 | 1089 | 1144 | 1112 | 1112 |
| kW-hr Dev.[b] | ---------- | -8.9 | ---------- | ---------- | -8.3 | ---------- |
| TEST 16-2 | | | | | | |
| Standard Error | 52. | 8.% | 4.% | 52. | 5.% | 3.% |
| Slope | 1.001 | .919 | .983 | 1.001 | .957 | .995 |
| Corr. Coef. | .9971 | .9305 | .9733 | .9971 | .9695 | .9832 |
| Intercept | -7. | 8.0 | .8 | -3. | 4.6 | .3 |
| Points Used | 1144 | 1083 | 1083 | 1144 | 1108 | 1108 |
| kW-hr Dev.[b] | ---------- | -9.0 | ---------- | ---------- | -9.0 | ---------- |

TRANSIENT CYCLE MODAL RESULTS[c]

| | Cold Cycle | | | | Hot Cycle | | | |
|---|---|---|---|---|---|---|---|---|
| TEST 16-1 | NYNF | LANF | LAF | NYNF | NYNF | LANF | LAF | NYNF |
| HC, gram | 12.87 | 5.89 | 18.80 | 3.76 | 7.18 | 5.31 | 18.77 | 4.31 |
| CO, gram | 129.04 | 73.26 | 730.74 | 55.89 | 42.90 | 61.16 | 754.87 | 58.22 |
| $CO_2$, gram | 1378.4 | 2498.4 | 5834.9 | 1188.6 | 1121.6 | 2348.6 | 5568.7 | 1175.1 |
| NOX, gram | 2.89 | 11.43 | 35.80 | 3.90 | 3.94 | 11.84 | 35.18 | 3.92 |
| FUEL, kg | 0.511 | 0.830 | 2.220 | 0.406 | 0.382 | 0.776 | 2.148 | 0.404 |
| KW-HR | 0.67 | 1.69 | 5.86 | 0.66 | 0.68 | 1.70 | 5.88 | 0.68 |
| TEST 16-2 | | | | | | | | |
| HC, gram | 11.86 | 5.83 | 17.98 | 3.41 | 6.17 | 5.00 | 17.67 | 3.39 |
| CO, gram | 138.02 | 62.27 | 704.01 | 43.48 | 35.75 | 50.92 | 715.43 | 45.11 |
| $CO_2$, gram | 1363.9 | 2528.5 | 5722.2 | 1224.6 | 1147.6 | 2373.1 | 5561.8 | 1164.6 |
| NOX, gram | 2.78 | 12.02 | 36.19 | 3.75 | 3.77 | 11.61 | 35.31 | 3.90 |
| FUEL, kg | 0.510 | 0.834 | 2.171 | 0.411 | 0.386 | 0.778 | 2.125 | 0.393 |
| KW-HR | 0.66 | 1.71 | 5.84 | 0.66 | 0.66 | 1.71 | 5.84 | 0.66 |

[b]Test kW-hr minus Reference kW-hr divided by the Reference kW-hr times 100%.
[c]Barometric Pressure: Test 16-1 = 747 mm Hg Test 16-2 = 751 mm Hg.

TABLE C-3 (Cont'd). ENGINE 16 SUMMARY OF RESULTS
1973 Chevrolet 454

ENGINE DESCRIPTION

Engine: 1973 Chevrolet 454 Serial No. TO 608 TRC
Carburetor: Rochester Quadra Jet 4-barrel No. 7043507QB
Distributor: No. 1112113
Rated Power: 240 hp @ 4000 rpm
Maximum Torque: 355 ft-lb @ 2800 rpm
Comments:

ENGINE DATA

| | Mfg. Spec. | Measured |
|---|---|---|
| Max. Engine Torque, Ft-Lb @ RPM | N.A. | 303 @ 2800 |
| Max. Engine Power, HP @ RPM | N.A. | 210 @ 3900 |
| Cylinder Compression, psi min.-max. (avg.) | 105-150 | 120-135 (125) |
| Idle RPM | 700 | 700 |

Comments: Rated Power and Maximum Torque are not applicable.

POWER MAPPING (TQ in ft-lb) @ Temp. - 73°F Baro. - 29.29 "Hg

| RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ |
|---|---|---|---|---|---|---|---|---|---|
| - | - | 1100 | 256 | 2100 | 284 | 3100 | 300 | 4100 | 265 |
| - | - | 1200 | 270 | 2200 | 283 | 3200 | 300 | 4200 | 258 |
| - | - | 1300 | 281 | 2300 | 283 | 3300 | 300 | 4300 | 248 |
| 400 | - | 1400 | 282 | 2400 | 289 | 3400 | 299 | 4400 | 237 |
| 500 | - | 1500 | 280 | 2500 | 293 | 3500 | 296 | 4500 | - |
| 600 | - | 1600 | 279 | 2600 | 297 | 3600 | 295 | 4600 | - |
| 700 | - | 1700 | 271 | 2700 | 298 | 3700 | 289 | 4700 | - |
| 800 | 285 | 1800 | 268 | 2800 | 303 | 3800 | 286 | 4800 | - |
| 900 | 265 | 1900 | 272 | 2900 | 302 | 3900 | 283 | 4900 | - |
| 1000 | 249 | 2000 | 278 | 3000 | 300 | 4000 | 274 | 5000 | - |

VEHICLE DESCRIPTION

1973 Chevalier 18-foot Step-Van
Transmission: Automatic GVW: 11,800 lbs

TABLE C-3 (Cont'd). ENGINE 16 SUMMARY OF RESULTS
1973 Chevrolet 454

NINE-MODE MODAL RESULTS[d]

| | | Torque | Weighting | Weighted Emissions, grams/hour | | | | Weighted Fuel & Power | |
|---|---|---|---|---|---|---|---|---|---|
| Test 16-1 | | N.m | Factor | HC | CO | $CO_2$ | $NO_x$ | kg/hr | kW |
| 1 | Idle | 0 | 0.232 | 11.39 | 88.48 | 1561.3 | 0.61 | 0.610 | 0.00 |
| 2 | 25% | 98 | 0.077 | 0.28 | 5.74 | 2658.0 | 5.27 | 0.880 | 1.57 |
| 3 | 55% | 220 | 0.147 | 1.43 | 23.69 | 7424.3 | 40.40 | 2.427 | 6.76 |
| 4 | 25% | 95 | 0.077 | 0.26 | 5.03 | 2606.0 | 5.41 | 0.866 | 1.53 |
| 5 | 10% | 41 | 0.057 | 0.08 | 2.41 | 1565.9 | 1.86 | 0.525 | 0.48 |
| 6 | 25% | 100 | 0.077 | 0.23 | 5.11 | 2664.8 | 5.72 | 0.891 | 1.62 |
| 7 | 90% | 359 | 0.113 | 24.15 | 509.64 | 7043.5 | 63.19 | 2.578 | 8.50 |
| 8 | 25% | 98 | 0.077 | 0.25 | 5.35 | 2588.5 | 5.64 | 0.866 | 1.57 |
| 9 | CT | 0 | 0.143 | 99.91 | 77.77 | 528.7 | 0.19 | 0.383 | 0.00 |
| Test 16-3 | | | | | | | | | |
| 1 | Idle | 0 | 0.232 | 16.93 | 92.54 | 1549.9 | 0.31 | 0.631 | 0.00 |
| 2 | 25% | 100 | 0.077 | 0.31 | 5.53 | 2631.0 | 7.16 | 0.873 | 1.62 |
| 3 | 55% | 217 | 0.147 | 1.09 | 20.34 | 7190.6 | 37.89 | 2.401 | 6.68 |
| 4 | 25% | 96 | 0.077 | 0.19 | 4.79 | 2622.6 | 6.92 | 0.873 | 1.55 |
| 5 | 10% | 38 | 0.057 | 0.08 | 2.11 | 1491.7 | 1.68 | 0.517 | 0.46 |
| 6 | 25% | 100 | 0.077 | 0.19 | 4.93 | 2653.5 | 5.74 | 0.891 | 1.62 |
| 7 | 90% | 359 | 0.113 | 25.24 | 416.44 | 6972.7 | 69.47 | 2.589 | 8.50 |
| 8 | 25% | 98 | 0.077 | 0.21 | 5.01 | 2591.5 | 7.02 | 0.873 | 1.57 |
| 9 | CT | 0 | 0.143 | 113.07 | 101.06 | 562.8 | 0.36 | 0.631 | 0.00 |

IDLE RESULTS[e]

| | Bagged Undiluted | Calc. from Bagged Dilute |
|---|---|---|
| Test 16-1 | | |
| HC, ppm | -- | 4459. |
| CO, % | -- | 1.03 |
| $CO_2$, % | 13.65 | -- |
| | FUEL 2.7 kg/hr | D.R.[f] 91 |
| Test 16-2 | | |
| HC, ppm | -- | 5734. |
| CO, % | -- | 0.79 |
| $CO_2$, % | 13.10 | -- |
| | FUEL 2.7 kg/hr | D.R.[f] 94 |

[d]Barometric Pressure: Test 16-1 = 749.3 mm Hg Test 16-3 = 752.1 mm Hg
[e]Idle Speed: Test 16-1 700 rpm Test 16-2 700 rpm
[f]Calculated Dilution Ratio based on carbon dioxide values minus background for Dilute and Undiluted.

TABLE C-4. ENGINE 17 SUMMARY OF RESULTS
1973 GMC 427

TRANSIENT CYCLE

| | Test 17-2 | | | Test 17-3 | | | |
|---|---|---|---|---|---|---|---|
| | Cold | Hot | Composite | Cold | Hot | Composite | Average |
| HC, g/kW-hr | 10.09 | 7.33 | 7.72 | 10.03 | 8.00 | 8.29 | 8.01 |
| CO, g/kW-hr | 85.12 | 65.45 | 68.26 | 85.05 | 65.05 | 67.91 | 68.09 |
| $CO_2$, g/kW-hr | 1066. | 1038. | 1042. | 1052. | 1031. | 1034. | 1038. |
| NOX, g/kW-hr | 10.05 | 10.41 | 10.36 | 10.63 | 11.46 | 11.34 | 10.85 |
| SFC, kg/kW-hr | 0.388 | 0.367 | 0.370 | 0.384 | 0.365 | 0.368 | 0.369 |
| WORK, kW-hr | 9.13 | 9.19 | 9.18 | 9.30 | 9.25 | 9.26 | 9.22 |
| POWER, kW | 28.2 | 28.4 | 28.3 | 28.7 | 28.5 | 28.6 | 28.4 |
| Methane, g/kW-hr | 0.69 | 0.47 | 0.50 | 0.59 | 0.49 | 0.50 | 0.50 |

NINE MODE

| | Test 17-1 | Test 17-2 | Average |
|---|---|---|---|
| HC, g/kW-hr | 11.13 | 10.08 | 10.61 |
| CO, g/kW-hr | 43.84 | 49.35 | 46.60 |
| $CO_2$, g/kW-hr | 1038. | 1081. | 1060. |
| NOX, g/kW-hr | 9.87 | 9.62 | 9.75 |
| SFC, kg/kW-hr | 0.383 | 0.391 | 0.387 |
| POWER, kW | 25.5 | 25.6 | 25.6 |

IDLE

| | Test 17-1 | Test 17-2 | Average |
|---|---|---|---|
| RPM | 530 | 530 | 530 |
| HC, ppmC | 8175 | 7210 | 7690 |
| CO, % | 2.9 | 2.6 | 2.7 |
| $CO_2$, % | 11.2 | 11.3 | 11.3 |
| Fuel, kg/hr | 2.2 | 2.3 | 2.2 |

TRANSIENT CYCLE AVERAGE VALUES

| | | | g/kg Fuel | g/km[a] |
|---|---|---|---|---|
| HC, g/kW-hr (g/hp-hr) | 8.01 | ( 5.97 ) | HC | 21.71 | 7.09 |
| CO, g/kW-hr (g/hp-hr) | 68.09 | (50.78 ) | CO | 184.53 | 60.30 |
| NOX, g/kW-hr (g/hp-hr) | 10.85 | ( 8.09 ) | NOX | 29.40 | 9.61 |
| Methane, g/kW-hr (g/hp-hr) | 0.50 | ( 0.37 ) | Methane | 1.36 | 0.44 |
| SFC, kg/kW-hr (lb/hp-hr) | 0.369 | ( 0.607) | FUEL CONS. | -- | 327. |
| WORK, kW-hr (hp-hr) | 9.22 | (12.36) | | | |

[a] Using a composite value of 10.41 km for the Transient Cycle.

TABLE C-4 (Cont'd).ENGINE 17 SUMMARY OF RESULTS
1973 GMC 427

TRANSIENT CYCLE STATISTICS

| | Cold Cycle | | | Hot Cycle | | |
|---|---|---|---|---|---|---|
| TEST 17-2 | Speed | Torque | Power | Speed | Torque | Power |
| Standard Error | 66. | 10.% | 5.% | 67. | 6.% | 4.% |
| Slope | .987 | .940 | .974 | .988 | .966 | .979 |
| Corr. Coef. | .9954 | .9157 | .9624 | .9952 | .9698 | .9793 |
| Intercept | 35. | -.8 | -.2 | 39. | -1.1 | -.1 |
| Points Used | 1144 | 1139 | 1139 | 1144 | 1144 | 1144 |
| kW-hr Dev.[b] | ---------- | -6.3 | ---------- | ---------- | -5.8 | ---------- |
| TEST 17-3 | | | | | | |
| Standard Error | 68. | 9.% | 5.% | 67. | 6.% | 3.% |
| Slope | .985 | .956 | .977 | .988 | .985 | .996 |
| Corr. Coef. | .9951 | .9397 | .9700 | .9953 | .9689 | .9795 |
| Intercept | 36. | -.0 | .5 | .37 | -2.2 | -.5 |
| Points Used | 1144 | 1134 | 1134 | 1144 | 1142 | 1142 |
| kW-hr Dev.[b] | ---------- | -4.7 | ---------- | ---------- | -5.1 | ---------- |

TRANSIENT CYCLE MODAL RESULTS[c]

| | Cold Cycle | | | | Hot Cycle | | | |
|---|---|---|---|---|---|---|---|---|
| TEST 17-2 | NYNF | LANF | LAF | NYNF | NYNF | LANF | LAF | NYNF |
| HC, gram | 35.09 | 19.58 | 28.34 | 9.11 | 14.29 | 15.18 | 25.08 | 12.80 |
| CO, gram | 196.40 | 142.54 | 374.85 | 63.67 | 78.18 | 95.41 | 336.35 | 91.31 |
| $CO_2$, gram | 1086.5 | 2188.4 | 5448.2 | 1012.8 | 1018.5 | 2125.4 | 5379.6 | 1009.4 |
| NOX, gram | 4.75 | 15.65 | 65.74 | 5.62 | 5.64 | 17.22 | 67.11 | 5.67 |
| FUEL, kg | .475 | .780 | 1.932 | .360 | .374 | .732 | 1.888 | .376 |
| KW-HR | .74 | 1.80 | 5.85 | .74 | .77 | 1.82 | 5.83 | .77 |
| TEST 17-3 | | | | | | | | |
| HC, gram | 33.91 | 19.81 | 26.66 | 12.90 | 17.03 | 18.15 | 25.93 | 12.90 |
| CO, gram | 188.93 | 136.91 | 373.84 | 91.15 | 80.37 | 102.69 | 337.87 | 81.05 |
| $CO_2$, gram | 1092.8 | 2170.6 | 5508.0 | 1011.3 | 1013.7 | 2129.5 | 5433.3 | 963.6 |
| NOX, gram | 5.02 | 17.74 | 70.35 | 5.71 | 5.84 | 18.12 | 76.43 | 5.66 |
| FUEL, kg | .472 | .772 | 1.948 | .377 | .376 | .740 | 1.906 | .357 |
| KW-HR | .75 | 1.83 | 5.93 | .79 | .75 | 1.83 | 5.89 | .78 |

[b]Test kW-hr minus Reference kW-hr divided by the Reference kW-hr times 100%.
[c]Barometric Pressure: Test 17-2 = 744 mm Hg Test 17-3 = 744 mm Hg.

TABLE C-4 (Cont'd) ENGINE 17 SUMMARY OF RESULTS
1973 GMC 427

ENGINE DESCRIPTION

Engine: 1973 GMC 427 Serial Number T1113AHT
Carburetor: Holley 4-bore No. 1111365
Distributor: No. 1111365
Rated Power: 230 hp at 4000 rpm
Maximum Torque: 360 ft-lb at 2800 rpm
Comments:

ENGINE DATA

| | Mfg. Spec. | Measured |
|---|---|---|
| Max. Engine Torque, Ft-Lb @ RPM | N.A. | 320@2800 |
| Max. Engine Power, HP @ RPM | N.A. | 203@3800 |
| Cylinder Compression, psi min.-max. (avg.) | Low 80% of High | 100-125(110) |
| Idle RPM | 550 | 550 |

Comments: Rated Power and Maximum Torque are not applicable.

POWER MAPPING (TQ in ft-lb) @ Temp. - 89 Baro. - 29.14

| RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ |
|---|---|---|---|---|---|---|---|---|---|
| - | - | 1100 | 285 | 2100 | 327 | 3100 | 311 | 4100 | - |
| - | - | 1200 | 294 | 2200 | 327 | 3200 | 309 | 4200 | - |
| - | - | 1300 | 300 | 2300 | 327 | 3300 | 305 | 4300 | - |
| 400 | 150 | 1400 | 303 | 2400 | 326 | 3400 | 301 | 4400 | - |
| 500 | 220 | 1500 | 309 | 2500 | 327 | 3500 | 300 | 4500 | - |
| 600 | 259 | 1600 | 315 | 2600 | 322 | 3600 | 295 | 4600 | - |
| 700 | 254 | 1700 | 318 | 2700 | 319 | 3700 | 289 | 4700 | - |
| 800 | 264 | 1800 | 323 | 2800 | 317 | 3800 | 283 | 4800 | - |
| 900 | 273 | 1900 | 323 | 2900 | 315 | 3900 | 275 | 4900 | - |
| 1000 | 278 | 2000 | 325 | 3000 | 312 | 4000 | 267 | 5000 | - |

VEHICLE DESCRIPTION

*1973 GMC Tractor*
***Model Number:*** *CE 66213*
***Transmission: Automatic*** ***GVW:*** *31,500 lbs*

TABLE C-4 (Cont'd). ENGINE 17 SUMMARY OF RESULTS
1973 GMC 427

NINE-MODE MODAL RESULTS[d]

| | | Torque | Weighting | Weighted Emissions, grams/hour | | | | Weighted Fuel & Power | |
|---|---|---|---|---|---|---|---|---|---|
| Test | 17-1 | N.m | Factor | HC | CO | $CO_2$ | $NO_x$ | kg/hr | kW |
| 1 | Idle | 0 | 0.232 | 37.33 | 99.14 | 1076.3 | 0.22 | 0.474 | 0.00 |
| 2 | 25% | 118 | 0.077 | 6.42 | 78.74 | 2440.1 | 9.43 | 0.856 | 1.90 |
| 3 | 55% | 251 | 0.147 | 23.69 | 266.70 | 6647.8 | 70.35 | 2.521 | 7.74 |
| 4 | 25% | 113 | 0.077 | 8.38 | 124.62 | 2364.3 | 9.03 | 0.838 | 1.81 |
| 5 | 10% | 45 | 0.057 | 1.94 | 42.70 | 1276.9 | 1.98 | 0.465 | 0.54 |
| 6 | 25% | 119 | 0.077 | 7.64 | 118.69 | 2055.5 | 8.70 | 0.870 | 1.92 |
| 7 | 90% | 407 | 0.113 | 30.10 | 219.14 | 8054.5 | 142.4 | 2.763 | 9.75 |
| 8 | 25% | 117 | 0.077 | 8.88 | 136.06 | 2377.7 | 9.75 | 0.866 | 1.88 |
| 9 | CT | 0 | 0.143 | 159.90 | 33.77 | 225.0 | 0.14 | 0.331 | 0.00 |
| Test | 17-2 | | | | | | | | |
| 1 | Idle | 0 | 0.232 | 35.39 | 92.99 | 1174.8 | 0.22 | 0.463 | 0.00 |
| 2 | 25% | 121 | 0.077 | 5.61 | 79.54 | 2499.0 | 9.53 | 0.873 | 1.95 |
| 3 | 55% | 252 | 0.147 | 24.73 | 284.92 | 7243.7 | 74.56 | 2.534 | 7.79 |
| 4 | 25% | 113 | 0.077 | 7.02 | 109.34 | 2364.9 | 8.48 | 0.849 | 1.81 |
| 5 | 10% | 46 | 0.057 | 1.61 | 37.22 | 1380.7 | 2.22 | 0.476 | 0.55 |
| 6 | 25% | 114 | 0.077 | 7.13 | 103.75 | 2422.9 | 9.47 | 0.852 | 1.83 |
| 7 | 90% | 414 | 0.113 | 32.48 | 273.23 | 8019.7 | 132.66 | 2.794 | 9.83 |
| 8 | 25% | 117 | 0.077 | 8.95 | 139.43 | 2406.6 | 9.37 | 0.873 | 1.88 |
| 9 | CT | 0 | 0.143 | 135.53 | 145.28 | 218.3 | 0.21 | 0.324 | 0.00 |

IDLE RESULTS[e]

| | Bagged Undiluted | Calc. from Bagged Dilute |
|---|---|---|
| Test 17-1 | | |
| HC, ppm | -- | 8175. |
| CO, % | -- | 2.9 |
| $CO_2$, % | 11.2 | -- |
| | FUEL 2.2 kg/hr | D.R.[f] 102 |
| Test 17-2 | | |
| HC, ppm | -- | 7210. |
| CO, % | -- | 2.6 |
| $CO_2$, % | 11.3 | -- |
| | FUEL 2.3kg/hr | D.R.[f] 103 |

[d]Barometric Pressure: Test 17-1 = 742.95 mm Hg Test 17-2 = 742.70 mm Hg
[e]Idle Speed: Test 17-1 = 530 rpm Test 17-2 = 530 rpm
[f]Calculated Dilution Ratio based on carbon dioxide values minus background for Dilute and Undiluted.

TABLE C-5. ENGINE 18 SUMMARY OF RESULTS
1972 Chevrolet 350

TRANSIENT CYCLE

| | Test 18-1 | | | Test 18-3 | | | |
|---|---|---|---|---|---|---|---|
| | Cold | Hot | Composite | Cold | Hot | Composite | Average |
| HC, g/kW-hr | 8.74 | 4.80 | 5.36 | 7.35 | 4.50 | 4.91 | 5.14 |
| CO, g/kW-hr | 96.70 | 109.38 | 107.57 | 125.35 | 105.64 | 108.46 | 108.02 |
| $CO_2$, g/kW-hr | 964. | 883. | 895. | 902. | 907. | 906. | 901. |
| NOX, g/kW-hr | 8.36 | 8.26 | 8.27 | 8.60 | 8.51 | 8.52 | 8.40 |
| SFC, kg/kW-hr | 0.361 | 0.337 | 0.340 | 0.354 | 0.343 | 0.345 | 0.343 |
| WORK, kW-hr | 8.00 | 8.10 | 8.09 | 7.85 | 7.89 | 7.88 | 7.99 |
| POWER, kW | 24.7 | 25.0 | 25.0 | 24.2 | 24.3 | 24.3 | 24.7 |
| Methane, g/kW-hr | 0.48 | 0.35 | 0.37 | -- | -- | -- | 0.37 |

NINE MODE

| | Test 18-2 | Test 18-4 | Average |
|---|---|---|---|
| HC, g/kW-hr | 8.72 | 9.29 | 9.01 |
| CO, g/kW-hr | 41.01 | 47.31 | 44.16 |
| $CO_2$, g/kW-hr | 1000.49 | 1007.40 | 1003.95 |
| NOX, g/kW-hr | 9.91 | 9.49 | 9.70 |
| SFC, kg/kW-hr | 0.373 | 0.374 | 0.374 |
| POWER, kW | 20.2 | 19.9 | 20.1 |

IDLE

| | Test 18-1 | Test 18-2 | Average |
|---|---|---|---|
| RPM | 600 | 610 | 605 |
| HC, ppmC | 3500 | 4915 | 4210 |
| CO, % | 1.6 | 3.0 | 2.3 |
| $CO_2$, % | 12.5 | 11.9 | 12.2 |
| Fuel, kg/hr | 2.2 | 2.0 | 2.1 |

TRANSIENT CYCLE AVERAGE VALUES

| | | g/kg Fuel | g/km[a] |
|---|---|---|---|
| HC, g/kW-hr (g/hp-hr) | 5.14 ( 3.83) | HC | 14.99 | 3.95 |
| CO, g/kW-hr (g/hp-hr) | 108.02 (80.55) | CO | 314.93 | 82.91 |
| NOX, g/kW-hr (g/hp-hr) | 8.40 ( 6.26) | NOX | 24.49 | 6.45 |
| Methane, g/kW-hr (g/hp-hr) | 0.37 ( 0.28) | Methane | 1.08 | 0.28 |
| SFC, kg/kW-hr (lb/hp-hr) | 0.343 ( 0.564) | FUEL CONS. | -- | 263. |
| WORK, kW-hr (hp-hr) | 7.99 (10.72) | | | |

[a] Using a composite value of 10.41 km for the Transient Cycle.

TABLE C-5 (Cont'd). ENGINE 18 SUMMARY OF RESULTS
1972 Chevrolet 350

TRANSIENT CYCLE STATISTICS

| | Cold Cycle | | | Hot Cycle | | |
|---|---|---|---|---|---|---|
| TEST 18-1 | Speed | Torque | Power | Speed | Torque | Power |
| Standard Error | 64. | 12.% | 7.% | 72. | 5.% | 5.% |
| Slope | .993 | .863 | .976 | .992 | .974 | .996 |
| Corr. Coef. | .9958 | .8609 | .9638 | .9947 | .9763 | .9894 |
| Intercept | 13. | 14.5 | 1.4 | 15. | 4.8 | .9 |
| Points Used | 1144 | 1137 | 1137 | 1144 | 1143 | 1143 |
| kW-hr Dev. [b] | ---------- | +0.2 | ---------- | -------- | +1.5 | ---------- |
| TEST 18-3 | | | | | | |
| Standard Error | 70. | 8.% | 4.% | 79. | 6.% | 5.% |
| Slope | .987 | .931 | .981 | 1.010 | .975 | .950 |
| Corr. Coef. | .9949 | .9372 | .9837 | .9953 | .9635 | .9789 |
| Intercept | 18. | 6.2 | .5 | -36. | -2.8 | .6 |
| Points Used | 1144 | 1135 | 1135 | 1144 | 1144 | 1144 |
| kW-hr Dev. [b] | -------- | -1.8 | ---------- | ------- | -1.2 | ---------- |

TRANSIENT CYCLE MODAL RESULTS [c]

| | Cold Cycle | | | | Hot Cycle | | | |
|---|---|---|---|---|---|---|---|---|
| TEST 18-1 | NYNF | LANF | LAF | NYNF | NYNF | LANF | LAF | NYNF |
| HC, gram | 24.97 | 13.98 | 13.27 | 17.70 | 6.46 | 9.22 | 17.79 | 5.41 |
| CO, gram | 231.02 | 176.36 | 262.84 | 103.17 | 91.97 | 172.75 | 514.86 | 106.77 |
| $CO_2$, gram | 789.8 | 1555.8 | 4575.9 | 788.9 | 740.6 | 1485.4 | 4236.2 | 694.1 |
| NOX, gram | 2.49 | 10.92 | 48.92 | 4.52 | 4.59 | 12.84 | 45.15 | 4.33 |
| FUEL, kg | 0.388 | 0.592 | 1.586 | 0.318 | 0.285 | 0.563 | 1.608 | 0.277 |
| KW-HR | 0.71 | 1.50 | 5.13 | 0.67 | 0.68 | 1.53 | 5.23 | 0.67 |
| TEST 18-3 | | | | | | | | |
| HC, gram | 21.18 | 14.06 | 17.16 | 5.25 | 5.43 | 7.58 | 16.69 | 5.82 |
| CO, gram | 243.61 | 163.76 | 464.82 | 111.56 | 96.25 | 143.97 | 473.95 | 119.62 |
| $CO_2$, gram | 703.7 | 1490.5 | 4165.1 | 716.9 | 736.1 | 1515.4 | 4193.7 | 715.8 |
| NOX, gram | 2.67 | 12.57 | 47.55 | 4.74 | 4.55 | 13.43 | 44.50 | 4.65 |
| FUEL, kg | 0.364 | 0.565 | 1.560 | 0.287 | 0.285 | 0.557 | 1.574 | 0.291 |
| KW-HR | 0.64 | 1.46 | 5.10 | 0.65 | 0.64 | 1.50 | 5.10 | 0.65 |

[b] Test kW-hr minus Reference kW-hr divided by the Reference kW-hr times 100%.
[c] Barometric Pressure: Test 18-1 = 751 mm Hg Test 18-3 = 742 mm Hg.

TABLE C-5 (Cont'd). ENGINE 18 SUMMARY OF RESULTS
1972 Chevrolet 350

ENGINE DESCRIPTION

Engine: 1972 Chevrolet 350 Serial No. VO 210 TLX
Carburetor: Rochester Quadra Jet 4-barrel No. 7042208 QC 0402
Distributor: No. 1112047 2A19
Rated Power: 175 hp @ 4000 rpm
Maximum Torque: 290 ft-lb @ 2400 rpm
Comments:

ENGINE DATA

| | Mfg. Spec. | Measured |
|---|---|---|
| Max. Engine Torque, Ft-Lb @ RPM | N.A. | 256 @ 2800 |
| Max. Engine Power, HP @ RPM | N.A. | 155 @ 3900 |
| Cylinder Compression, psi min.-max. (avg.) | 130-150 | 125-150 (135) |
| Idle RPM | 600 | 600 |

Comments: Rated Power and Maximum Torque are not applicable.

POWER MAPPING (TQ in ft-lb) @ Temp. - 74°F Baro. - 29.37 " Hg.

| RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ |
|---|---|---|---|---|---|---|---|---|---|
| - | - | 1100 | 231 | 2100 | 236 | 3100 | 248 | 4100 | 194 |
| - | - | 1200 | 233 | 2200 | 242 | 3200 | 243 | 4200 | 185 |
| - | - | 1300 | 237 | 2300 | 247 | 3300 | 237 | 4300 | 179 |
| 400 | 204 | 1400 | 235 | 2400 | 250 | 3400 | 233 | 4400 | 170 |
| 500 | 219 | 1500 | 233 | 2500 | 253 | 3500 | 227 | 4500 | 163 |
| 600 | 220 | 1600 | 232 | 2600 | 255 | 3600 | 220 | 4600 | - |
| 700 | 220 | 1700 | 230 | 2700 | 255 | 3700 | 215 | 4700 | - |
| 800 | 223 | 1800 | 230 | 2800 | 256 | 3800 | 212 | 4800 | - |
| 900 | 220 | 1900 | 232 | 2900 | 254 | 3900 | 208 | 4900 | - |
| 1000 | 227 | 2000 | 234 | 3000 | 253 | 4000 | 201 | 5000 | - |

VEHICLE DESCRIPTION

1972 Chevrolet Step-Van
Model: Olson Kurbmaster
Transmission: Automatic GVW: 9,000 to 14,999 lbs.

TABLE C-5 (Cont'd). ENGINE 18 SUMMARY OF RESULTS
1972 Chevrolet 350

NINE-MODE MODAL RESULTS[d]

| | | Torque | Weighting | Weighted Emissions, grams/hour | | | | Weighted Fuel & Power | |
|---|---|---|---|---|---|---|---|---|---|
| Test 18-2 | | N.m | Factor | HC | CO | $CO_2$ | $NO_x$ | kg/hr | kW |
| 1 | Idle | 0 | 0.232 | 9.49 | 159.02 | 847.73 | 0.53 | 0.421 | 0.00 |
| 2 | 25% | 89 | 0.077 | 4.61 | 11.63 | 1688.06 | 13.66 | 0.583 | 1.45 |
| 3 | 55% | 195 | 0.147 | 10.88 | 33.06 | 5396.96 | 66.12 | 1.834 | 6.07 |
| 4 | 25% | 92 | 0.077 | 4.70 | 12.11 | 1728.06 | 14.60 | 0.587 | 1.49 |
| 5 | 10% | 33 | 0.057 | 2.33 | 17.74 | 846.25 | 2.03 | 0.303 | 0.39 |
| 6 | 25% | 89 | 0.077 | 4.41 | 11.25 | 1668.47 | 13.72 | 0.583 | 1.45 |
| 7 | 90% | 328 | 0.113 | 25.18 | 506.22 | 5909.86 | 74.31 | 2.307 | 7.84 |
| 8 | 25% | 91 | 0.077 | 4.53 | 13.35 | 1702.66 | 14.43 | 0.594 | 1.47 |
| 9 | CT | 0 | 0.143 | 109.55 | 61.78 | 371.00 | 0.26 | 0.305 | 0.00 |
| Test 18-4 | | | | | | | | | |
| 1 | Idle | 0 | 0.232 | 8.60 | 131.21 | 856.08 | 0.36 | 0.421 | 0.00 |
| 2 | 25% | 94 | 0.077 | 5.11 | 13.11 | 1673.09 | 14.63 | 0.583 | 1.51 |
| 3 | 55% | 195 | 0.147 | 11.25 | 32.99 | 5446.70 | 67.77 | 1.854 | 6.05 |
| 4 | 25% | 89 | 0.077 | 5.19 | 14.79 | 1708.85 | 14.77 | 0.576 | 1.45 |
| 5 | 10% | 35 | 0.057 | 3.04 | 26.48 | 885.44 | 2.51 | 0.310 | 0.42 |
| 6 | 25% | 94 | 0.077 | 5.09 | 13.36 | 1738.41 | 15.76 | 0.594 | 1.51 |
| 7 | 90% | 319 | 0.113 | 27.57 | 629.55 | 5676.35 | 59.23 | 2.255 | 7.54 |
| 8 | 25% | 86 | 0.077 | 4.79 | 15.79 | 1647.12 | 13.48 | 0.576 | 1.40 |
| 9 | CT | 0 | 0.143 | 114.13 | 62.96 | 387.99 | 0.14 | 0.259 | 0.00 |

IDLE RESULTS[e]

| | | Bagged Undiluted | Calc. from Bagged Dilute |
|---|---|---|---|
| Test 18-1 | | | |
| HC, | ppm | -- | 3500. |
| CO, | % | -- | 1.6 |
| $CO_2$, | % | 12.47 | -- |
| | | FUEL 2.3 kg/hr | D.R.[f] 128 |
| Test 18-2 | | | |
| HC, | ppm | -- | 4917. |
| CO, | % | -- | 3.0 |
| $CO_2$, | % | 11.94 | -- |
| | | FUEL 2.0 kg/hr | D.R.[f] 147 |

[d]Barometric Pressure: Test 18-2 = 746.25 mm Hg Test 18-4 = 739.14 mm Hg
[e]Idle Speed: Test 18-1 600 rpm Test 18-2 610 rpm
[f]Calculated Dilution Ratio based on carbon dioxide values minus background for Dilute and Undiluted.

TABLE C-6. ENGINE 19 SUMMARY OF RESULTS
1972 IHC 345

TRANSIENT CYCLE

| | TEST 19-2 | | | TEST 19-3 | | | |
|---|---|---|---|---|---|---|---|
| | Cold | Hot | Composite | Cold | Hot | Composite | Average |
| HC, g/kW-hr | 9.45 | 5.86 | 6.37 | 10.28 | 5.81 | 6.45 | 6.41 |
| CO, g/kW-hr | 160.94 | 155.28 | 156.09 | 153.54 | 143.78 | 145.17 | 150.63 |
| $CO_2$, g/kW-hr | 871 | 862 | 863 | 845 | 825 | 828 | 846 |
| NOX, g/kW-hr | 6.78 | 6.85 | 6.84 | 6.25 | 6.18 | 6.19 | 6.52 |
| SFC, kg/kW-hr | 0.364 | 0.354 | 0.355 | 0.353 | 0.337 | 0.339 | 0.347 |
| WORK, kW-hr | 8.64 | 8.67 | 8.67 | 8.74 | 8.76 | 8.76 | 8.72 |
| POWER, kW | 26.65 | 26.75 | 26.74 | 26.96 | 27.02 | 27.01 | 26.88 |
| Methane, g/kW-hr | 0.54 | 0.41 | 0.43 | 0.53 | 0.40 | 0.42 | 0.43 |

NINE MODE

| | Test 19-1 | Test 19-2 | Average |
|---|---|---|---|
| HC, g/kW-hr | 8.33 | 8.48 | 8.41 |
| CO, g/kW-hr | 45.58 | 46.08 | 45.83 |
| $CO_2$, g/kW-hr | 957.5 | 954.5 | 956.0 |
| NOX, g/kW-hr | 9.04 | 9.40 | 9.22 |
| SFC, kg/kW-hr | 0.393 | 0.387 | 0.390 |
| POWER, kW | 20.34 | 20.30 | 20.32 |

IDLE

| | Test 19-1 | Test 19-2 | Average |
|---|---|---|---|
| RPM | 710 | 710 | 710 |
| HC, ppmC | 2121 | 2071 | 2096 |
| CO, % | 1.3 | 1.5 | 1.4 |
| $CO_2$, % | 11.12 | 10.86 | 10.99 |
| Fuel, kg/hr | 2.2 | 2.2 | 2.2 |

TRANSIENT CYCLE AVERAGE VALUES

| | | | g/kg Fuel | g/km[a] |
|---|---|---|---|---|
| HC, g/kW-hr (g/hp-hr) | 6.41 | ( 4.78) | HC | 18.47 | 5.37 |
| CO, g/kW-hr (g/hp-hr) | 150.63 | (112.32) | CO | 434.09 | 216.18 |
| NOX, g/kW-hr (g/hp-hr) | 6.52 | ( 4.86) | NOX | 18.79 | 5.46 |
| Methane g/kW-hr (g/hp-hr) | 0.43 | ( 0.32) | Methane | 1.24 | 0.36 |
| SFC, kg/kW-hr(lb/hp-hr) | 0.347 | ( 0.571) | FUEL CONS. | -- | 291. |
| WORK, kW-hr (hp-hr) | 8.72 | ( 11.69) | | | |

[a] Using a composite value of 10.41 km for the Transient Cycle.

TABLE C-6 (Cont'd). ENGINE 19 SUMMARY OF RESULTS
1972 IHC 345

TRANSIENT CYCLE STATISTICS

| | Cold Cycle | | | Hot Cycle | | |
|---|---|---|---|---|---|---|
| TEST 19-2 | Speed | Torque | Power | Speed | Torque | Power |
| Standard Error | 44. | 7.% | 5.% | 52. | 6.% | 5.% |
| Slope | .984 | .988 | 1.000 | .984 | .973 | .998 |
| Corr. Coef. | 19977 | .9571 | .9767 | .9969 | .9641 | .9772 |
| Intercept | 29. | 2.6 | .6 | 35. | 2.9 | .5 |
| Points Used | 1144 | 1052 | 1052 | 1144 | 1079 | 1079 |
| kW-hr Dev.[b] | ---------- | 1.3 | ---------- | ---------- | 1.7 | ---------- |
| TEST 19-3 | | | | | | |
| Standard Error | 44. | 7.% | 5.% | 47. | 6.% | 6.% |
| Slope | .990 | 1.000 | 1.010 | .987 | .992 | 1.000 |
| Corr. Coef. | .9978 | .9632 | .9811 | .9975 | .9744 | .9844 |
| Intercept | 22. | 2.6 | .8 | 31. | 3.9 | 1.1 |
| Points Used | 1144 | 1134 | 1134 | 1144 | 1144 | 1144 |
| kW-hr Dev.[b] | ---------- | 2.4 | ---------- | ---------- | 2.6 | ---------- |

TRANSIENT CYCLE MODAL RESULTS[c]

| | Cold Cycle | | | | Hot Cycle | | | |
|---|---|---|---|---|---|---|---|---|
| Test 19-2 | NYNF | LANF | LAF | NYNF | NYNF | LANF | LAF | NYNF |
| HC, gram | 34.79 | 15.59 | 23.91 | 7.38 | 8.44 | 12,27 | 25.27 | 4.84 |
| CO, gram | 184.02 | 231.31 | 843.55 | 132.37 | 105.61 | 204.26 | 912.53 | 124.58 |
| $CO_2$, gram | 965.6 | 1669.8 | 4139.8 | 750.3 | 820.1 | 1585.6 | 4210.1 | 859.7 |
| NOX, gram | 4.23 | 12.32 | 38.14 | 3.95 | 4.26 | 12.77 | 38.25 | 4.15 |
| FUEL, kg | 0.430 | 0.657 | 1.747 | 0.309 | 0.319 | 0.613 | 1.805 | 0.338 |
| KW-HR | 0.71 | 1.68 | 5.51 | 0.74 | 0.74 | 1.68 | 5.51 | 0.75 |
| TEST 19-3 | | | | | | | | |
| HC, gram | 40.79 | 17.71 | 24.88 | 6.48 | 6.63 | 12.93 | 25.11 | 6.25 |
| CO, gram | 189.19 | 203.46 | 818.73 | 130.92 | 96.13 | 204.71 | 831.64 | 126.67 |
| $CO_2$ gram | 908.3 | 1620.7 | 4085.6 | 775.1 | 803.2 | 1578.0 | 4060.0 | 784.6 |
| NOX, gram | 3.56 | 11.87 | 35.31 | 3.92 | 3.82 | 11.97 | 34.62 | 3.69 |
| FUEL, kg | 0.421 | 0.629 | 1.718 | 0.316 | 0.307 | 0.612 | 1.717 | 0.316 |
| KW-HR | 0.71 | 1.70 | 5.61 | 0.73 | 0.71 | 1.71 | 5.61 | 0.74 |

[b] Test kW-hr minus Reference kW-hr divided by the Reference kW-hr times 100%.
[c] Barometric Pressure: Test 19.2= 739 mm Hg Test 19.3 = 745 mm Hg.

TABLE C-6 (Cont'd). ENGINE 19 SUMMARY OF RESULTS
1972 IHC 345

ENGINE DESCRIPTION

Engine: 1972 International Harvester 345 Serial No. 1099236V345E
Carburetor: Holley 2-bore No. 454578-C91
Distributor: No. 433142
Rated Power: 197 hp @ 4000 rpm
Maximum Torque: 309 ft-lb. @ 2200 rpm
Comments:

ENGINE DATA

| | Mfg. Spec. | Measured |
|---|---|---|
| Max. Engine Torque, Ft-Lb @ RPM | N.A. | 279 @ 2200 |
| Max. Engine Power, HP @ RPM | N.A. | 152 @ 4000 |
| Cylinder Compression, psi min.-max. (avg.) | 80% of High | 115 - 125(120) |
| Idle RPM | 700 | 700 |

Comments: Rated Power and Maximum Torque are not applicable.

POWER MAPPING (TQ in ft-lb) @ Temp. - 81°F Baro. - 29.39"Hg

| RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ |
|---|---|---|---|---|---|---|---|---|---|
| - | | 1100 | 249 | 2100 | 281 | 3100 | 253 | 4100 | 195 |
| - | | 1200 | 258 | 2200 | 279 | 3200 | 248 | 4200 | 190 |
| - | | 1300 | 264 | 2300 | 278 | 3300 | 244 | 4300 | - |
| - | | 1400 | 268 | 2400 | 274 | 3400 | 236 | 4400 | - |
| 500 | 210 | 1500 | 271 | 2500 | 272 | 3500 | 231 | 4500 | - |
| 600 | 211 | 1600 | 275 | 2600 | 269 | 3600 | 226 | 4600 | - |
| 700 | 210 | 1700 | 278 | 2700 | 268 | 3700 | 220 | 4700 | - |
| 800 | 208 | 1800 | 281 | 2800 | 265 | 3800 | 214 | 4800 | - |
| 900 | 227 | 1900 | 282 | 2900 | 262 | 3900 | 206 | 4900 | - |
| 1000 | 241 | 2000 | 282 | 3000 | 258 | 4000 | 200 | 5000 | - |

VEHICLE DESCRIPTION

1972 IHC Load Star 1600 Truck
Transmission: Manual GVW:

TABLE C-6 (Cont'd). ENGINE 19 SUMMARY OF RESULTS
1972 IHC 345

NINE-MODE MODAL RESULTS[d]

| | | Torque N.m | Weighting Factor | Weighted Emissions, grams/hour HC | CO | $CO_2$ | $NO_x$ | Weighted Fuel & Power kg/hr | kW |
|---|---|---|---|---|---|---|---|---|---|
| Test 19-1 | | | | | | | | | |
| 1 | Idle | 0 | 0.232 | 7.38 | 107.84 | 1110.3 | 0.53 | 0.600 | 0.00 |
| 2 | 25% | 92 | 0.077 | 5.54 | 18.67 | 1680.2 | 12.16 | 0.611 | 1.48 |
| 3 | 55% | 201 | 0.147 | 21.38 | 108.50 | 5037.5 | 75.94 | 1.920 | 6.17 |
| 4 | 25% | 91 | 0.077 | 5.05 | 18.33 | 1643.1 | 11.89 | 0.639 | 1.46 |
| 5 | 10% | 39 | 0.057 | 1.89 | 10.75 | 914.0 | 2.52 | 0.349 | 0.47 |
| 6 | 25% | 92 | 0.077 | 5.43 | 17.55 | 1642.2 | 12.49 | 0.629 | 1.48 |
| 7 | 90% | 329 | 0.113 | 28.96 | 589.39 | 5353.6 | 55.77 | 2.281 | 7.80 |
| 8 | 25% | 92 | 0.077 | 5.42 | 19.85 | 1634.3 | 12.41 | 0.629 | 1.48 |
| 9 | CT | 0 | 0.143 | 88.41 | 28.18 | 475.7 | 0.24 | 0.350 | 0.00 |
| Test 19-2 | | | | | | | | | |
| 1 | Idle | 0 | 0.232 | 6.79 | 100.50 | 1089.9 | 0.42 | 0.558 | 0.00 |
| 2 | 25% | 94 | 0.077 | 5.63 | 18.29 | 1699.9 | 13.60 | 0.625 | 1.51 |
| 3 | 55% | 201 | 0.147 | 20.94 | 113.20 | 5044.2 | 77.58 | 1.894 | 6.17 |
| 4 | 25% | 92 | 0.077 | 5.20 | 19.66 | 1623.0 | 12.74 | 0.622 | 1.48 |
| 5 | 10% | 35 | 0.057 | 1.73 | 11.38 | 889.9 | 2.31 | 0.336 | 0.42 |
| 6 | 25% | 92 | 0.077 | 5.64 | 19.31 | 1648.8 | 13.88 | 0.611 | 1.48 |
| 7 | 90% | 328 | 0.113 | 29.53 | 600.0 | 5303.9 | 57.48 | 2.271 | 7.76 |
| 8 | 25% | 92 | 0.077 | 5.65 | 22.96 | 1624.0 | 12.94 | 0.629 | 1.48 |
| 9 | CT | 0 | 0.143 | 90.97 | 30.63 | 466.1 | 0.07 | 0.324 | 0.00 |

IDLE RESULTS[e]

| | | Bagged Undiluted | Calc. from Bagged Dilute |
|---|---|---|---|
| Test 19-1 | | | |
| HC, | ppm | - | 2121 |
| CO, | % | - | 1.3 |
| $CO_2$, | % | 11.12 | - |
| | | FUEL 2.2 kg/hr | D.R[f] 101 |
| Test 19-2 | | | |
| HC, | ppm | - | 2071 |
| CO, | % | - | 1.5 |
| $CO_2$, | % | 10.86 | - |
| | | FUEL 2.2 kg/hr | D.R[f] 109 |

[d] Barometric Pressure: Test 19-1 = 746 mm Hg Test 19-2 = 744 mm Hg

[e] Idle Speed: Test 19-1 = 705rpm Test 19-2 = 710 rpm

[f] Calculated Dilution Ratio based on carbon dioxide values minus background for Dilute and Undiluted

TABLE C-7. ENGINE 20 SUMMARY OF RESULTS
1972 Ford 300

TRANSIENT CYCLE

| | Test 20-3 | | | Test 20-4 | | | |
|---|---|---|---|---|---|---|---|
| | Cold | Hot | Composite | Cold | Hot | Composite | Average |
| HC, g/kW-hr | 14.18 | 9.26 | 9.96 | 14.89 | 9.48 | 10.25 | 10.11 |
| CO, g/kW-hr | 108.85 | 92.71 | 95.02 | 110.08 | 93.14 | 95.56 | 95.29 |
| $CO_2$, g/kW-hr | 938 | 926 | 928 | 950 | 940 | 941 | 935 |
| NOX, g/kW-hr | 10.14 | 11.12 | 10.98 | 10.98 | 12.44 | 12.23 | 11.61 |
| SFC, kg/kW-hr | 0.364 | 0.347 | 0.349 | 0.369 | 0.352 | 0.354 | 0.352 |
| WORK, kW-hr | 6.35 | 6.30 | 6.31 | 6.25 | 6.27 | 6.27 | 6.29 |
| POWER, kW | 19.59 | 19.44 | 19.46 | 19.28 | 19.34 | 19.33 | 19.40 |
| Methane, g/kW-hr | 0.57 | 0.35 | 0.38 | 0.57 | 0.38 | 0.41 | 0.40 |

NINE MODE

| | Test 20-3 | Test 20-4 | Average |
|---|---|---|---|
| HC, g/kW-hr | 9.47 | 10.25 | 9.86 |
| CO, g/kW-hr | 44.21 | 42.66 | 43.44 |
| $CO_2$, g/kW-hr | 1034.98 | 1025.61 | 1030.30 |
| NOX, g/kW-hr | 11.45 | 11.95 | 11.70 |
| SFC, kg/kW-hr | 0.372 | 0.376 | 0.374 |
| POWER, kW | 16.58 | 16.79 | 16.69 |

IDLE

| | Test 20-3 | Test 20-4 | Average |
|---|---|---|---|
| RPM | 600 | 600 | 600 |
| HC, ppmC | 18020 | 17730 | 17875 |
| CO, % | 3.88 | 3.85 | 3.87 |
| $CO_2$, % | 9.16 | 9.16 | 9.16 |
| Fuel, kg/hr | 2.2 | 2.2 | 2.2 |

TRANSIENT CYCLE AVERAGE VALUES

| | | | g/kg Fuel | g/km[a] |
|---|---|---|---|---|
| HC, g/kW-hr (g/hp-hr) | 10.11 | ( 7.54) | HC | 28.72 | 6.11 |
| CO, g/kW-hr (g/hp-hr) | 95.29 | (71.06) | CO | 270.71 | 57.58 |
| NOX, g/kW-hr (g/hp-hr) | 11.61 | ( 8.66) | NOX | 32.98 | 7.02 |
| Methane, g/kW-hr (g/hp-hr) | 0.40 | ( 0.30) | Methane | 1.14 | 0.24 |
| SFC, kg/kW-hr (lb/hp-hr) | 0.352 | ( 0.579) | FUEL CONS. | -- | 213. |
| WORK, kW-hr (hp-hr) | 6.29 | ( 8.43) | | | |

[a] Using a composite value of 10.41 km for the Transient Cycle.

TABLE C-7 (Cont'd) ENGINE 20 SUMMARY OF RESULTS
1972 Ford 300

TRANSIENT CYCLE STATISTICS

| | Cold Cycle | | | Hot Cycle | | |
|---|---|---|---|---|---|---|
| TEST 20-3 | Speed | Torque | Power | Speed | Torque | Power |
| Standard Error | 36. | 11.% | 7.% | 33. | 8.% | 4.% |
| Slope | .998 | .947 | .986 | 1.001 | .973 | 1.000 |
| Corr. Coef. | .9982 | .8915 | .9586 | .9985 | .9491 | .9781 |
| Intercept | 10. | 5.9 | 1.1 | 10. | 2.6 | 0.1 |
| Points Used | 1144 | 1090 | 1090 | 1144 | 1113 | 1113 |
| kW-hr Dev.[b] | ---------- | +4.8 | ---------- | ---------- | +3.9 | ---------- |
| TEST 20-4 | | | | | | |
| Standard Error | 36. | 13.% | 8.% | 35. | 8.% | 5.% |
| Slope | 1.000 | .919 | .976 | .999 | .962 | .996 |
| Corr. Coef. | .9982 | .8649 | .9518 | .9983 | .9457 | .9785 |
| Intercept | 10. | 7.2 | 1.2 | 15. | 3.1 | 0.2 |
| Points Used | 1144 | 1090 | 1090 | 1144 | 1123 | 1123 |
| kW-hr Dev.[b] | ---------- | +3.2 | ---------- | ---------- | +3.4 | ---------- |

TRANSIENT CYCLE MODAL RESULTS[c]

| | Cold Cycle | | | | Hot Cycle | | | |
|---|---|---|---|---|---|---|---|---|
| TEST 20-3 | NYNF | LANF | LAF | NYNF | NYNF | LANF | LAF | NYNF |
| HC, gram | 46.73 | 17.78 | 14.96 | 10.62 | 17.45 | 14.47 | 14.87 | 11.56 |
| CO, gram | 149.91 | 124.83 | 328.67 | 87.99 | 73.35 | 100.42 | 327.13 | 83.11 |
| $CO_2$, gram | 738.6 | 1298.5 | 3301.8 | 619.2 | 648.3 | 1262.9 | 3289.2 | 631.5 |
| NOX, gram | 3.49 | 13.11 | 42.98 | 4.81 | 5.02 | 14.74 | 45.14 | 5.17 |
| FUEL, kg | 0.354 | 0.489 | 1.219 | 0.249 | 0.258 | 0.462 | 1.214 | 0.252 |
| KW-HR | 0.61 | 1.23 | 3.94 | 0.57 | 0.56 | 1.24 | 3.93 | 0.56 |
| TEST 20-4 | | | | | | | | |
| HC, gram | 51.19 | 17.90 | 15.36 | 8.68 | 19.12 | 13.58 | 15.73 | 10.97 |
| CO, gram | 141.86 | 127.60 | 327.31 | 91.72 | 72.53 | 102.75 | 324.53 | 84.12 |
| $CO_2$, gram | 678.3 | 1309.4 | 3355.4 | 595.9 | 649.0 | 1278.5 | 3348.4 | 615.1 |
| NOX, gram | 3.43 | 13.69 | 46.62 | 4.91 | 5.13 | 15.18 | 52.38 | 5.29 |
| FUEL, kg | 0.335 | 0.494 | 1.235 | 0.242 | 0.260 | 0.468 | 1.232 | 0.247 |
| KW-HR | 0.55 | 1.21 | 3.93 | 0.56 | 0.55 | 1.22 | 3.94 | 0.56 |

[b] Test kW-hr minus Reference kW-hr divided by the Reference kW-hr times 100%.
[c] Barometric Pressure: Test 20-3 = 741 mm Hg Test 20-4 = 744 mm Hg.

TABLE C-7 (Cont'd). ENGINE 20 SUMMARY OF RESULTS
1972 Ford 300

ENGINE DESCRIPTION

Engine: 1972 Ford 300 CID No. F60BCN42126
Carburetor: 1 barrel Motorcraft No. D2TZ-9510-AA Replacement Kit
Distributor: Rebuilt Unit No. C9TZ-12127-FRM (C6TF-12127-AG on unit)
Rated Power: 165 hp @ 3600 rpm
Maximum Torque: 294 ft/lb @ 2000
Comments:

ENGINE DATA

| | Mfg. Spec. | Measured |
|---|---|---|
| Max. Engine Torque, Ft-Lb @ RPM | N.A. | 220 @ 1200 |
| Max. Engine Power, HP @ RPM | N.A. | 118 @ 3400 |
| Cylinder Compression, psi min.-max. (avg.) | 75% of High | 115-135(125) |
| Idle RPM | 600 | 600 |

Comments: Rated Power and Maximum Torque are not applicable.

POWER MAPPING (TQ in ft-lb) @ Temp. - 73°F Baro. - 29.28"Hg

| RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ |
|---|---|---|---|---|---|---|---|---|---|
| - | - | 1100 | 220 | 2100 | 215 | 3100 | 196 | 4100 | - |
| - | - | 1200 | 220 | 2200 | 215 | 3200 | 192 | 4200 | - |
| - | - | 1300 | 218 | 2300 | 213 | 3300 | 187 | 4300 | - |
| 400 | 155 | 1400 | 217 | 2400 | 212 | 3400 | 182 | 4400 | - |
| 500 | 185 | 1500 | 218 | 2500 | 210 | 3500 | 175 | 4500 | - |
| 600 | 194 | 1600 | 216 | 2600 | 208 | 3600 | 170 | 4600 | - |
| 700 | 192 | 1700 | 215 | 2700 | 207 | 3700 | 162 | 4700 | - |
| 800 | 204 | 1800 | 215 | 2800 | 204 | 3800 | 153 | 4800 | - |
| 900 | 209 | 1900 | 215 | 2900 | 203 | 3900 | 145 | 4900 | - |
| 1000 | 218 | 2000 | 215 | 3000 | 199 | 4000 | 135 | 5000 | - |

VEHICLE DESCRIPTION

1972 Ford 600 Flat-bed Truck
Transmission: Manual GVW: 16,000

TABLE C-7 (Cont'd). ENGINE 20 SUMMARY OF RESULTS
1972 Ford 300

NINE-MODE MODAL RESULTS[d]

| | | Torque | Weighting | Weighted Emissions, grams/hour | | | | Weighted Fuel & Power | |
|---|---|---|---|---|---|---|---|---|---|
| Test 20-3 | | N.m | Factor | HC | CO | $CO_2$ | $NO_x$ | kg/hr | kW |
| 1 | Idle | 0 | 0.232 | 41.37 | 176.53 | 757.81 | 0.14 | 0.364 | 0.00 |
| 2 | 25% | 75 | 0.077 | 4.23 | 10.71 | 1477.75 | 13.73 | 0.491 | 1.20 |
| 3 | 55% | 165 | 0.147 | 10.18 | 29.14 | 4611.45 | 75.99 | 1.581 | 5.09 |
| 4 | 25% | 75 | 0.077 | 4.27 | 11.66 | 1434.33 | 14.47 | 0.484 | 1.19 |
| 5 | 10% | 30 | 0.057 | 4.10 | 8.61 | 774.43 | 3.25 | 0.261 | 0.36 |
| 6 | 25% | 75 | 0.077 | 4.72 | 11.65 | 1412.06 | 14.36 | 0.484 | 1.20 |
| 7 | 90% | 268 | 0.113 | 14.60 | 449.43 | 4883.23 | 54.58 | 1.857 | 6.35 |
| 8 | 25% | 75 | 0.077 | 3.91 | 11.02 | 1467.87 | 13.15 | 0.484 | 1.19 |
| 9 | CT | 0 | 0.143 | 69.64 | 24.44 | 397.60 | 0.26 | 0.223 | 0.00 |
| Test 20-4 | | | | | | | | | |
| 1 | Idle | 0 | 0.232 | 44.88 | 178.59 | 681.52 | 0.33 | 0.458 | 0.00 |
| 2 | 25% | 75 | 0.077 | 4.28 | 10.18 | 1523.49 | 18.57 | 0.512 | 1.20 |
| 3 | 55% | 165 | 0.147 | 9.88 | 28.95 | 4538.95 | 76.81 | 1.518 | 5.09 |
| 4 | 25% | 75 | 0.077 | 3.96 | 10.93 | 1452.99 | 14.48 | 0.484 | 1.20 |
| 5 | 10% | 47 | 0.057 | 3.45 | 8.85 | 810.40 | 3.49 | 0.261 | 0.57 |
| 6 | 25% | 75 | 0.077 | 4.23 | 11.01 | 1444.77 | 18.61 | 0.484 | 1.20 |
| 7 | 90% | 268 | 0.113 | 13.86 | 427.52 | 4884.72 | 53.36 | 1.827 | 6.35 |
| 8 | 25% | 73 | 0.077 | 3.95 | 11.23 | 1516.28 | 15.01 | 0.484 | 1.18 |
| 9 | CT | 0 | 0.143 | 83.54 | 29.02 | 370.31 | 0.00 | 0.283 | 0.00 |

IDLE RESULTS[e]

| | Bagged Undiluted | Calc. from Bagged Dilute |
|---|---|---|
| Test 20-3 | | |
| HC, ppm | -- | 18020. |
| CO, % | -- | 3.88 |
| $CO_2$, % | 9.13 | -- |
| | FUEL 2.2 kg/hr | D.R.[f] 143 |
| Test 20-4 | | |
| HC, ppm | -- | 17730. |
| CO, % | -- | 3.85 |
| $CO_2$, % | 9.16 | -- |
| | FUEL 2.2 kg/hr | D.R.[f] 143 |

[d]Barometric Pressure: Test 20-3 = 739 mm Hg Test 20-4 = 744 mm Hg
[e]Idle Speed: Test 20-3 600 rpm Test 20-4 600 rpm
[f]Calculated Dilution Ratio based on carbon dioxide values minus background for Dilute and Undiluted.

TABLE C-8. ENGINE 21 SUMMARY OF RESULTS
1973 IHC 304

TRANSIENT CYCLE

| | Test 21-1 | | | Test 21-2 | | | |
|---|---|---|---|---|---|---|---|
| | Cold | Hot | Composite | Cold | Hot | Composite | Average |
| HC, g/kW-hr | 6.52 | 5.19 | 5.38 | 7.78 | 5.14 | 5.52 | 5.45 |
| CO, g/kW-hr | 127.40 | 115.44 | 117.15 | 123.77 | 110.50 | 112.40 | 114.78 |
| $CO_2$, g/kW-hr | 960. | 939. | 942. | 959. | 921. | 926. | 934. |
| NOX, g/kW-hr | 7.50 | 7.76 | 7.72 | 8.03 | 8.16 | 8.14 | 7.93 |
| SFC, kg/kW-hr | 0.372 | 0.358 | 0.360 | 0.371 | 0.350 | 0.353 | 0.357 |
| WORK, kW-hr | 7.34 | 7.43 | 7.42 | 7.49 | 7.52 | 7.52 | 7.47 |
| POWER, kW | 22.64 | 22.92 | 22.88 | 23.11 | 23.20 | 23.19 | 23.04 |
| Methane, g/kW-hr | 0.43 | 0.32 | 0.34 | 0.44 | 0.31 | 0.33 | 0.34 |

NINE MODE

| | Test 21-1 | Test 21-2 | Average |
|---|---|---|---|
| HC, g/kW-hr | 9.43 | 10.18 | 9.18 |
| CO, g/kW-hr | 77.39 | 73.37 | 75.38 |
| $CO_2$, g/kW-hr | 986.7 | 1000.5 | 993.6 |
| NOX, g/kW-hr | 8.70 | 8.86 | 8.78 |
| SFC, kg/kW-hr | 0.397 | 0.412 | 0.405 |
| POWER, kW | 18.11 | 17.83 | 17.97 |

IDLE

| | Test 21-1 | Test 21-2 | Average |
|---|---|---|---|
| RPM | 695 | 705 | 700 |
| HC, ppmC | 1376 | 1785 | 1581 |
| CO, % | 0.19 | 0.33 | 0.26 |
| $CO_2$, % | 11.19 | 13.68 | 12.44 |
| Fuel, kg/hr | 2.3 | 2.2 | 2.3 |

TRANSIENT CYCLE AVERAGE VALUES

| | | | g/kg Fuel | g/km[a] |
|---|---|---|---|---|
| HC, g/kW-hr (g/hp-hr) | 5.45 | (4.06) | HC | 15.27 | 3.91 |
| CO, g/kW-hr (g/hp-hr) | 114.78 | (85.59) | CO | 321.51 | 82.36 |
| NOX, g/kW-hr (g/hp-hr) | 7.93 | (5.91) | NOX | 22.21 | 5.69 |
| Methane, g/kW-hr (g/hp-hr) | 0.34 | (0.25) | Methane | 0.95 | 0.24 |
| SFC, kg/kW-hr (lb/hp-hr) | 0.357 | (0.587) | FUEL CONS. | - | 256. |
| WORK, kW-hr (hp-hr) | 7.47 | (10.02) | | | |

[a] Using a composite value of 10.41 km for the Transient Cycle.

TABLE C-8 (Cont'd). ENGINE 21 SUMMARY OF RESULTS
1973 IHC 304

TRANSIENT CYCLE STATISTICS

| | Cold Cycle | | | Hot Cycle | | |
|---|---|---|---|---|---|---|
| TEST 21-1 | Speed | Torque | Power | Speed | Torque | Power |
| Standard Error | 94. | 9.% | 7.% | 60. | 8.% | 8.% |
| Slope | .993 | .960 | .993 | .984 | .952 | .992 |
| Corr. Coef. | .9906 | .9385 | .9608 | .9960 | .9492 | .9614 |
| Intercept | 7. | 4.3 | .8 | 33. | 6.4 | 1.1 |
| Points Used | 1144 | 1144 | 1144 | 1144 | 1144 | 1144 |
| kW-hr Dev.[b] | ---------- | 1.9 | ---------- | ---------- | 3.1 | ---------- |
| TEST 21-2 | | | | | | |
| Standard Error | 62. | 7.% | 7.% | 65. | 8.% | 7.% |
| Slope | .995 | .968 | .996 | .985 | .949 | .990 |
| Corr. Coef. | .9959 | .9530 | .9743 | .9954 | .9457 | .9747 |
| Intercept | 20. | 6.4 | 1.6 | 40. | 7.4 | 1.6 |
| Points Used | 1144 | 1130 | 1130 | 1144 | 1141 | 1141 |
| kW-hr Dev.[b] | ---------- | 3.8 | ---------- | ---------- | 4.2 | ---------- |

TRANSIENT CYCLE MODAL RESULTS[c]

| | Cold Cycle | | | | Hot Cycle | | | |
|---|---|---|---|---|---|---|---|---|
| TEST 21-1 | NYNF | LANF | LAF | NYNF | NYNF | LANF | LAF | NYNF |
| HC, gram | 15.65 | 8.01 | 19.63 | 4.57 | 6.67 | 7.47 | 19.25 | 5.22 |
| CO, gram | 119.61 | 135.56 | 598.13 | 82.37 | 61.52 | 117.31 | 596.68 | 82.74 |
| $CO_2$, gram | 960. | 1618. | 3689. | 780. | 821. | 1567. | 3769. | 823. |
| NOX, gram | 4.07 | 11.92 | 35.30 | 3.81 | 4.14 | 12.79 | 36.59 | 4.17 |
| FUEL, kg | 0.378 | 0.585 | 1.479 | 0.291 | 0.296 | 0.560 | 1.503 | 0.306 |
| KW-HR | 0.57 | 1.42 | 4.71 | 0.65 | 0.59 | 1.47 | 4.71 | 0.66 |
| TEST 21-2 | | | | | | | | |
| HC, gram | 24.89 | 9.10 | 19.50 | 4.74 | 6.55 | 8.00 | 19.56 | 4.53 |
| CO, gram | 146.97 | 129.83 | 570.15 | 79.70 | 63.81 | 115.20 | 572.97 | 78.66 |
| $CO_2$, gram | 951. | 1645. | 3772. | 811.1 | 815.1 | 1555.2 | 3732.1 | 819.4 |
| NOX, gram | 4.17 | 13.27 | 38.34 | 4.32 | 4.32 | 13.92 | 38.76 | 4.32 |
| FUEL, kg | 0.397 | 0.592 | 1.491 | 0.300 | 0.295 | 0.555 | 1.480 | 0.302 |
| KW-HR | 0.59 | 1.48 | 4.74 | 0.68 | 0.61 | 1.50 | 4.74 | 0.67 |

[b]Test kW-hr minus Reference kW-hr divided by the Reference kW-hr times 100%.
[c]Barometric Pressure: Test 21-1 = 751 mm Hg Test 21-2 = 754 mm Hg.

TABLE C-8 (Cont'd). ENGINE 21 SUMMARY OF RESULTS
1974 IHC 304

## ENGINE DESCRIPTION

Engine: 1973 International Harvester 304
Carburetor: Holley 2-barrel No. 427908C9
Distributor: IHC No. 428095C91
Rated Power: 147 hp @ 3900 rpm
Maximum Torque: 240 ft/lb @ 2400 rpm
Comments:

## ENGINE DATA

| | Mfg. Spec. | Measured |
|---|---|---|
| Max. Engine Torque, Ft-Lb @ RPM | N.A. | 230 @ 2400 |
| Max. Engine Power, HP @ RPM | N.A. | 128 @ 3900 |
| Cylinder Compression, psi min.-max. (avg.) | -- | 125-135(130) |
| Idle RPM | 700 | 700 |

Comments: Rated Power and Maximum Torque are not applicable.



POWER MAPPING (TQ in ft-lb) @ Temp. - Baro. -

| RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ |
|---|---|---|---|---|---|---|---|---|---|
| - | - | 1100 | 199 | 2100 | 229 | 3100 | 212 | 4100 | 165 |
| - | - | 1200 | 206 | 2200 | 230 | 3200 | 207 | 4200 | 160 |
| - | - | 1300 | 212 | 2300 | 230 | 3300 | 202 | 4300 | 156 |
| - | - | 1400 | 221 | 2400 | 230 | 3400 | 198 | 4400 | 0 |
| 500 | 173 | 1500 | 223 | 2500 | 230 | 3500 | 193 | 4500 | - |
| 600 | 179 | 1600 | 225 | 2600 | 229 | 3600 | 190 | 4600 | - |
| 700 | 184 | 1700 | 228 | 2700 | 227 | 3700 | 183 | 4700 | - |
| 800 | 186 | 1800 | 229 | 2800 | 224 | 3800 | 179 | 4800 | - |
| 900 | 185 | 1900 | 229 | 2900 | 222 | 3900 | 174 | 4900 | - |
| 1000 | 193 | 2000 | 230 | 3000 | 217 | 4000 | 170 | 5000 | - |

## VEHICLE DESCRIPTION

No Vehicle

TABLE C-8 (Cont'd). ENGINE 21 SUMMARY OF RESULTS
1973 IHC 304

NINE-MODE MODAL RESULTS[d]

| | | Torque | Weighting | Weighted Emissions, grams/hour | | | | Weighted Fuel & Power | |
|---|---|---|---|---|---|---|---|---|---|
| Test 21-1 | | N.m | Factor | HC | CO | $CO_2$ | $NO_x$ | kg/hr | kW |
| 1 | Idle | 0 | 0.232 | 5.60 | 19.88 | 1336.3 | 0.70 | 0.495 | 0.00 |
| 2 | 25% | 83 | 0.077 | 6.73 | 66.56 | 1531.3 | 10.82 | 0.559 | 1.33 |
| 3 | 55% | 179 | 0.147 | 19.23 | 106.95 | 4583.0 | 76.19 | 1.627 | 5.50 |
| 4 | 25% | 81 | 0.077 | 6.59 | 70.82 | 1476.6 | 10.83 | 0.576 | 1.31 |
| 5 | 10% | 33 | 0.057 | 2.12 | 23.15 | 836.3 | 2.46 | 0.313 | 0.39 |
| 6 | 25% | 83 | 0.077 | 7.14 | 68.31 | 1521.2 | 11.76 | 0.587 | 1.33 |
| 7 | 90% | 293 | 0.113 | 30.80 | 949.06 | 4522.3 | 34.05 | 2.178 | 6.94 |
| 8 | 25% | 81 | 0.077 | 6.59 | 76.30 | 1478.9 | 10.73 | 0.559 | 1.31 |
| 9 | CT | 0 | 0.143 | 85.94 | 21.42 | 593.7 | 0.26 | 0.305 | 0.00 |
| Test 21-2 | | | | | | | | | |
| 1 | Idle | 0 | 0.232 | 5.18 | 14.34 | 1285.4 | 0.75 | 0.516 | 0.00 |
| 2 | 25% | 80 | 0.077 | 6.24 | 57.49 | 1502.8 | 10.93 | 0.562 | 1.29 |
| 3 | 55% | 176 | 0.147 | 19.51 | 108.33 | 4605.6 | 75.39 | 1.727 | 5.43 |
| 4 | 25% | 80 | 0.077 | 6.13 | 59.50 | 1487.1 | 10.84 | 0.576 | 1.29 |
| 5 | 10% | 34 | 0.057 | 1.95 | 19.57 | 846.9 | 2.46 | 0.328 | 0.40 |
| 6 | 25% | 80 | 0.077 | 6.35 | 56.38 | 1487.3 | 11.33 | 0.576 | 1.29 |
| 7 | 90% | 289 | 0.113 | 29.57 | 903.61 | 4533.9 | 35.19 | 2.122 | 6.84 |
| 8 | 25% | 80 | 0.077 | 6.14 | 61.50 | 1493.9 | 10.78 | 0.594 | 1.29 |
| 9 | CT | 0 | 0.143 | 100.40 | 27.49 | 595.3 | 0.30 | 0.344 | 0.00 |

IDLE RESULTS[e]

| | Bagged Undiluted | Calc. from Bagged Dilute |
|---|---|---|
| Test 21-1 | | |
| HC, ppm | - | 1376 |
| CO, % | - | 0.19 |
| $CO_2$, % | 11.19 | - |
| | Fuel 2.3 kg/hr | D.R.[f] 86 |
| Test 21-2 | | |
| HC, ppm | - | 1785 |
| CO, % | - | 0.33 |
| $CO_2$, % | 13.68 | - |
| | Fuel 2.2 kg/hr | D.R.[f] 105 |

[d] Barometric Pressure: Test 21-1 = mmHg Test 21-2 = 751 mmHg
[e] Idle Speed: Test 21-1=695 rpm Test 21-2=705 rpm
[f] Calculated Dilution Ratio based on carbon dioxide values minus background for Dilute and Undiluted.

TABLE C-9. ENGINE 22 SUMMARY OF RESULTS
1973 GMC 366 [a]

TRANSIENT CYCLE

| | TEST 22-3 | | | TEST 22-4 | | | |
|---|---|---|---|---|---|---|---|
| | Cold | Hot | Composite | Cold | Hot | Composite | Average |
| HC, g/kW-hr | 10.23 | 7.36 | 7.77 | 11.56 | 7.22 | 7.84 | 7.81 |
| CO, g/kW-hr | 191.38 | 173.09 | 175.70 | 195.17 | 170.84 | 174.32 | 175.01 |
| $CO_2$, g/kW-hr | 982. | 949. | 954. | 1023. | 1013. | 1014. | 984. |
| NOX, g/kW-hr | 6.48 | 6.26 | 6.29 | 6.62 | 6.55 | 6.56 | 6.43 |
| SFC, kg/kW-hr | 0.414 | 0.392 | 0.395 | 0.431 | 0.411 | 0.414 | 0.405 |
| WORK, kW-hr | 8.14 | 8.17 | 8.17 | 8.11 | 8.16 | 8.15 | 8.16 |
| POWER, kW | 25.11 | 25.20 | 25.19 | 25.02 | 25.17 | 25.15 | 25.17 |
| Methane, g/kW-hr | 0.79 | 0.56 | 0.59 | 0.81 | 0.58 | 0.61 | 0.60 |

NINE MODE

| | Test 22-2 | Test 22-3 | Average |
|---|---|---|---|
| HC, g/kW-hr | 8.60 | 8.53 | 8.57 |
| CO, g/kW-hr | 132.77 | 130.59 | 131.68 |
| $CO_2$, g/kW-hr | 1010.3 | 1005.6 | 1008.0 |
| NOX, g/kW-hr | 5.60 | 5.67 | 5.64 |
| SFC, kg/kW-hr | 0.395 | 0.398 | 0.397 |
| POWER, kW | 21.5 | 21.6 | 21.6 |

IDLE

| | Test 22-2 | Test 22-3 | Average |
|---|---|---|---|
| RPM | 525 | 535 | 530 |
| HC, ppmC | 4940 | 4940 | 4940 |
| CO, % | 1.87 | 1.87 | 1.87 |
| $CO_2$, % | 11.66 | 11.66 | 11.66 |
| Fuel, kg/hr | 1.6 | 1.8 | 1.7 |

TRANSIENT CYCLE AVERAGE VALUES

| | | | | g/kg Fuel | g/km [b] |
|---|---|---|---|---|---|
| HC, | g/kW-hr (g/hp-hr) | 7.81 | (5.82) | 19.28 | 6.12 |
| CO, | g/kW-hr (g/hp-hr) | 175.01 | (130.51) | 432.1 | 137.18 |
| NOX, | g/kW-hr (g/hp-hr) | 6.43 | (4.79) | 15.88 | 5.04 |
| Methane | g/kW-hr (g/hp-hr) | 0.60 | (0.45) | 1.48 | 0.47 |
| SFC, | kg/kW-hr (lb/hp-hr) | 0.405 | (0.666) | -- | 317. |
| WORK, | kW-hr (hp-hr) | 8.16 | (10.94) | | |

[a] Was previously tested as Engine 11
[b] Using a composite value of 10.41 km for the Transient Cycle.

TABLE C-9 (Cont'd). ENGINE 22 SUMMARY OF RESULTS
1973 GMC 366

TRANSIENT CYCLE STATISTICS

| | Cold Cycle | | | Hot Cycle | | |
|---|---|---|---|---|---|---|
| TEST 22-3 | Speed | Torque | Power | Speed | Torque | Power |
| Standard Error | 91. | 8.% | 6.% | 98. | 8.% | 6.% |
| Slope | .978 | .929 | .974 | .974 | .902 | .964 |
| Corr. Coef. | .9921 | .9421 | .9806 | .9909 | .9337 | .9794 |
| Intercept | 41. | 8.9 | 1.4 | 50. | 11.0 | 1.5 |
| Points Used | 1144 | 1136 | 1136 | 1144 | 1144 | 1144 |
| kW-hr Dev.[c] | ---------- | -5.3 | ---------- | ---------- | -4.9 | ---------- |
| TEST 22-4 | | | | | | |
| Standard Error | 93. | 9.% | 6.% | 95. | 9.% | 6.% |
| Slope | .979 | .929 | .976 | .977 | .886 | .958 |
| Corr. Coef. | .9918 | .9263 | .9738 | .9915 | .9198 | .9754 |
| Intercept | 31. | 9.0 | 1.2 | 39. | 13.8 | 1.8 |
| Points Used | 1144 | 1134 | 1134 | 1144 | 1144 | 1144 |
| kW-hr Dev.[c] | ---------- | -5.6 | ---------- | ---------- | -5.0 | ---------- |

TRANSIENT CYCLE MODAL RESULTS[d]

| | Cold Cycle | | | | Hot Cycle | | | |
|---|---|---|---|---|---|---|---|---|
| TEST 22-3 | NYNF | LANF | LAF | NYNF | NYNF | LANF | LAF | NYNF |
| HC, gram | 25.64 | 18.83 | 30.95 | 7.89 | 8.41 | 14.48 | 30.45 | 6.82 |
| CO, gram | 210.14 | 230.28 | 1003.74 | 114.08 | 111.22 | 205.96 | 995.04 | 102.18 |
| $CO_2$, gram | 964.8 | 1872.3 | 4336.2 | 819.1 | 854.7 | 1739.1 | 4332.2 | 826.0 |
| NOX, gram | 4.37 | 12.31 | 32.13 | 3.98 | 3.58 | 11.39 | 32.30 | 3.90 |
| FUEL, kg | 0.434 | 0.723 | 1.895 | 0.323 | 0.333 | 0.665 | 1.889 | 0.318 |
| KW-HR | 0.63 | 1.61 | 5.26 | 0.64 | 0.66 | 1.60 | 5.27 | 0.64 |
| TEST 22-4 | | | | | | | | |
| HC, gram | 35.85 | 19.66 | 32.04 | 6.25 | 7.26 | 14.78 | 30.09 | 6.83 |
| CO, gram | 221.29 | 223.07 | 1033.70 | 105.40 | 106.38 | 189.10 | 990.51 | 108.75 |
| $CO_2$, gram | 1002.6 | 1919.3 | 4502.8 | 872.0 | 894.9 | 1869.3 | 4588.6 | 915.0 |
| NOX, gram | 4.95 | 13.59 | 30.94 | 4.25 | 3.98 | 12.66 | 32.09 | 4.78 |
| FUEL, kg | 0.462 | 0.735 | 1.964 | 0.333 | 0.342 | 0.698 | 1.967 | 0.349 |
| KW-HR | 0.62 | 1.57 | 5.28 | 0.63 | 0.63 | 1.59 | 5.28 | 0.66 |

[c]Test kW-hr minus Reference kW-hr divided by the Reference kW-hr times 100%.
[d]Barometric Pressure: Test 22-3 = 735 mm Hg Test 22-4 = 743 mm Hg.

TABLE C-9 (ont'd). ENGINE 22 SUMMARY OF RESULTS
1973 GMC 366

## ENGINE DESCRIPTION

Engine: 1973 GMC 366 V-8 No. TO818TOA
Carburetor: Holley 4-barrel #685981
Distributor: Delco-Remy No. 1111365
Rated Power: 200 hp @ 4000 rpm
Maximum Torque: 310 ft/lb @ 2800 rpm
Comments:

## ENGINE DATA

| | Mfg. Spec. | Measured |
|---|---|---|
| Max. Engine Torque, Ft-Lb @ RPM | N.A. | 286 @ 2700 |
| Max. Engine Power, HP @ RPM | N.A. | 178 @ 4000 |
| Cylinder Compression, pse min.-max. (avg.) | 75% of High | 115-123(125) |
| Idle RPM | 550 | 550 |
| Comments: | | |



POWER MAPPING (TQ in ft-lb) @ Temp. - Baro. -

| RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ |
|---|---|---|---|---|---|---|---|---|---|
| - | - | 1100 | 221 | 2100 | 281 | 3100 | 285 | 4100 | |
| - | - | 1200 | 228 | 2200 | 282 | 3200 | 281 | 4200 | |
| - | - | 1300 | 237 | 2300 | 284 | 3300 | 285 | 4300 | |
| 400 | 210 | 1400 | 239 | 2400 | 285 | 3400 | 270 | 4400 | |
| 500 | 221 | 1500 | 246 | 2500 | 286 | 3500 | 263 | 4500 | |
| 600 | 223 | 1600 | 254 | 2600 | 286 | 3600 | 255 | 4600 | |
| 700 | 214 | 1700 | 262 | 2700 | 286 | 3700 | 253 | 4700 | |
| 800 | 212 | 1800 | 270 | 2800 | 285 | 3800 | 245 | 4800 | |
| 900 | 212 | 1900 | 274 | 2900 | 284 | 3900 | 238 | 4900 | |
| 1000 | 216 | 2000 | 281 | 3000 | 289 | 4000 | 234 | 5000 | |

## VEHICLE DESCRIPTION

1973 GMC Van
Transmission: Manual GVW: 19,000-24,000

TABLE C-9 (Cont'd). ENGINE 22 SUMMARY OF RESULTS
1973 GMC 366

NINE-MODE MODAL RESULTS[e]

| Test | | Torque N.m | Weighting Factor | Weighted Emissions, grams/hour HC | CO | $CO_2$ | $NO_x$ | Weighted Fuel & Power kg/hr | kW |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Idle | 0 | 0.232 | 13.17 | 84.55 | 947.7 | 0.31 | 0.316 | 0.00 |
| 2 | 25% | 99 | 0.077 | 6.19 | 91.94 | 2056.8 | 8.45 | 0.699 | 1.59 |
| 3 | 55% | 210 | 0.147 | 19.18 | 164.58 | 6071.7 | 64.05 | 2.034 | 6.48 |
| 4 | 25% | 96 | 0.077 | 6.36 | 113.97 | 1998.9 | 7.56 | 0.692 | 1.55 |
| 5 | 10% | 39 | 0.057 | 1.61 | 35.31 | 1178.7 | 2.26 | 0.401 | 0.47 |
| 6 | 25% | 99 | 0.077 | 6.39 | 106.94 | 2020.7 | 8.21 | 0.702 | 1.59 |
| 7 | 90% | 348 | 0.113 | 50.63 | 2089.70 | 5105.3 | 21.30 | 2.768 | 8.25 |
| 8 | 25% | 96 | 0.077 | 6.55 | 115.97 | 1998.4 | 8.16 | 0.699 | 1.55 |
| 9 | CT | 0 | 0.143 | 74.56 | 48.44 | 319.5 | 0.15 | 0.175 | 0.00 |
| Test | | | | | | | | | |
| 1 | Idle | 0 | 0.232 | 11.44 | 83.72 | 926.2 | 0.39 | 0.389 | 0.00 |
| 2 | 25% | 98 | 0.077 | 6.01 | 93.89 | 2027.5 | 8.50 | 0.706 | 1.57 |
| 3 | 55% | 216 | 0.147 | 18.96 | 172.84 | 6142.1 | 65.62 | 2.087 | 6.64 |
| 4 | 25% | 102 | 0.077 | 6.63 | 102.75 | 2028.6 | 9.11 | 0.709 | 1.64 |
| 5 | 10% | 41 | 0.057 | 1.41 | 33.84 | 1163.7 | 2.13 | 0.388 | 0.49 |
| 6 | 25% | 95 | 0.077 | 6.02 | 98.05 | 2015.9 | 8.14 | 0.699 | 1.53 |
| 7 | 90% | 346 | 0.113 | 47.88 | 2053.34 | 5069.4 | 20.39 | 2.717 | 8.18 |
| 8 | 25% | 98 | 0.077 | 7.13 | 121.10 | 2001.3 | 8.01 | 0.727 | 1.57 |
| 9 | CT | 0 | 0.143 | 79.02 | 63.58 | 363.8 | 0.19 | 0.182 | 0.00 |

IDLE RESULTS[f]

| | | Bagged Undiluted | Calc. from Bagged Dilute |
|---|---|---|---|
| Test 22-2 | | | |
| HC, | ppm | -- | 4940 |
| CO, | % | -- | 1.87 |
| $CO_2$, | % | 11.66 | -- |
| | | Fuel 1.6 lg.hr | 130 D.R.[g] |
| Test 22-3 | | | |
| HC, | ppm | -- | 4940 |
| CO, | % | -- | 1.87 |
| $CO_2$, | % | 11.66 | -- |
| | | Fuel 1.8 kg/hr | 130 D.R.[g] |

[e]Barometric Pressure: Test 22-2 = 737 mmHg Test 22-3 = 733 mmHg
[f]Idle Speed: Test 22-2=525 rpm Test 22-3=535 rpm
[g]Calculated Dilution Ratio based on carbon dioxide values minus background for Dilute and Undiluted.

TABLE C-10. ENGINE 11 SUMMARY OF RESULTS
1973 GMC 366

TRANSIENT CYCLE

| | | TEST 11-6 | | | TEST 11-8 | | | |
|---|---|---|---|---|---|---|---|---|
| | | Cold | Hot | Composite | Cold | Hot | Composite | Average |
| HC, | g/kW-hr | 15.73 | 13.89 | 14.15 | 20.48 | 15.00 | 15.78 | 14.97 |
| CO, | g/kW-hr | 273.58 | 226.41 | 233.15 | 252.37 | 223.89 | 227.96 | 230.56 |
| $CO_2$, | g/kW-hr | 928. | 919. | 920. | 999. | 898. | 912. | 916. |
| NOX, | g/kW-hr | 3.36 | 3.62 | 3.58 | 4.31 | 3.64 | 3.74 | 3.66 |
| SFC, | kg/kW-hr | 0.444 | 0.416 | 0.420 | 0.461 | 0.409 | 0.416 | 0.418 |
| WORK, | kW-hr | 8.06 | 8.03 | 8.03 | 8.05 | 8.01 | 8.02 | 8.02 |
| POWER, | kW | 24.87 | 24.77 | 23.78 | 24.83 | 24.71 | 24.73 | 24.76 |

NINE MODE

| | | Test 11-1 | Test 11-2 | Average |
|---|---|---|---|---|
| HC, | g/kW-hr | 15.39 | 14.06 | 14.73 |
| CO, | g/kW-hr | 183.04 | 188.74 | 185.89 |
| NOX, | g/kW-hr | 5.43 | 5.56 | 5.50 |
| SFC, | kg/kW-hr | 0.440 | 0.435 | 0.438 |
| POWER, | kW | | | |

IDLE

| | | Test | Test | Average |
|---|---|---|---|---|
| RPM | | | | |
| HC, | ppmC | | | |
| CO, | % | | N.A. | |
| $CO_2$, | % | | | |
| Fuel, | kg/hr | | | |

TRANSIENT CYCLE AVERAGE VALUES

| | | | | | g/kg Fuel | g/km[a] |
|---|---|---|---|---|---|---|
| HC, | g/kW-hr (g/hp-hr) | 14.97 | (11.16) | HC | 35.81 | 11.53 |
| CO, | g/kW-hr (g/hp-hr) | 230.56 | (171.93) | CO | 551.58 | 177.63 |
| NOX, | g/kW-hr (g/hp-hr) | 3.66 | (2.73) | NOX | 8.76 | 2.82 |
| SFC, | kg/kW-hr (lb/hp-hr) | 0.418 | (0.687) | FUEL CONS. | -- | 322. |
| WORK, | kW-hr (hp-hr) | 8.02 | (10.71) | | | |

[a] Using a composite value of 10.41 km for the Transient Cycle.

TABLE C-10 (Cont'd). ENGINE 11 SUMMARY OF RESULTS
1973 GMC 366

TRANSIENT CYCLE STATISTICS

| | Cold Cycle | | | Hot Cycle | | |
|---|---|---|---|---|---|---|
| TEST 11-6 | Speed | Torque | Power | Speed | Torque | Power |
| Standard Error | 46. | 11.% | 8.% | 52. | 8.% | 7.% |
| Slope | 1.007 | .910 | .975 | 1.003 | .949 | .981 |
| Corr. Coef. | .9977 | .8886 | .9625 | .9970 | .9386 | .9702 |
| Intercept | 23. | 12.9 | 2.9 | 37. | 7.1 | 2.1 |
| Points Used | 1144 | 1119 | 1119 | 1144 | 1138 | 1138 |
| kW-hr Dev.[c] | | | | | | |
| TEST 11-8 | | | | | | |
| Standard Error | 52. | 9.% | 8.% | 45. | 7.% | 6.% |
| Slope | 1.004 | .932 | .963 | 1.008 | .948 | .972 |
| Corr. Coef. | .9970 | .9214 | .9699 | .9977 | .9572 | .9755 |
| Intercept | 11. | 9.8 | 2.7 | 11. | 5.9 | 1.9 |
| Points Used | 1144 | 1117 | 1117 | 1144 | 1138 | 1138 |
| kW-hr Dev.[c] | | | | | | |

TRANSIENT CYCLE MODAL RESULTS[d]

| | Cold Cycle | | | | Hot Cycle | | | |
|---|---|---|---|---|---|---|---|---|
| Test 11-6 | NYNF | LANF | LAF | NYNF | NYNF | LANF | LAF | NYNF |
| HC, gram | 55.21 | 31.33 | 27.62 | 12.67 | 32.22 | 27.13 | 32.31 | 19.90 |
| CO, gram | 439.27 | 323.66 | 1257.28 | 185.18 | 147.38 | 291.79 | 1206.08 | 173.14 |
| $CO_2$, gram | 872.2 | 1809.1 | 3932.4 | 869.0 | 799.8 | 1723.2 | 3999.6 | 854.3 |
| NOX, gram | 2.36 | 9.52 | 12.61 | 2.61 | 2.95 | 9.11 | 14.39 | 2.66 |
| FUEL, kg | 0.548 | 0.762 | 1.890 | 0.378 | 0.357 | 0.715 | 1.891 | 0.375 |
| KW-HR | 0.70 | 1.56 | 5.11 | 0.70 | 0.67 | 1.56 | 5.11 | 0.70 |
| TEST 11-8 | | | | | | | | |
| HC, gram | 65.95 | 40.75 | 35.71 | 22.34 | 35.90 | 30.66 | 32.61 | 20.99 |
| CO, gram | 292.80 | 335.28 | 1225.56 | 176.98 | 145.84 | 280.55 | 1185.33 | 181.37 |
| $CO_2$ gram | 975.6 | 1896.4 | 4273.4 | 895.6 | 819.5 | 1699.7 | 3796.7 | 874.6 |
| NOX, gram | 3.37 | 10.17 | 18.47 | 2.66 | 3.03 | 9.22 | 14.01 | 2.85 |
| FUEL, kg | 0.519 | 0.805 | 1.990 | 0.392 | 0.366 | 0.705 | 1.817 | 0.387 |
| KW-HR | 0.70 | 1.59 | 5.07 | 0.69 | 0.67 | 1.57 | 5.08 | 0.69 |

[c]Test kW-hr minus Reference kW-hr divided by the Reference kW-hr times 100%.
[d]Barometric Pressure: Test 11-6 = 742 mm Hg Test 11-8 = 735 mm Hg.

TABLE C-10 (Cont'd). ENGINE 11 SUMMARY OF RESULTS
1973 GMC 366

## ENGINE DESCRIPTION

Engine: 1973 General Motors 366 CID No. T0818T0A
Carburetor: Holley 4-barrel No. 685981
Distributor: Delco-Remy No. 1111365
Rated Power: 200 hp @ 4000 rpm
Maximum Torque: 310 ft/lbs @ 2800 rpm
Comments:

## ENGINE DATA

| | Mfg. Spec. | Measured |
|---|---|---|
| Max. Engine Torque, Ft-Lb @ RPM | 310 @ 2800 | 273 @ 2100 |
| Max. Engine Power, HP @ RPM | 200 @ 4000 | 161 @ 3700 |
| Cylinder Compression, psi min.-max. (avg.) | | 125-146 (132) |
| Idle RPM | 550 | 550 |

Comments: Rated Power and Maximum Torque are not applicable.



POWER MAPPING (TQ in ft-lb) @ Temp. - 74 Baro. - 29.08

| RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ |
|---|---|---|---|---|---|---|---|---|---|
| - | | 1100 | 211 | 2100 | 273 | 3100 | 248 | 4100 | |
| - | | 1200 | 219 | 2200 | 271 | 3200 | 247 | 4200 | |
| - | | 1300 | 230 | 2300 | 267 | 3300 | 242 | 4300 | |
| 400 | 216 | 1400 | 235 | 2400 | 268 | 3400 | 239 | 4400 | |
| 500 | 212 | 1500 | 245 | 2500 | 264 | 3500 | 238 | 4500 | |
| 600 | 206 | 1600 | 255 | 2600 | 263 | 3600 | 234 | 4600 | |
| 700 | 190 | 1700 | 260 | 2700 | 260 | 3700 | 229 | 4700 | |
| 800 | 193 | 1800 | 266 | 2800 | 254 | 3800 | 221 | 4800 | |
| 900 | 199 | 1900 | 269 | 2900 | 256 | 3900 | 123 | 4900 | |
| 1000 | 202 | 2000 | 273 | 3000 | 253 | 4000 | 0 | 5000 | |

## APPENDIX D

## $NO_X$ BASELINE DATA COMPUTER PRINTOUTS

| Table Number | Engine Number | Description |
|---|---|---|
| D-1 | 14 | 1972 Ford 361 |
| D-2 | 15 | 1973 Dodge 413 |
| D-3 | 16 | 1973 Chevrolet 454 |
| D-4 | 17 | 1973 GMC 427 |
| D-5 | 18 | 1972 Chevrolet 350 |
| D-6 | 19 | 1972 IHC 345 |
| D-7 | 20 | 1972 Ford 300 |
| D-8 | 21 | 1973 IHC 304 |
| D-9 | 22 | 1973 GMC 366 |
| D-10 | 11[a] | 1973 GMC 366 |

[a] Engine 11 was retested as Engine 22.

# TABLE D-1A. TEST 14-2 EMISSIONS RESULTS

COLD TRANSIENT

PROJECT NO. 11-5044-001

ENGINE NO.
ENGINE MODEL 72 FORD 361
ENGINE 5.9 L(361 CID)
CVS NO. 9

TEST NO.14-2 RUN
DATE 8/17/79
TIME 09:39
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 743.46 MM HG(29.27 IN HG)
DRY BULB TEMP. 21.7 DEG C(71.0 DEG F)

RELATIVE HUMIDITY 68 PCT
ABSOLUTE HUMIDITY 11.3 GM/KG( 78.8 GRAINS/LB)

NOX HUMIDITY C.F. 1.0180

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7164 | 8084 | 8316 | 7190 |
| TIME SECONDS | 272.0 | 306.9 | 316.0 | 273.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 182.6 ( 6451) | 205.7 ( 7266) | 210.0 ( 7418) | 183.1 ( 6468) |
| HC SAMPLE METER/RANGE/PPM | 59.1/ 3/ 591 | 49.0/ 3/ 490 | 37.0/ 3/ 370 | 24.4/ 3/ 244 |
| HC BCKGRD METER/RANGE/PPM | 3.6/ 3/ 36 | 5.4/ 3/ 54 | 5.1/ 3/ 51 | 4.8/ 3/ 48 |
| CO SAMPLE METER/RANGE/PPM | 38.8/ 3/ 1125 | 63.6/ 3/ 1820 | 66.6/ 2/ 4285 | 34.1/ 3/ 990 |
| CO BCKGRD METER/RANGE/PPM | 1.0/ 3/ 29 | .4/ 3/ 11 | .7/ 2/ 42 | 1.0/ 3/ 29 |
| CO2 SAMPLE METER/RANGE/PCT | 19.5/ 3/ .30 | 29.7/ 3/ .48 | 63.2/ 3/ 1.10 | 17.5/ 3/ .27 |
| CO2 BCKGRD METER/RANGE/PCT | 3.2/ 3/ .05 | 3.8/ 3/ .06 | 2.9/ 3/ .04 | 3.4/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 12.8/ 2/ 13 | 25.9/ 2/ 26 | 64.9/ 2/ 65 | 12.4/ 2/ 12 |
| NOX BCKGRD METER/RANGE/PPM | .4/ 2/ 0 | .5/ 2/ 1 | .8/ 2/ 1 | 1.0/ 2/ 1 |
| DILUTION FACTOR | 28.45 | 19.13 | 8.65 | 34.31 |
| HC CONCENTRATION PPM | 556 | 439 | 325 | 197 |
| CO CONCENTRATION PPM | 1067 | 1753 | 4064 | 936 |
| CO2 CONCENTRATION PCT | .26 | .42 | 1.06 | .22 |
| NOX CONCENTRATION PPM | 12.4 | 25.4 | 64.2 | 11.4 |
| HC MASS GRAMS | 58.60 | 52.07 | 39.35 | 20.85 |
| CO MASS GRAMS | 226.91 | 420.00 | 993.80 | 199.63 |
| CO2 MASS GRAMS | 860.3 | 1591.0 | 4091.8 | 742.2 |
| NOX MASS GRAMS | 4.42 | 10.19 | 26.25 | 4.08 |
| FUEL KG (LB) | .442 ( .97) | .762 ( 1.68) | 1.822 ( 4.02) | .354 ( .78) |
| KW HR (HP HR) | .60 ( .81) | 1.43 ( 1.92) | 4.86 ( 6.52) | .61 ( .82) |
| BSHC G/KW HR (G/HP HR) | 97.44 ( 72.66) | 36.46 ( 27.19) | 8.09 ( 6.03) | 34.24 ( 25.53) |
| BSCO G/KW HR (G/HP HR) | 377.32 ( 281.37) | 294.06 ( 219.28) | 204.34 ( 152.37) | 327.86 ( 244.49) |
| BSCO2 G/KW HR (G/HP HR) | 1430.63 (1066.82) | 1113.91 ( 830.65) | 841.31 ( 627.36) | 1218.93 ( 908.95) |
| BSNOX G/KW HR (G/HP HR) | 7.34 ( 5.47) | 7.13 ( 5.32) | 5.40 ( 4.03) | 6.69 ( 4.99) |
| BSFC KG/KW HR (LB/HP HR) | .735 ( 1.209) | .533 ( .877) | .375 ( .616) | .581 ( .955) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 7.50 ( 10.06) |
| BSHC G/KW HR (G/HP HR) | 22.78 ( 16.98) |
| BSCO G/KW HR (G/HP HR) | 245.31 (182.93) |
| BSCO2 G/KW HR (G/HP HR) | 971 ( 724) |
| BSNOX G/KW HR (G/HP HR) | 5.99 ( 4.47) |
| BSFC KG/KW HR (LB/HP HR) | .450 ( .740) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.000 ( 0.000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.000 ( 0.000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-1A (CONT'D). TEST 14-2 EMISSIONS RESULTS

HOT TRANSIENT

PROJECT NO. 11-5044-001

ENGINE NO.
ENGINE MODEL 72 FORD 361
ENGINE 5.9 L(361 CID)
CVS NO. 9

TEST NO.14-2 RUN
DATE 8/17/79
TIME 10:19
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 743.46 MM HG(29.27 IN HG)
DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)

RELATIVE HUMIDITY 64 PCT
ABSOLUTE HUMIDITY 11.8 GM/KG( 82.5 GRAINS/LB)

NOX HUMIDITY C.F. 1.0364

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7163 | 8084 | 8316 | 7188 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 273.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 182.6 ( 6450) | 205.7 ( 7266) | 210.0 ( 7418) | 183.1 ( 6466) |
| HC SAMPLE METER/RANGE/PPM | 23.5/ 3/ 235 | 27.0/ 3/ 270 | 31.4/ 3/ 314 | 20.2/ 3/ 202 |
| HC BCKGRD METER/RANGE/PPM | 4.5/ 3/ 45 | 4.3/ 3/ 43 | 4.4/ 3/ 44 | 4.2/ 3/ 42 |
| CO SAMPLE METER/RANGE/PPM | 31.2/ 3/ 906 | 42.8/ 3/ 1239 | 59.4/ 2/ 3818 | 30.7/ 3/ 892 |
| CO BCKGRD METER/RANGE/PPM | .9/ 3/ 26 | .9/ 3/ 26 | .4/ 2/ 24 | .6/ 3/ 17 |
| CO2 SAMPLE METER/RANGE/PCT | 18.9/ 3/ .29 | 29.4/ 3/ .47 | 66.1/ 3/ 1.16 | 22.0/ 3/ .34 |
| CO2 BCKGRD METER/RANGE/PCT | 5.2/ 3/ .08 | 4.6/ 3/ .07 | 4.5/ 3/ .07 | 3.6/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 12.2/ 2/ 12 | 32.8/ 2/ 33 | 73.7/ 2/ 74 | 11.9/ 2/ 12 |
| NOX BCKGRD METER/RANGE/PPM | .8/ 2/ 1 | .8/ 2/ 1 | .9/ 2/ 1 | 1.1/ 2/ 1 |
| DILUTION FACTOR | 33.13 | 21.71 | 8.61 | 29.71 |
| HC CONCENTRATION PPM | 191 | 229 | 275 | 161 |
| CO CONCENTRATION PPM | 858 | 1178 | 3633 | 851 |
| CO2 CONCENTRATION PCT | .22 | .41 | 1.10 | .29 |
| NOX CONCENTRATION PPM | 11.4 | 32.0 | 72.9 | 10.8 |
| HC MASS GRAMS | 20.15 | 27.17 | 33.32 | 17.04 |
| CO MASS GRAMS | 182.46 | 282.28 | 888.50 | 181.49 |
| CO2 MASS GRAMS | 729.4 | 1527.0 | 4234.3 | 981.9 |
| NOX MASS GRAMS | 4.14 | 13.07 | 30.35 | 3.93 |
| FUEL KG (LB) | .340 ( .75) | .648 ( 1.43) | 1.808 ( 3.99) | .417 ( .92) |
| KW HR (HP HR) | .62 ( .83) | 1.45 ( 1.95) | 4.87 ( 6.53) | .61 ( .82) |
| BSHC G/KW HR (G/HP HR) | 32.70 ( 24.38) | 18.73 ( 13.97) | 6.84 ( 5.10) | 27.99 ( 20.87) |
| BSCO G/KW HR (G/HP HR) | 296.01 ( 220.74) | 194.57 ( 145.09) | 182.40 ( 136.02) | 298.08 ( 222.27) |
| BSCO2 G/KW HR (G/HP HR) | 1183.34 ( 882.42) | 1052.52 ( 784.86) | 869.27 ( 648.21) | 1612.68 (1202.57) |
| BSNOX G/KW HR (G/HP HR) | 6.71 ( 5.00) | 9.01 ( 6.72) | 6.23 ( 4.65) | 6.46 ( 4.82) |
| BSFC KG/KW HR (LB/HP HR) | .552 ( .908) | .447 ( .735) | .371 ( .610) | .684 ( 1.125) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 7.55 ( 10.12) |
| BSHC G/KW HR (G/HP HR) | 12.94 ( 9.65) |
| BSCO G/KW HR (G/HP HR) | 203.35 (151.64) |
| BSCO2 G/KW HR (G/HP HR) | 990 ( 738) |
| BSNOX G/KW HR (G/HP HR) | 6.82 ( 5.09) |
| BSFC KG/KW HR (LB/HP HR) | .426 ( .700) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.000 ( 0.000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.000 ( 0.000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-1B. TEST 14-4 EMISSIONS RESULTS

COLD TRANSIENT

PROJECT NO. 11-5044-001

ENGINE NO.F 361
ENGINE MODEL 72 FORD 361
ENGINE 5.9 L(361 CID)
CVS NO. 9

TEST NO. 14-4 RUN
DATE 8/22/79
TIME 09:39
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 740.16 MM HG(29.14 IN HG)
DRY BULB TEMP. 22.8 DEG C(73.0 DEG F)

RELATIVE HUMIDITY 70 PCT
ABSOLUTE HUMIDITY 12.5 GM/KG( 87.3 GRAINS/LB)

NOX HUMIDITY C.F. 1.0614

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7161 | 8082 | 8315 | 7186 |
| TIME SECONDS | 272.0 | 306.9 | 315.9 | 273.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 181.7 ( 6418) | 204.7 ( 7230) | 209.0 ( 7382) | 182.2 ( 6434) |
| HC SAMPLE METER/RANGE/PPM | 48.0/ 3/ 480 | 43.8/ 3/ 438 | 36.0/ 3/ 360 | 27.1/ 3/ 271 |
| HC BCKGRD METER/RANGE/PPM | 2.2/ 3/ 22 | 3.0/ 3/ 30 | 3.1/ 3/ 31 | 3.1/ 3/ 31 |
| CO SAMPLE METER/RANGE/PPM | 37.2/ 3/ 1079 | 64.0/ 3/ 1831 | 67.4/ 2/ 4336 | 37.3/ 3/ 1082 |
| CO BCKGRD METER/RANGE/PPM | .9/ 3/ 26 | 1.2/ 3/ 34 | .6/ 2/ 36 | 2.6/ 3/ 75 |
| CO2 SAMPLE METER/RANGE/PCT | 19.8/ 3/ .31 | 29.5/ 3/ .47 | 64.7/ 3/ 1.13 | 18.4/ 3/ .28 |
| CO2 BCKGRD METER/RANGE/PCT | 3.8/ 3/ .06 | 4.0/ 3/ .06 | 4.4/ 3/ .06 | 4.3/ 3/ .06 |
| NOX SAMPLE METER/RANGE/PPM | 12.3/ 2/ 12 | 25.4/ 2/ 25 | 64.1/ 2/ 64 | 12.9/ 2/ 13 |
| NOX BCKGRD METER/RANGE/PPM | .3/ 2/ 0 | 0.0/ 2/ 0 | .2/ 2/ 0 | .5/ 2/ 1 |
| DILUTION FACTOR | 29.11 | 19.34 | 8.47 | 32.15 |
| HC CONCENTRATION PPM | 459 | 410 | 333 | 241 |
| CO CONCENTRATION PPM | 1024 | 1741 | 4113 | 981 |
| CO2 CONCENTRATION PCT | .25 | .42 | 1.07 | .22 |
| NOX CONCENTRATION PPM | 12.0 | 25.4 | 63.9 | 12.4 |
| HC MASS GRAMS | 48.08 | 48.36 | 40.10 | 25.32 |
| CO MASS GRAMS | 216.72 | 415.14 | 1001.05 | 208.14 |
| CO2 MASS GRAMS | 843.6 | 1559.3 | 4111.7 | 744.2 |
| NOX MASS GRAMS | 4.43 | 10.56 | 27.12 | 4.59 |
| FUEL KG (LB) | .421 ( .93) | .746 ( 1.64) | 1.832 ( 4.04) | .363 ( .80) |
| KW HR (HP HR) | .61 ( .82) | 1.44 ( 1.93) | 4.89 ( 6.55) | .63 ( .85) |
| BSHC G/KW HR (G/HP HR) | 78.96 ( 58.88) | 33.68 ( 25.12) | 8.21 ( 6.12) | 40.10 ( 29.90) |
| BSCO G/KW HR (G/HP HR) | 355.93 ( 265.42) | 289.14 ( 215.61) | 204.88 ( 152.78) | 329.63 ( 245.81) |
| BSCO2 G/KW HR (G/HP HR) | 1385.45 (1033.13) | 1086.06 ( 809.87) | 841.50 ( 627.50) | 1178.63 ( 878.90) |
| BSNOX G/KW HR (G/HP HR) | 7.28 ( 5.43) | 7.35 ( 5.48) | 5.55 ( 4.14) | 7.27 ( 5.42) |
| BSFC KG/KW HR (LB/HP HR) | .692 ( 1.138) | .519 ( .854) | .375 ( .616) | .575 ( .945) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 7.56 ( 10.14) |
| BSHC G/KW HR (G/HP HR) | 21.40 ( 15.96) |
| BSCO G/KW HR (G/HP HR) | 243.45 (181.54) |
| BSCO2 G/KW HR (G/HP HR) | 960 ( 716) |
| BSNOX G/KW HR (G/HP HR) | 6.18 ( 4.61) |
| BSFC KG/KW HR (LB/HP HR) | .445 ( .731) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | .992 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 1.132 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | .089 ( .067) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | .310 ( .141) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-1B (CONT'D). TEST 14-4 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.F 361
ENGINE MODEL 72 FORD 361
ENGINE 5.9 L(361 CID)
CVS NO. 9

TEST NO. 14-4 RUN
DATE 8/22/79
TIME 10:19
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 740.16 MM HG(29.14 IN HG)
DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)

RELATIVE HUMIDITY 46 PCT
ABSOLUTE HUMIDITY 12.1 GM/KG( 84.9 GRAINS/LB)

NOX HUMIDITY C.F. 1.0491

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7162 | 8082 | 8315 | 7186 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 273.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 181.7 ( 6419) | 204.7 ( 7230) | 209.0 ( 7382) | 182.2 ( 6434) |
| HC SAMPLE METER/RANGE/PPM | 25.4/ 3/ 254 | 28.9/ 3/ 289 | 30.0/ 3/ 300 | 22.1/ 3/ 221 |
| HC BCKGRD METER/RANGE/PPM | 2.5/ 3/ 25 | 2.9/ 3/ 29 | 3.0/ 3/ 30 | 2.9/ 3/ 29 |
| CO SAMPLE METER/RANGE/PPM | 33.3/ 3/ 967 | 46.9/ 3/ 1355 | 58.5/ 2/ 3760 | 34.4/ 3/ 999 |
| CO BCKGRD METER/RANGE/PPM | .5/ 3/ 14 | 1.0/ 3/ 29 | .5/ 2/ 30 | 1.6/ 3/ 46 |
| CO2 SAMPLE METER/RANGE/PCT | 17.9/ 3/ .28 | 28.1/ 3/ .45 | 59.1/ 3/ 1.02 | 17.5/ 3/ .27 |
| CO2 BCKGRD METER/RANGE/PCT | 3.8/ 3/ .06 | 3.9/ 3/ .06 | 4.1/ 3/ .06 | 4.1/ 3/ .06 |
| NOX SAMPLE METER/RANGE/PPM | 11.9/ 2/ 12 | 30.9/ 2/ 31 | 59.6/ 2/ 60 | 12.3/ 2/ 12 |
| NOX BCKGRD METER/RANGE/PPM | .1/ 2/ 0 | .1/ 2/ 0 | .4/ 2/ 0 | .6/ 2/ 1 |
| DILUTION FACTOR | 33.85 | 22.04 | 9.50 | 34.43 |
| HC CONCENTRATION PPM | 230 | 261 | 273 | 193 |
| CO CONCENTRATION PPM | 928 | 1288 | 3580 | 929 |
| CO2 CONCENTRATION PCT | .22 | .34 | .97 | .21 |
| NOX CONCENTRATION PPM | 11.8 | 30.8 | 59.2 | 11.7 |
| HC MASS GRAMS | 24.08 | 30.85 | 32.93 | 20.26 |
| CO MASS GRAMS | 196.35 | 307.08 | 871.26 | 197.04 |
| CO2 MASS GRAMS | 739.0 | 1472.5 | 3698.6 | 704.5 |
| NOX MASS GRAMS | 4.30 | 12.65 | 24.85 | 4.28 |
| FUEL KG (LB) | .354 ( .78) | .647 ( 1.43) | 1.630 ( 3.59) | .340 ( .75) |
| KW HR (HP HR) | .62 ( .84) | 1.46 ( 1.96) | 4.89 ( 6.55) | .63 ( .85) |
| BSHC G/KW HR (G/HP HR) | 38.59 ( 28.78) | 21.16 ( 15.78) | 6.74 ( 5.03) | 32.09 ( 23.93) |
| BSCO G/KW HR (G/HP HR) | 314.70 ( 234.67) | 210.57 ( 157.02) | 178.31 ( 132.97) | 312.04 ( 232.69) |
| BSCO2 G/KW HR (G/HP HR) | 1184.50 ( 883.28) | 1009.70 ( 752.93) | 756.96 ( 564.47) | 1115.65 ( 831.94) |
| BSNOX G/KW HR (G/HP HR) | 6.90 ( 5.14) | 8.68 ( 6.47) | 5.09 ( 3.79) | 6.78 ( 5.06) |
| BSFC KG/KW HR (LB/HP HR) | .568 ( .934) | .444 ( .730) | .334 ( .549) | .538 ( .885) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 7.60 ( 10.19) |
| BSHC G/KW HR (G/HP HR) | 14.23 ( 10.61) |
| BSCO G/KW HR (G/HP HR) | 206.81 (154.22) |
| BSCO2 G/KW HR (G/HP HR) | 870 ( 649) |
| BSNOX G/KW HR (G/HP HR) | 6.06 ( 4.52) |
| BSFC KG/KW HR (LB/HP HR) | .391 ( .643) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | .992 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 1.132 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | .089 ( .067) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | .310 ( .141) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-1C. TEST 14-6 EMISSIONS RESULTS

COLD TRANSIENT

PROJECT NO. 11-5044-001

ENGINE NO.F 361
ENGINE MODEL 72 FORD 361
ENGINE 5.9 L(361 CID)
CVS NO. 9

TEST NO.14-6 RUN
DATE 8/27/79
TIME 08:59
DYNO NO. 2

GASOLINE EM-287-F
BAG CART NO. 2

BAROMETER 741.17 MM HG(29.18 IN HG)
DRY BULB TEMP. 22.8 DEG C(73.0 DEG F)

RELATIVE HUMIDITY 63 PCT
ABSOLUTE HUMIDITY 11.1 GM/KG( 77.7 GRAINS/LB)

NOX HUMIDITY C.F. 1.0127

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7162 | 8084 | 8317 | 7188 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 273.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 182.0 ( 6428) | 205.1 ( 7243) | 209.4 ( 7394) | 182.5 ( 6445) |
| HC SAMPLE METER/RANGE/PPM | 45.4/ 3/ 454 | 41.5/ 3/ 415 | 33.0/ 3/ 330 | 19.1/ 3/ 191 |
| HC BCKGRD METER/RANGE/PPM | 2.0/ 3/ 20 | 2.2/ 3/ 22 | 2.6/ 3/ 26 | 2.4/ 3/ 24 |
| CO SAMPLE METER/RANGE/PPM | 38.5/ 3/ 1117 | 63.5/ 3/ 1818 | 68.9/ 2/ 4434 | 34.5/ 3/ 1002 |
| CO BCKGRD METER/RANGE/PPM | .5/ 3/ 14 | 1.0/ 3/ 29 | .1/ 2/ 6 | 1.2/ 3/ 34 |
| CO2 SAMPLE METER/RANGE/PCT | 18.8/ 3/ .29 | 27.9/ 3/ .44 | 62.6/ 3/ 1.09 | 16.9/ 3/ .26 |
| CO2 BCKGRD METER/RANGE/PCT | 3.5/ 3/ .05 | 3.3/ 3/ .05 | 3.2/ 3/ .05 | 3.2/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 11.7/ 2/ 12 | 25.4/ 2/ 25 | 55.8/ 2/ 56 | 11.4/ 2/ 11 |
| NOX BCKGRD METER/RANGE/PPM | 0.0/ 2/ 0 | 0.0/ 2/ 0 | .3/ 2/ 0 | .6/ 2/ 1 |
| DILUTION FACTOR | 30.10 | 20.24 | 8.66 | 35.56 |
| HC CONCENTRATION PPM | 435 | 394 | 307 | 168 |
| CO CONCENTRATION PPM | 1074 | 1739 | 4246 | 944 |
| CO2 CONCENTRATION PCT | .24 | .40 | 1.05 | .21 |
| NOX CONCENTRATION PPM | 11.7 | 25.4 | 55.5 | 10.8 |
| HC MASS GRAMS | 45.63 | 46.61 | 37.07 | 17.65 |
| CO MASS GRAMS | 227.67 | 415.19 | 1035.14 | 200.55 |
| CO2 MASS GRAMS | 804.3 | 1494.8 | 4018.0 | 716.5 |
| NOX MASS GRAMS | 4.12 | 10.09 | 22.52 | 3.82 |
| FUEL KG (LB) | .412 ( .91) | .724 ( 1.60) | 1.816 ( 4.00) | .343 ( .76) |
| KW HR (HP HR) | .62 ( .84) | 1.49 ( 2.00) | 4.96 ( 6.65) | .63 ( .85) |
| BSHC G/KW HR (G/HP HR) | 73.13 ( 54.53) | 31.32 ( 23.35) | 7.47 ( 5.57) | 27.95 ( 20.84) |
| BSCO G/KW HR (G/HP HR) | 364.90 ( 272.10) | 278.95 ( 208.02) | 208.64 ( 155.58) | 317.61 ( 236.84) |
| BSCO2 G/KW HR (G/HP HR) | 1289.07 ( 961.26) | 1004.31 ( 748.91) | 809.86 ( 603.91) | 1134.65 ( 846.11) |
| BSNOX G/KW HR (G/HP HR) | 6.61 ( 4.93) | 6.78 ( 5.06) | 4.54 ( 3.39) | 6.06 ( 4.52) |
| BSFC KG/KW HR (LB/HP HR) | .660 ( 1.085) | .486 ( .799) | .366 ( .602) | .543 ( .893) |

TOTAL TEST RESULTS 4 BAGS

| | | |
|---|---|---|
| TOTAL KW HR (HP HR) | 7.71 | ( 10.33) |
| BSHC G/KW HR (G/HP HR) | 19.07 | ( 14.22) |
| BSCO G/KW HR (G/HP HR) | 243.81 | (181.81) |
| BSCO2 G/KW HR (G/HP HR) | 913 | ( 681) |
| BSNOX G/KW HR (G/HP HR) | 5.26 | ( 3.93) |
| BSFC KG/KW HR (LB/HP HR) | .428 | ( .703) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | | |
|---|---|---|---|
| SAMPLE FLOW | SCM(SCF) | .634 | ( 0.00) |
| MULTIPLIER FOR | G/TEST | 1.315 | |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | .251 | ( .187) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | .882 | ( .400) |

20 X 20 FILTERS

| | | | |
|---|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 56.90 | ( 0.0) |

# TABLE D-1C (CONT'D). TEST 14-6 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.F 361
ENGINE MODEL 72 FORD 361
ENGINE 5.9 L(361 CID)
CVS NO. 9

TEST NO.14-6 RUN
DATE 8/27/79
TIME 09:39 — GASOLINE EM-287-F
DYNO NO. 2 — BAG CART NO. 2

BAROMETER 741.17 MM HG(29.18 IN HG)
DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)

RELATIVE HUMIDITY 61 PCT
ABSOLUTE HUMIDITY 11.3 GM/KG( 78.8 GRAINS/LB) — NOX HUMIDITY C.F. 1.0182

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7164 | 8085 | 8316 | 7188 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 273.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 182.0 ( 6430) | 205.1 ( 7244) | 209.3 ( 7393) | 182.5 ( 6445) |
| HC SAMPLE METER/RANGE/PPM | 26.0/ 3/ 260 | 27.6/ 3/ 276 | 31.7/ 3/ 317 | 17.7/ 3/ 177 |
| HC BCKGRD METER/RANGE/PPM | 2.0/ 3/ 20 | 2.3/ 3/ 23 | 2.5/ 3/ 25 | 3.5/ 3/ 35 |
| CO SAMPLE METER/RANGE/PPM | 32.5/ 3/ 944 | 47.8/ 3/ 1381 | 66.7/ 2/ 1291 | 34.7/ 3/ 1008 |
| CO BCKGRD METER/RANGE/PPM | .6/ 3/ 17 | .8/ 3/ 23 | .2/ 2/ 12 | 1.4/ 3/ 40 |
| CO2 SAMPLE METER/RANGE/PCT | 17.8/ 3/ .27 | 28.5/ 3/ .45 | 64.0/ 3/ 1.12 | 17.4/ 3/ .27 |
| CO2 BCKGRD METER/RANGE/PCT | 2.6/ 3/ .04 | 2.7/ 3/ .04 | 2.8/ 3/ .04 | 3.2/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 12.4/ 2/ 12 | 32.9/ 2/ 33 | 63.1/ 2/ 63 | 12.4/ 2/ 12 |
| NOX BCKGRD METER/RANGE/PPM | .3/ 2/ 0 | .3/ 2/ 0 | 1.3/ 2/ 1 | 1.7/ 2/ 2 |
| DILUTION FACTOR | 34.12 | 21.75 | 8.59 | 34.89 |
| HC CONCENTRATION PPM | 241 | 254 | 295 | 143 |
| CO CONCENTRATION PPM | 904 | 1320 | 4104 | 944 |
| CO2 CONCENTRATION PCT | .24 | .42 | 1.08 | .22 |
| NOX CONCENTRATION PPM | 12.1 | 32.6 | 62.0 | 10.7 |
| HC MASS GRAMS | 25.26 | 30.05 | 35.61 | 15.05 |
| CO MASS GRAMS | 191.64 | 315.24 | 1000.27 | 200.63 |
| CO2 MASS GRAMS | 792.5 | 1565.1 | 4144.8 | 743.7 |
| NOX MASS GRAMS | 4.29 | 13.03 | 25.26 | 3.82 |
| FUEL KG (LB) | .370 ( .82) | .680 ( 1.50) | 1.838 ( 4.05) | .349 ( .77) |
| KW HR (HP HR) | .65 ( .87) | 1.47 ( 1.98) | 4.94 ( 6.62) | .59 ( .80) |
| BSHC G/KW HR (G/HP HR) | 39.07 ( 29.14) | 20.40 ( 15.21) | 7.21 ( 5.38) | 25.35 ( 18.90) |
| BSCO G/KW HR (G/HP HR) | 296.44 ( 221.06) | 213.96 ( 159.55) | 202.54 ( 151.03) | 337.85 ( 251.94) |
| BSCO2 G/KW HR (G/HP HR) | 1225.90 ( 914.16) | 1062.29 ( 792.15) | 839.23 ( 625.82) | 1252.33 ( 933.86) |
| BSNOX G/KW HR (G/HP HR) | 6.64 ( 4.95) | 8.84 ( 6.59) | 5.11 ( 3.81) | 6.43 ( 4.80) |
| BSFC KG/KW HR (LB/HP HR) | .572 ( .941) | .461 ( .758) | .372 ( .612) | .587 ( .966) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 7.65 ( 10.26) |
| BSHC G/KW HR (G/HP HR) | 13.85 ( 10.33) |
| BSCO G/KW HR (G/HP HR) | 223.17 (166.42) |
| BSCO2 G/KW HR (G/HP HR) | 947 ( 706) |
| BSNOX G/KW HR (G/HP HR) | 6.06 ( 4.52) |
| BSFC KG/KW HR (LB/HP HR) | .423 ( .695) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | .634 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 1.315 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | .251 ( .187) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | .882 ( .400) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 56.90 ( 0.0) |

# TABLE D-2A. TEST 15-1 EMISSIONS RESULTS

COLD TRANSIENT

PROJECT NO. 11-5044-001

ENGINE NO. 413
ENGINE MODEL 73 DODGE 413
ENGINE 5.8 L(413 CID) V-8
CVS NO. 9

TEST NO. 15-1 RUN
DATE 9/11/79
TIME 08:45
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 739.90 MM HG(29.13 IN HG)
DRY BULB TEMP. 23.9 DEG C(75.0 DEG F)

RELATIVE HUMIDITY 64 PCT
ABSOLUTE HUMIDITY 12.2 GM/KG( 85.3 GRAINS/LB)

NOX HUMIDITY C.F. 1.0511

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7165 | 8085 | 8316 | 7163 |
| TIME SECONDS | 272.0 | 307.0 | 315.9 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 181.7 ( 6419) | 204.7 ( 7231) | 208.9 ( 7380) | 181.5 ( 6411) |
| HC SAMPLE METER/RANGE/PPM | 50.0/ 3/ 500 | 26.0/ 3/ 260 | 27.8/ 3/ 278 | 22.9/ 3/ 229 |
| HC BCKGRD METER/RANGE/PPM | 1.6/ 3/ 16 | 2.1/ 3/ 21 | 2.1/ 3/ 21 | 2.1/ 3/ 21 |
| CO SAMPLE METER/RANGE/PPM | 59.9/ 3/ 1718 | 58.2/ 3/ 1671 | 33.0/ 1/ 4717 | 44.9/ 3/ 1299 |
| CO BCKGRD METER/RANGE/PPM | 2.5/ 3/ 72 | 3.1/ 3/ 89 | .3/ 1/ 40 | 3.0/ 3/ 86 |
| CO2 SAMPLE METER/RANGE/PCT | 22.5/ 3/ .35 | 34.0/ 3/ .55 | 75.4/ 3/ 1.35 | 20.6/ 3/ .32 |
| CO2 BCKGRD METER/RANGE/PCT | 2.6/ 3/ .04 | 2.7/ 3/ .04 | 3.3/ 3/ .05 | 3.7/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 9.4/ 2/ 9 | 31.8/ 2/ 32 | 80.3/ 2/ 80 | 11.9/ 2/ 12 |
| NOX BCKGRD METER/RANGE/PPM | .4/ 2/ 0 | .3/ 2/ 0 | .4/ 2/ 0 | .7/ 2/ 1 |
| DILUTION FACTOR | 23.53 | 18.14 | 7.33 | 28.51 |
| HC CONCENTRATION PPM | 485 | 240 | 260 | 209 |
| CO CONCENTRATION PPM | 1604 | 1537 | 4464 | 1183 |
| CO2 CONCENTRATION PCT | .32 | .51 | 1.31 | .27 |
| NOX CONCENTRATION PPM | 9.0 | 31.5 | 80.0 | 11.2 |
| HC MASS GRAMS | 50.81 | 28.36 | 31.32 | 21.85 |
| CO MASS GRAMS | 339.45 | 366.34 | 1086.05 | 249.99 |
| CO2 MASS GRAMS | 1051.5 | 1924.7 | 5006.0 | 891.6 |
| NOX MASS GRAMS | 3.29 | 12.97 | 33.59 | 4.10 |
| FUEL KG (LB) | .550 ( 1.21) | .817 ( 1.80) | 2.147 ( 4.73) | .427 ( .94) |
| KW HR (HP HR) | .73 ( .98) | 1.71 ( 2.30) | 5.63 ( 7.55) | .72 ( .97) |
| BSHC G/KW HR (G/HP HR) | 69.68 ( 51.96) | 16.54 ( 12.34) | 5.56 ( 4.15) | 30.28 ( 22.58) |
| BSCO G/KW HR (G/HP HR) | 465.53 ( 347.15) | 213.75 ( 159.39) | 192.89 ( 143.84) | 346.41 ( 258.32) |
| BSCO2 G/KW HR (G/HP HR) | 1442.00 (1075.30) | 1122.97 ( 837.40) | 889.11 ( 663.01) | 1235.55 ( 921.35) |
| BSNOX G/KW HR (G/HP HR) | 4.52 ( 3.37) | 7.57 ( 5.64) | 5.97 ( 4.45) | 5.68 ( 4.23) |
| BSFC KG/KW HR (LB/HP HR) | .755 ( 1.241) | .476 ( .783) | .381 ( .627) | .591 ( .972) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.80 ( 11.79) |
| BSHC G/KW HR (G/HP HR) | 15.05 ( 11.22) |
| BSCO G/KW HR (G/HP HR) | 232.16 (173.12) |
| BSCO2 G/KW HR (G/HP HR) | 1009 ( 752) |
| BSNOX G/KW HR (G/HP HR) | 6.13 ( 4.57) |
| BSFC KG/KW HR (LB/HP HR) | .448 ( .737) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-2A (CONT'D). TEST 15-1 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO. 413
ENGINE MODEL 73 DODGE 413
ENGINE 6.8 L(413 CID) V-8
CVS NO. 9

TEST NO. 15-1 RUN
DATE 9/11/79
TIME 09:25
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 739.90 MM HG(29.13 IN HG)
DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)

RELATIVE HUMIDITY 59 PCT
ABSOLUTE HUMIDITY 11.7 GM/KG( 81.7 GRAINS/LB)

NOX HUMIDITY C.F. 1.0324

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7163 | 8085 | 8316 | 7162 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 181.7 ( 6417) | 204.7 ( 7231) | 208.9 ( 7380) | 181.5 ( 6410) |
| HC SAMPLE METER/RANGE/PPM | 19.0/ 3/ 190 | 19.2/ 3/ 192 | 26.0/ 3/ 260 | 20.4/ 3/ 204 |
| HC BCKGRD METER/RANGE/PPM | 1.8/ 3/ 18 | 1.8/ 3/ 18 | 1.8/ 3/ 18 | 2.0/ 3/ 20 |
| CO SAMPLE METER/RANGE/PPM | 37.8/ 3/ 1097 | 40.6/ 3/ 1177 | 32.4/ 1/ 463 | 45.7/ 3/ 1322 |
| CO BCKGRD METER/RANGE/PPM | .7/ 3/ 20 | 1.1/ 3/ 32 | .1/ 1/ 13 | 1.0/ 3/ 29 |
| CO2 SAMPLE METER/RANGE/PCT | 19.4/ 3/ .30 | 31.5/ 3/ .51 | 74.4/ 3/ 1.33 | 20.1/ 3/ .31 |
| CO2 BCKGRD METER/RANGE/PCT | 2.8/ 3/ .04 | 3.0/ 3/ .04 | 3.4/ 3/ .05 | 3.9/ 3/ .06 |
| NOX SAMPLE METER/RANGE/PPM | 15.9/ 2/ 16 | 41.1/ 2/ 41 | 96.8/ 2/ 97 | 15.9/ 2/ 16 |
| NOX BCKGRD METER/RANGE/PPM | .3/ 2/ 0 | .3/ 2/ 0 | .5/ 2/ 1 | 1.4/ 2/ 1 |
| DILUTION FACTOR | 31.39 | 20.93 | 7.46 | 29.02 |
| HC CONCENTRATION PPM | 173 | 175 | 244 | 185 |
| CO CONCENTRATION PPM | 1050 | 1113 | 4408 | 1261 |
| CO2 CONCENTRATION PCT | .26 | .46 | 1.29 | .26 |
| NOX CONCENTRATION PPM | 15.6 | 40.8 | 96.4 | 14.5 |
| HC MASS GRAMS | 18.08 | 20.65 | 29.46 | 19.33 |
| CO MASS GRAMS | 222.19 | 265.38 | 1072.61 | 266.54 |
| CO2 MASS GRAMS | 869.0 | 1742.4 | 4921.1 | 854.3 |
| NOX MASS GRAMS | 5.60 | 16.50 | 39.77 | 5.21 |
| FUEL KG (LB) | .402 ( .89) | .701 ( 1.55) | 2.112 ( 4.66) | .421 ( .93) |
| KW HR (HP HR) | .72 ( .97) | 1.68 ( 2.25) | 5.62 ( 7.54) | .72 ( .97) |
| BSHC G/KW HR (G/HP HR) | 25.06 ( 18.69) | 12.32 ( 9.18) | 5.24 ( 3.91) | 26.79 ( 19.98) |
| BSCO G/KW HR (G/HP HR) | 307.90 ( 229.60) | 158.31 ( 118.05) | 190.76 ( 142.25) | 369.36 ( 275.43) |
| BSCO2 G/KW HR (G/HP HR) | 1204.19 ( 897.96) | 1039.44 ( 775.11) | 875.20 ( 652.63) | 1183.84 ( 882.79) |
| BSNOX G/KW HR (G/HP HR) | 7.76 ( 5.79) | 9.84 ( 7.34) | 7.07 ( 5.27) | 7.23 ( 5.39) |
| BSFC KG/KW HR (LB/HP HR) | .557 ( .916) | .418 ( .688) | .376 ( .618) | .583 ( .958) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.74 ( 11.72) |
| BSHC G/KW HR (G/HP HR) | 10.01 ( 7.47) |
| BSCO G/KW HR (G/HP HR) | 208.95 (155.81) |
| BSCO2 G/KW HR (G/HP HR) | 959 ( 715) |
| BSNOX G/KW HR (G/HP HR) | 7.67 ( 5.72) |
| BSFC KG/KW HR (LB/HP HR) | .416 ( .684) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-2A (CONT'D). TEST 15-1 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO. 413
ENGINE MODEL 73 DODGE 413
ENGINE 6.8 L(413 CID) V-8
CVS NO. 9

TEST NO. 15-1 RUN
DATE 9/11/79
TIME 09:25 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 2

BAROMETER 739.90 MM HG(29.13 IN HG)
DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)

RELATIVE HUMIDITY 59 PCT
ABSOLUTE HUMIDITY 11.7 GM/KG( 81.7 GRAINS/LB) — NOX HUMIDITY C.F. 1.0324

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7163 | 8085 | 8316 | 7162 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 181.7 ( 6417) | 204.7 ( 7231) | 208.9 ( 7380) | 181.5 ( 6410) |
| HC SAMPLE METER/RANGE/PPM | 19.0/ 3/ 190 | 19.2/ 3/ 192 | 26.0/ 3/ 260 | 20.4/ 3/ 204 |
| HC BCKGRD METER/RANGE/PPM | 1.8/ 3/ 18 | 1.8/ 3/ 18 | 1.8/ 3/ 18 | 2.0/ 3/ 20 |
| CO SAMPLE METER/RANGE/PPM | 37.8/ 3/ 1097 | 40.6/ 3/ 1177 | 32.4/ 1/ 4627 | 45.7/ 3/ 1322 |
| CO BCKGRD METER/RANGE/PPM | .7/ 3/ 20 | 1.1/ 3/ 32 | .1/ 1/ 13 | 1.0/ 3/ 29 |
| CO2 SAMPLE METER/RANGE/PCT | 19.4/ 3/ .30 | 31.5/ 3/ .51 | 74.4/ 3/ 1.33 | 20.1/ 3/ .31 |
| CO2 BCKGRD METER/RANGE/PCT | 2.8/ 3/ .04 | 3.0/ 3/ .04 | 3.4/ 3/ .05 | 3.9/ 3/ .06 |
| NOX SAMPLE METER/RANGE/PPM | 15.9/ 2/ 16 | 41.1/ 2/ 41 | 96.8/ 2/ 97 | 15.9/ 2/ 16 |
| NOX BCKGRD METER/RANGE/PPM | .3/ 2/ 0 | .3/ 2/ 0 | .5/ 2/ 1 | 1.4/ 2/ 1 |
| DILUTION FACTOR | 31.39 | 20.93 | 7.46 | 29.02 |
| HC CONCENTRATION PPM | 173 | 175 | 244 | 185 |
| CO CONCENTRATION PPM | 1050 | 1113 | 4408 | 1261 |
| CO2 CONCENTRATION PCT | .26 | .46 | 1.29 | .26 |
| NOX CONCENTRATION PPM | 15.6 | 40.8 | 96.4 | 14.5 |
| HC MASS GRAMS | 18.08 | 20.65 | 29.46 | 19.33 |
| CO MASS GRAMS | 222.19 | 265.38 | 1072.61 | 266.54 |
| CO2 MASS GRAMS | 869.0 | 1742.4 | 4921.1 | 854.3 |
| NOX MASS GRAMS | 5.60 | 16.50 | 39.77 | 5.21 |
| FUEL KG (LB) | .402 ( .89) | .701 ( 1.55) | 2.112 ( 4.66) | .421 ( .93) |
| KW HR (HP HR) | .72 ( .97) | 1.68 ( 2.25) | 5.62 ( 7.54) | .72 ( .97) |
| BSHC G/KW HR (G/HP HR) | 25.06 ( 18.69) | 12.32 ( 9.18) | 5.24 ( 3.91) | 26.79 ( 19.98) |
| BSCO G/KW HR (G/HP HR) | 307.90 ( 229.60) | 158.31 ( 118.05) | 190.76 ( 142.25) | 369.36 ( 275.43) |
| BSCO2 G/KW HR (G/HP HR) | 1204.19 ( 897.96) | 1039.44 ( 775.11) | 875.20 ( 652.63) | 1183.84 ( 882.79) |
| BSNOX G/KW HR (G/HP HR) | 7.76 ( 5.79) | 9.84 ( 7.34) | 7.07 ( 5.27) | 7.23 ( 5.39) |
| BSFC KG/KW HR (LB/HP HR) | .557 ( .916) | .418 ( .688) | .376 ( .618) | .583 ( .958) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.74 ( 11.72) |
| BSHC G/KW HR (G/HP HR) | 10.01 ( 7.47) |
| BSCO G/KW HR (G/HP HR) | 208.95 (155.81) |
| BSCO2 G/KW HR (G/HP HR) | 959 ( 715) |
| BSNOX G/KW HR (G/HP HR) | 7.67 ( 5.72) |
| BSFC KG/KW HR (LB/HP HR) | .416 ( .684) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-2B. TEST 15-2 EMISSIONS RESULTS

COLD TRANSIENT

PROJECT NO. 11-5044-001

ENGINE NO. 413
ENGINE MODEL 73 DODGE 413
ENGINE 6.8 L(413 CID) V-8
CVS NO. 9

TEST NO. 15-2 RUN
DATE 9/13/79
TIME 08:31
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 738.12 MM HG(29.06 IN HG)
DRY BULB TEMP. 23.9 DEG C(75.0 DEG F)

RELATIVE HUMIDITY 63 PCT
ABSOLUTE HUMIDITY 12.1 GM/KG( 84.9 GRAINS/LB)

NOX HUMIDITY C.F. 1.0486

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7165 | 8087 | 8316 | 7163 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 181.3 ( 6403) | 204.2 ( 7214) | 208.4 ( 7361) | 181.1 ( 6395) |
| HC SAMPLE METER/RANGE/PPM | 47.7/ 3/ 477 | 21.9/ 3/ 219 | 24.9/ 3/ 249 | 13.2/ 3/ 132 |
| HC BCKGRD METER/RANGE/PPM | 1.2/ 3/ 12 | 2.1/ 3/ 21 | 1.9/ 3/ 19 | 1.9/ 3/ 19 |
| CO SAMPLE METER/RANGE/PPM | 59.2/ 3/ 1699 | 57.9/ 3/ 1663 | 33.0/ 1/ 4717 | 39.5/ 3/ 1145 |
| CO BCKGRD METER/RANGE/PPM | .9/ 3/ 26 | .2/ 3/ 6 | .2/ 1/ 27 | 3.2/ 3/ 92 |
| CO2 SAMPLE METER/RANGE/PCT | 23.4/ 3/ .37 | 35.2/ 3/ .57 | 77.6/ 3/ 1.39 | 21.4/ 3/ .33 |
| CO2 BCKGRD METER/RANGE/PCT | 3.2/ 3/ .05 | 3.6/ 3/ .05 | 4.4/ 3/ .06 | 4.9/ 3/ .07 |
| NOX SAMPLE METER/RANGE/PPM | 10.3/ 2/ 10 | 30.1/ 2/ 30 | 79.8/ 2/ 80 | 13.1/ 2/ 13 |
| NOX BCKGRD METER/RANGE/PPM | .4/ 2/ 0 | .2/ 2/ 0 | .4/ 2/ 0 | 1.0/ 2/ 1 |
| DILUTION FACTOR | 23.09 | 17.75 | 7.17 | 29.22 |
| HC CONCENTRATION PPM | 466 | 199 | 233 | 114 |
| CO CONCENTRATION PPM | 1628 | 1605 | 4472 | 1027 |
| CO2 CONCENTRATION PCT | .32 | .52 | 1.34 | .26 |
| NOX CONCENTRATION PPM | 9.9 | 29.9 | 79.5 | 12.1 |
| HC MASS GRAMS | 48.67 | 23.46 | 27.97 | 11.87 |
| CO MASS GRAMS | 343.67 | 381.82 | 1085.22 | 216.63 |
| CO2 MASS GRAMS | 1070.8 | 1953.1 | 5107.4 | 875.8 |
| NOX MASS GRAMS | 3.61 | 12.26 | 33.22 | 4.41 |
| FUEL KG (LB) | .556 ( 1.23) | .828 ( 1.83) | 2.176 ( 4.80) | .395 ( .87) |
| KW HR (HP HR) | .73 ( .98) | 1.71 ( 2.30) | 5.63 ( 7.55) | .68 ( .92) |
| BSHC G/KW HR (G/HP HR) | 66.75 ( 49.78) | 13.69 ( 10.21) | 4.97 ( 3.70) | 17.35 ( 12.94) |
| BSCO G/KW HR (G/HP HR) | 471.32 ( 351.46) | 222.78 ( 166.12) | 192.75 ( 143.73) | 316.69 ( 236.15) |
| BSCO2 G/KW HR (G/HP HR) | 1468.54 (1095.09) | 1139.57 ( 849.78) | 907.13 ( 676.44) | 1280.23 ( 954.67) |
| BSNOX G/KW HR (G/HP HR) | 4.95 ( 3.69) | 7.15 ( 5.33) | 5.90 ( 4.40) | 6.44 ( 4.80) |
| BSFC KG/KW HR (LB/HP HR) | .763 ( 1.255) | .483 ( .795) | .386 ( .635) | .578 ( .950) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.76 ( 11.74) |
| BSHC G/KW HR (G/HP HR) | 12.79 ( 9.53) |
| BSCO G/KW HR (G/HP HR) | 231.50 (172.63) |
| BSCO2 G/KW HR (G/HP HR) | 1029 ( 767) |
| BSNOX G/KW HR (G/HP HR) | 6.11 ( 4.55) |
| BSFC KG/KW HR (LB/HP HR) | .492 ( .743) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-2B (CONT'D). TEST 15-2 EMISSIONS RESULTS

HOT TRANSIENT

PROJECT NO. 11-5044-001

ENGINE NO. 413
ENGINE MODEL 73 DODGE 413
ENGINE 6.8 L(413 CID) V-8
CVS NO. 9

TEST NO. 15-2 RUN
DATE 9/13/79
TIME 09:11
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 738.12 MM HG(29.06 IN HG)
DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)

RELATIVE HUMIDITY 59 PCT
ABSOLUTE HUMIDITY 11.7 GM/KG( 81.9 GRAINS/LB)

NOX HUMIDITY C.F. 1.0334

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7165 | 8085 | 8315 | 7163 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 181.3 ( 6403) | 204.2 ( 7212) | 208.4 ( 7360) | 181.1 ( 6395) |
| HC SAMPLE METER/RANGE/PPM | 10.7/ 3/ 107 | 15.3/ 3/ 153 | 24.5/ 3/ 245 | 13.5/ 3/ 135 |
| HC BCKGRD METER/RANGE/PPM | 1.4/ 3/ 14 | 1.7/ 3/ 17 | 1.8/ 3/ 18 | 1.7/ 3/ 17 |
| CO SAMPLE METER/RANGE/PPM | 38.4/ 3/ 1114 | 40.3/ 3/ 1168 | 33.3/ 1/ 4763 | 39.9/ 3/ 1157 |
| CO BCKGRD METER/RANGE/PPM | 2.2/ 3/ 63 | 1.7/ 3/ 49 | .1/ 1/ 13 | .7/ 3/ 20 |
| CO2 SAMPLE METER/RANGE/PCT | 19.3/ 3/ .30 | 33.0/ 3/ .53 | 74.1/ 3/ 1.32 | 19.9/ 3/ .31 |
| CO2 BCKGRD METER/RANGE/PCT | 2.0/ 3/ .03 | 2.2/ 3/ .03 | 2.4/ 3/ .04 | 2.4/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 14.1/ 2/ 14 | 39.6/ 2/ 40 | 85.9/ 2/ 86 | 14.3/ 2/ 14 |
| NOX BCKGRD METER/RANGE/PPM | .5/ 2/ 1 | .5/ 2/ 1 | .6/ 2/ 1 | .9/ 2/ 1 |
| DILUTION FACTOR | 32.01 | 20.25 | 7.43 | 30.77 |
| HC CONCENTRATION PPM | 93 | 137 | 229 | 119 |
| CO CONCENTRATION PPM | 1026 | 1088 | 4539 | 1109 |
| CO2 CONCENTRATION PCT | .27 | .50 | 1.29 | .28 |
| NOX CONCENTRATION PPM | 13.6 | 39.1 | 85.4 | 13.4 |
| HC MASS GRAMS | 9.77 | 16.12 | 27.57 | 12.38 |
| CO MASS GRAMS | 216.60 | 258.78 | 1101.43 | 233.74 |
| CO2 MASS GRAMS | 899.5 | 1879.0 | 4933.2 | 912.4 |
| NOX MASS GRAMS | 4.88 | 15.79 | 35.17 | 4.81 |
| FUEL KG (LB) | .401 ( .88) | .737 ( 1.62) | 2.128 ( 4.69) | .416 ( .92) |
| KW HR (HP HR) | .71 ( .95) | 1.67 ( 2.24) | 5.62 ( 7.54) | .68 ( .92) |
| BSHC G/KW HR (G/HP HR) | 13.83 ( 10.31) | 9.66 ( 7.20) | 4.90 ( 3.66) | 18.10 ( 13.50) |
| BSCO G/KW HR (G/HP HR) | 306.53 ( 228.58) | 155.07 ( 115.63) | 195.88 ( 146.07) | 341.70 ( 254.80) |
| BSCO2 G/KW HR (G/HP HR) | 1272.97 ( 949.25) | 1125.97 ( 839.63) | 877.35 ( 654.24) | 1333.79 ( 994.61) |
| BSNOX G/KW HR (G/HP HR) | 6.91 ( 5.15) | 9.46 ( 7.06) | 6.26 ( 4.66) | 7.03 ( 5.24) |
| BSFC KG/KW HR (LB/HP HR) | .567 ( .932) | .441 ( .726) | .379 ( .622) | .608 ( .999) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.68 ( 11.64) |
| BSHC G/KW HR (G/HP HR) | 7.58 ( 5.65) |
| BSCO G/KW HR (G/HP HR) | 208.53 (155.50) |
| BSCO2 G/KW HR (G/HP HR) | 993 ( 741) |
| BSNOX G/KW HR (G/HP HR) | 6.99 ( 5.21) |
| BSFC KG/KW HR (LB/HP HR) | .624 ( .697) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-3A. TEST 16-1 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO. 16
ENGINE MODEL 73 CHEV 454
ENGINE 8.0 L( 460 CID) V-8
CVS NO. 9

TEST NO. 01 RUN
DATE 12/13/79
TIME 01:00 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 1

BAROMETER 747.01 MM HG(29.41 IN HG)
DRY BULB TEMP. 22.2 DEG C(72.0 DEG F)

RELATIVE HUMIDITY 48 PCT
ABSOLUTE HUMIDITY 8.1 GM/KG( 57.0 GRAINS/LB) — NOX HUMIDITY C.F. .9218

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 48.9 (120.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7167 | 8086 | 8315 | 7163 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 183.6 ( 6486) | 206.8 ( 7305) | 214.5 ( 7576) | 183.4 ( 6476) |
| HC SAMPLE METER/RANGE/PPM | 13.4/ 3/ 134 | 61.0/ 2/ 61 | 16.4/ 3/ 164 | 50.2/ 2/ 50 |
| HC BCKGRD METER/RANGE/PPM | 1.3/ 3/ 13 | 12.3/ 2/ 12 | 1.4/ 3/ 14 | 15.2/ 2/ 15 |
| CO SAMPLE METER/RANGE/PPM | 26.8/ 3/ 623 | 74.3/11/ 323 | 60.5/ 2/ 3084 | 71.2/11/ 302 |
| CO BCKGRD METER/RANGE/PPM | .2/ 3/ 5 | 3.3/11/ 10 | .6/ 2/ 23 | 11.6/11/ 35 |
| CO2 SAMPLE METER/RANGE/PCT | 27.9/ 3/ .96 | 91.9/ 3/ .71 | 83.5/ 3/ 1.54 | 25.5/ 3/ .92 |
| CO2 BCKGRD METER/RANGE/PCT | 3.3/ 3/ .05 | 3.7/ 3/ .06 | 4.3/ 3/ .07 | 4.2/ 3/ .06 |
| NOX SAMPLE METER/RANGE/PPM | 9.7/ 2/ 10 | 32.2/ 2/ 32 | 96.2/ 2/ 96 | 13.8/ 2/ 14 |
| NOX BCKGRD METER/RANGE/PPM | .8/ 2/ 1 | .9/ 2/ 1 | 1.8/ 2/ 2 | 1.8/ 2/ 2 |
| DILUTION FACTOR | 25.16 | 17.85 | 7.23 | 29.72 |
| HC CONCENTRATION PPM | 122 | 49 | 152 | 36 |
| CO CONCENTRATION PPM | 603 | 304 | 2926 | 262 |
| CO2 CONCENTRATION PCT | .91 | .66 | 1.49 | .35 |
| NOX CONCENTRATION PPM | 8.9 | 31.4 | 94.6 | 12.1 |
| HC MASS GRAMS | 12.87 | 5.89 | 18.80 | 3.76 |
| CO MASS GRAMS | 129.04 | 73.26 | 730.74 | 55.89 |
| CO2 MASS GRAMS | 1378.4 | 2498.4 | 5834.9 | 1188.6 |
| NOX MASS GRAMS | 2.89 | 11.43 | 35.80 | 3.90 |
| FUEL KG (LB) | .511 ( 1.13) | .830 ( 1.83) | 2.220 ( 4.89) | .406 ( .90) |
| KW HR (HP HR) | .67 ( .90) | 1.69 ( 2.27) | 5.86 ( 7.86) | .66 ( .89) |
| BSHC G/KW HR (G/HP HR) | 19.24 ( 14.35) | 3.48 ( 2.60) | 3.21 ( 2.39) | 5.68 ( 4.23) |
| BSCO G/KW HR (G/HP HR) | 192.88 ( 143.83) | 43.31 ( 32.30) | 124.63 ( 92.94) | 84.48 ( 63.00) |
| BSCO2 G/KW HR (G/HP HR) | 2060.34 (1536.40) | 1477.14 (1101.50) | 995.15 ( 742.08) | 1796.86 (1339.92) |
| BSNOX G/KW HR (G/HP HR) | 4.32 ( 3.22) | 6.76 ( 5.04) | 6.11 ( 4.55) | 5.89 ( 4.40) |
| BSFC KG/KW HR (LB/HP HR) | .764 ( 1.256) | .491 ( .807) | .379 ( .622) | .614 ( 1.009) |

TOTAL TEST RESULTS 4 BAGS

| | | |
|---|---|---|
| TOTAL KW HR (HP HR) | 8.89 | ( 11.92) |
| BSHC G/KW HR (G/HP HR) | 4.65 | ( 3.47) |
| BSCO G/KW HR (G/HP HR) | 111.30 | ( 83.00) |
| BSCO2 G/KW HR (G/HP HR) | 1227 | ( 915) |
| BSNOX G/KW HR (G/HP HR) | 6.08 | ( 4.53) |
| BSFC KG/KW HR (LB/HP HR) | .447 | ( .734) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-3A (CONT'D). TEST 16-1 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO. 16
ENGINE MODEL 73 CHEV 454
ENGINE 7.0 L( 454 CID) V-8
CVS NO. 9

TEST NO. 01 RUN
DATE 12/13/79
TIME 01:33
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 1

BAROMETER 747.01 MM HG(29.41 IN HG)
DRY BULB TEMP. 22.8 DEG C(73.0 DEG F)

RELATIVE HUMIDITY 47 PCT
ABSOLUTE HUMIDITY 8.2 GM/KG( 57.7 GRAINS/LB)

NOX HUMIDITY C.F. .9248

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 48.9 (120.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7165 | 8085 | 8315 | 7162 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 183.6 ( 6484) | 206.8 ( 7304) | 214.5 ( 7576) | 183.3 ( 6475) |
| HC SAMPLE METER/RANGE/PPM | 81.3/ 2/ 81 | 57.6/ 2/ 58 | 16.3/ 3/ 163 | 52.4/ 2/ 52 |
| HC BCKGRD METER/RANGE/PPM | 13.4/ 2/ 14 | 13.8/ 2/ 14 | 1.3/ 3/ 13 | 12.0/ 2/ 12 |
| CO SAMPLE METER/RANGE/PPM | 86.7/12/ 210 | 65.6/11/ 268 | 61.4/ 2/ 3183 | 74.4/11/ 323 |
| CO BCKGRD METER/RANGE/PPM | 2.8/12/ 5 | 2.4/11/ 7 | .7/ 2/ 27 | 14.7/11/ 45 |
| CO2 SAMPLE METER/RANGE/PCT | 23.3/ 3/ .38 | 39.4/ 3/ .67 | 79.8/ 3/ 1.47 | 25.1/ 3/ .41 |
| CO2 BCKGRD METER/RANGE/PCT | 3.0/ 3/ .05 | 3.2/ 3/ .05 | 3.6/ 3/ .06 | 4.0/ 3/ .06 |
| NOX SAMPLE METER/RANGE/PPM | 13.4/ 2/ 13 | 33.7/ 2/ 34 | 94.7/ 2/ 95 | 14.3/ 2/ 14 |
| NOX BCKGRD METER/RANGE/PPM | 1.3/ 2/ 1 | 1.4/ 2/ 1 | 2.3/ 2/ 2 | 2.3/ 2/ 2 |
| DILUTION FACTOR | 32.94 | 19.19 | 7.50 | 30.03 |
| HC CONCENTRATION PPM | 68 | 45 | 152 | 41 |
| CO CONCENTRATION PPM | 201 | 254 | 3022 | 273 |
| CO2 CONCENTRATION PCT | .33 | .62 | 1.42 | .35 |
| NOX CONCENTRATION PPM | 12.1 | 32.4 | 92.7 | 12.1 |
| HC MASS GRAMS | 7.18 | 5.31 | 18.77 | 4.31 |
| CO MASS GRAMS | 42.90 | 61.16 | 754.87 | 58.22 |
| CO2 MASS GRAMS | 1121.6 | 2348.6 | 5568.7 | 1175.1 |
| NOX MASS GRAMS | 3.94 | 11.84 | 35.18 | 3.92 |
| FUEL KG (LB) | .382 ( .84) | .776 ( 1.71) | 2.148 ( 4.74) | .404 ( .89) |
| KW HR (HP HR) | .68 ( .92) | 1.70 ( 2.28) | 5.88 ( 7.88) | .68 ( .92) |
| BSHC G/KW HR (G/HP HR) | 10.50 ( 7.83) | 3.13 ( 2.33) | 3.19 ( 2.38) | 6.31 ( 4.70) |
| BSCO G/KW HR (G/HP HR) | 62.71 ( 46.76) | 36.00 ( 26.85) | 128.41 ( 95.76) | 85.11 ( 63.47) |
| BSCO2 G/KW HR (G/HP HR) | 1639.65 (1222.69) | 1382.43 (1030.88) | 947.32 ( 706.42) | 1717.80 (1280.96) |
| BSNOX G/KW HR (G/HP HR) | 5.76 ( 4.30) | 6.97 ( 5.20) | 5.98 ( 4.46) | 5.73 ( 4.27) |
| BSFC KG/KW HR (LB/HP HR) | .558 ( .918) | .457 ( .751) | .365 ( .601) | .590 ( .970) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.95 ( 12.00) |
| BSHC G/KW HR (G/HP HR) | 3.98 ( 2.97) |
| BSCO G/KW HR (G/HP HR) | 102.53 ( 76.46) |
| BSCO2 G/KW HR (G/HP HR) | 1142 ( 851) |
| BSNOX G/KW HR (G/HP HR) | 6.13 ( 4.57) |
| BSFC KG/KW HR (LB/HP HR) | .915 ( .682) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00'( 0.0) |

# TABLE D-3B. TEST 16-2 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO. 16
ENGINE MODEL 73 CHEV 454
ENGINE 8.0 L( 460 CID) V-8
CVS NO. 9

TEST NO. 02 RUN
DATE 12/14/79
TIME
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 1

BAROMETER 750.82 MM HG(29.56 IN HG)
DRY BULB TEMP. 21.7 DEG C(71.0 DEG F)

RELATIVE HUMIDITY 46 PCT
ABSOLUTE HUMIDITY 7.5 GM/KG( 52.4 GRAINS/LB)

NOX HUMIDITY C.F. .9841

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7166 | 8086 | 8316 | 7163 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 184.6 ( 6520) | 207.9 ( 7344) | 212.2 ( 7496) | 184.3 ( 6511) |
| HC SAMPLE METER/RANGE/PPM | 12.2/ 3/ 122 | 59.2/ 2/ 59 | 15.9/ 3/ 159 | 44.7/ 2/ 45 |
| HC BCKGRD METER/RANGE/PPM | 1.1/ 3/ 11 | 11.2/ 2/ 11 | 1.4/ 3/ 14 | 13.1/ 2/ 13 |
| CO SAMPLE METER/RANGE/PPM | 28.4/ 3/ 662 | 66.7/11/ 275 | 59.3/ 2/ 3001 | 61.2/11/ 243 |
| CO BCKGRD METER/RANGE/PPM | .2/ 3/ 5 | 3.5/11/ 10 | .6/ 2/ 23 | 12.0/11/ 36 |
| CO2 SAMPLE METER/RANGE/PCT | 27.2/ 3/ .45 | 41.9/ 3/ .71 | 83.0/ 3/ 1.53 | 26.0/ 3/ .43 |
| CO2 BCKGRD METER/RANGE/PCT | 2.9/ 3/ .04 | 3.4/ 3/ .05 | 4.5/ 3/ .07 | 4.2/ 3/ .06 |
| NOX SAMPLE METER/RANGE/PPM | 9.0/ 2/ 9 | 34.0/ 2/ 34 | 33.3/ 3/ 100 | 13.6/ 2/ 14 |
| NOX BCKGRD METER/RANGE/PPM | .3/ 2/ 0 | .6/ 2/ 1 | .5/ 3/ 2 | 1.9/ 2/ 2 |
| DILUTION FACTOR | 25.63 | 17.97 | 7.30 | 29.56 |
| HC CONCENTRATION PPM | 111 | 49 | 147 | 32 |
| CO CONCENTRATION PPM | 642 | 257 | 2849 | 203 |
| CO2 CONCENTRATION PCT | .40 | .66 | 1.47 | .36 |
| NOX CONCENTRATION PPM | 8.7 | 33.4 | 98.6 | 11.8 |
| HC MASS GRAMS | 11.86 | 5.83 | 17.98 | 3.41 |
| CO MASS GRAMS | 138.02 | 62.27 | 704.01 | 43.48 |
| CO2 MASS GRAMS | 1363.9 | 2528.5 | 5722.2 | 1224.6 |
| NOX MASS GRAMS | 2.78 | 12.02 | 36.19 | 3.75 |
| FUEL KG (LB) | .510 ( 1.12) | .834 ( 1.84) | 2.171 ( 4.79) | .411 ( .91) |
| KW HR (HP HR) | .66 ( .89) | 1.71 ( 2.29) | 5.84 ( 7.83) | .66 ( .89) |
| BSHC G/KW HR (G/HP HR) | 17.93 ( 13.37) | 3.42 ( 2.55) | 3.08 ( 2.30) | 5.15 ( 3.84) |
| BSCO G/KW HR (G/HP HR) | 208.65 ( 155.59) | 36.49 ( 27.21) | 120.53 ( 89.88) | 65.73 ( 49.02) |
| BSCO2 G/KW HR (G/HP HR) | 2061.81 (1537.49) | 1481.76 (1104.95) | 979.69 ( 730.56) | 1851.16 (1380.41) |
| BSNOX G/KW HR (G/HP HR) | 4.20 ( 3.14) | 7.05 ( 5.25) | 6.20 ( 4.62) | 5.67 ( 4.23) |
| BSFC KG/KW HR (LB/HP HR) | .771 ( 1.268) | .489 ( .803) | .372 ( .611) | .621 ( 1.021) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.87 ( 11.90) |
| BSHC G/KW HR (G/HP HR) | 4.41 ( 3.29) |
| BSCO G/KW HR (G/HP HR) | 106.85 ( 79.68) |
| BSCO2 G/KW HR (G/HP HR) | 1222 ( 911) |
| BSNOX G/KW HR (G/HP HR) | 6.17 ( 4.60) |
| BSFC KG/KW HR (LB/HP HR) | .443 ( .728) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-3B (CONT'D). TEST 16-2 EMISSIONS RESULTS

HOT TRANSIENT

PROJECT NO. 11-5044-001

ENGINE NO. 16
ENGINE MODEL 73 CHEV 454
ENGINE 8.0 L( 490 CID) V-8
CVS NO. 9

TEST NO. 02 RUN
DATE 12/14/79
TIME
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 1

BAROMETER 750.82 MM HG(29.56 IN HG)
DRY BULB TEMP. 21.7 DEG C(71.0 DEG F)

RELATIVE HUMIDITY 49 PCT
ABSOLUTE HUMIDITY 7.9 GM/KG( 55.6 GRAINS/LB)

NOX HUMIDITY C.F. .9163

BAG RESULTS

| BAG NUMBER | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7165 | 8086 | 8316 | 7163 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 184.6 ( 6519) | 207.9 ( 7344) | 212.2 ( 7496) | 184.3 ( 6511) |
| HC SAMPLE METER/RANGE/PPM | 68.9/ 2/ 69 | 52.5/ 2/ 53 | 15.3/ 3/ 153 | 43.5/ 2/ 43 |
| HC BCKGRD METER/RANGE/PPM | 11.3/ 2/ 11 | 11.4/ 2/ 11 | 1.0/ 3/ 10 | 12.0/ 2/ 12 |
| CO SAMPLE METER/RANGE/PPM | 74.9/12/ 174 | 89.8/12/ 221 | 59.9/ 2/ 3043 | 98.3/12/ 250 |
| CO BCKGRD METER/RANGE/PPM | 1.8/12/ 3 | 2.3/12/ 4 | .4/ 2/ 15 | 18.4/12/ 36 |
| CO2 SAMPLE METER/RANGE/PCT | 23.9/ 3/ .39 | 39.8/ 3/ .67 | 80.7/ 3/ 1.48 | 24.9/ 3/ .41 |
| CO2 BCKGRD METER/RANGE/PCT | 3.3/ 3/ .05 | 3.5/ 3/ .05 | 4.0/ 3/ .06 | 4.1/ 3/ .06 |
| NOX SAMPLE METER/RANGE/PPM | 13.1/ 2/ 13 | 32.8/ 2/ 33 | 97.0/ 2/ 97 | 13.9/ 2/ 14 |
| NOX BCKGRD METER/RANGE/PPM | 1.5/ 2/ 2 | 1.0/ 2/ 1 | 2.4/ 2/ 2 | 1.9/ 2/ 2 |
| DILUTION FACTOR | 32.50 | 19.12 | 7.48 | 30.83 |
| HC CONCENTRATION PPM | 58 | 42 | 144 | 32 |
| CO CONCENTRATION PPM | 166 | 210 | 2895 | 210 |
| CO2 CONCENTRATION PCT | .39 | .62 | 1.43 | .39 |
| NOX CONCENTRATION PPM | 11.6 | 31.9 | 99.9 | 12.1 |
| HC MASS GRAMS | 6.17 | 5.00 | 17.67 | 3.39 |
| CO MASS GRAMS | 35.75 | 50.92 | 715.43 | 45.11 |
| CO2 MASS GRAMS | 1147.6 | 2373.1 | 5561.8 | 1164.6 |
| NOX MASS GRAMS | 3.77 | 11.61 | 35.31 | 3.90 |
| FUEL KG (LB) | .386 ( .85) | .778 ( 1.72) | 2.125 ( 4.69) | .393 ( .87) |
| KW HR (HP HR) | .66 ( .89) | 1.71 ( 2.29) | 5.84 ( 7.83) | .66 ( .89) |
| BSHC G/KW HR (G/HP HR) | 9.33 ( 6.95) | 2.93 ( 2.19) | 3.02 ( 2.26) | 5.13 ( 3.82) |
| BSCO G/KW HR (G/HP HR) | 54.04 ( 40.30) | 29.84 ( 22.25) | 122.49 ( 91.34) | 68.19 ( 50.85) |
| BSCO2 G/KW HR (G/HP HR) | 1734.80 (1293.64) | 1390.69 (1037.04) | 952.23 ( 710.08) | 1760.47 (1312.78) |
| BSNOX G/KW HR (G/HP HR) | 5.70 ( 4.25) | 6.80 ( 5.07) | 6.06 ( 4.51) | 5.89 ( 4.39) |
| BSFC KG/KW HR (LB/HP HR). | .583 ( .958) | .456 ( .750) | .364 ( .598) | .594 ( .976) |

TOTAL TEST RESULTS 4 BAGS

| | | |
|---|---|---|
| TOTAL KW HR (HP HR) | 8.87 | ( 11.90) |
| BSHC G/KW HR (G/HP HR) | 3.63 | ( 2.71) |
| BSCO G/KW HR (G/HP HR) | 95.51 | ( 71.22) |
| BSCO2 G/KW HR (G/HP HR) | 1155 | ( 861) |
| BSNOX G/KW HR (G/HP HR) | 6.15 | ( 4.59) |
| BSFC KG/KW HR (LB/HP HR) | .915 | ( .682) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW SCM(SCF) | 0.000 | ( 0.00) |
| MULTIPLIER FOR G/TEST | 0.000 | |
| MULTIPLIER FOR G/KW HR (G/HP HR) | 0.0000 | (0.0000) |
| MULTIPLIER FOR G/KG FUEL (G/LB FUEL) | 0.0000 | (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW SCM(SCF) | 0.00 | ( 0.0) |

# TABLE D-4A. TEST 17-2 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO. 427
ENGINE MODEL 73 GMC 427
ENGINE 7.0 L(427 CID) V-8
CVS NO. 9

TEST NO. 17-2 RUN 1
DATE 10/24/79
TIME 09:01 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 1

BAROMETER 744.47 MM HG(29.31 IN HG)
DRY BULB TEMP. 20.6 DEG C(69.0 DEG F)

RELATIVE HUMIDITY 49 PCT
ABSOLUTE HUMIDITY 7.5 GM/KG( 52.8 GRAINS/LB) — NOX HUMIDITY C.F. .9057

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7299 | 8086 | 8318 | 7164 |
| TIME SECONDS | 277.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 186.3 ( 6582) | 206.1 ( 7279) | 210.4 ( 7430) | 182.7 ( 6454) |
| HC SAMPLE METER/RANGE/PPM | 33.9/ 3/ 339 | 17.8/ 3/ 178 | 24.5/ 3/ 245 | 10.1/ 3/ 101 |
| HC BCKGRD METER/RANGE/PPM | 1.3/ 3/ 13 | 1.4/ 3/ 14 | 1.3/ 3/ 13 | 1.5/ 3/ 15 |
| CO SAMPLE METER/RANGE/PPM | 39.0/ 3/ 928 | 26.4/ 3/ 613 | 63.3/ 3/ 1611 | 72.9/11/ 313 |
| CO BCKGRD METER/RANGE/PPM | .1/ 3/ 2 | .1/ 3/ 2 | .5/ 3/ 11 | 2.5/11/ 7 |
| CO2 SAMPLE METER/RANGE/PCT | 22.4/ 3/ .36 | 36.9/ 3/ .62 | 79.2/ 3/ 1.45 | 22.2/ 3/ .36 |
| CO2 BCKGRD METER/RANGE/PCT | 3.0/ 3/ .05 | 2.8/ 3/ .04 | 2.9/ 3/ .04 | 3.8/ 3/ .06 |
| NOX SAMPLE METER/RANGE/PPM | 15.4/ 2/ 15 | 44.5/ 2/ 44 | 60.3/ 3/ 181 | 19.1/ 2/ 19 |
| NOX BCKGRD METER/RANGE/PPM | .7/ 2/ 1 | .7/ 2/ 1 | .2/ 3/ 1 | 1.4/ 2/ 1 |
| DILUTION FACTOR | 27.50 | 19.20 | 8.21 | 33.51 |
| HC CONCENTRATION PPM | 326 | 165 | 234 | 86 |
| CO CONCENTRATION PPM | 905 | 594 | 1530 | 299 |
| CO2 CONCENTRATION PCT | .32 | .58 | 1.41 | .30 |
| NOX CONCENTRATION PPM | 14.7 | 43.8 | 180.4 | 17.7 |
| HC MASS GRAMS | 35.09 | 19.58 | 28.34 | 9.11 |
| CO MASS GRAMS | 196.40 | 142.54 | 374.85 | 63.67 |
| CO2 MASS GRAMS | 1086.5 | 2188.4 | 5448.2 | 1012.8 |
| NOX MASS GRAMS | 4.75 | 15.65 | 65.74 | 5.62 |
| FUEL KG (LB) | .475 ( 1.05) | .780 ( 1.72) | 1.932 ( 4.26) | .360 ( .79) |
| KW HR (HP HR) | .74 ( 1.00) | 1.80 ( 2.41) | 5.85 ( 7.84) | .74 ( 1.00) |
| BSHC G/KW HR (G/HP HR) | 47.15 ( 35.16) | 10.90 ( 8.13) | 4.85 ( 3.61) | 12.24 ( 9.13) |
| BSCO G/KW HR (G/HP HR) | 263.91 ( 196.80) | 79.34 ( 59.16) | 64.10 ( 47.80) | 85.56 ( 63.80) |
| BSCO2 G/KW HR (G/HP HR) | 1460.03 (1088.74) | 1218.11 ( 908.34) | 931.58 ( 694.68) | 1360.89 (1014.81) |
| BSNOX G/KW HR (G/HP HR) | 6.39 ( 4.76) | 8.71 ( 6.50) | 11.24 ( 8.38) | 7.55 ( 5.63) |
| BSFC KG/KW HR (LB/HP HR) | .638 ( 1.049) | .434 ( .714) | .330 ( .543) | .484 ( .795) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 9.13 ( 12.25) |
| BSHC G/KW HR (G/HP HR) | 10.09 ( 7.52) |
| BSCO G/KW HR (G/HP HR) | 85.12 ( 63.48) |
| BSCO2 G/KW HR (G/HP HR) | 1065 ( 795) |
| BSNOX G/KW HR (G/HP HR) | 10.05 ( 7.49) |
| BSFC KG/KW HR (LB/HP HR) | .388 ( .638) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-4A (CONT'D). TEST 17-2 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO. 427
ENGINE MODEL 73 GMC 427
ENGINE 7.0 L(427 CID) V-8
CVS NO. 9

TEST NO. 17-2 RUN 1
DATE 10/24/79
TIME 09:42 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 1

BAROMETER 744.73 MM HG(29.32 IN HG)
DRY BULB TEMP. 22.2 DEG C(72.0 DEG F)

RELATIVE HUMIDITY 50 PCT
ABSOLUTE HUMIDITY 8.4 GM/KG( 59.1 GRAINS/LB) — NOX HUMIDITY C.F. .9303

BAG RESULTS

| BAG NUMBER | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7165 | 8087 | 8316 | 7162 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 183.0 ( 6463) | 205.2 ( 7282) | 210.4 ( 7431) | 182.7 ( 6454) |
| HC SAMPLE METER/RANGE/PPM | 14.8/ 3/ 148 | 14.0/ 3/ 140 | 21.9/ 3/ 219 | 13.5/ 3/ 135 |
| HC BCKGRD METER/RANGE/PPM | 1.3/ 3/ 13 | 1.3/ 3/ 13 | 1.4/ 3/ 14 | 1.4/ 3/ 14 |
| CO SAMPLE METER/RANGE/PPM | 82.4/11/ 380 | 86.6/11/ 413 | 57.6/ 3/ 1440 | 90.2/11/ 443 |
| CO BCKGRD METER/RANGE/PPM | 1.7/11/ 5 | 1.6/11/ 5 | .2/ 3/ 5 | 1.5/11/ 4 |
| CO2 SAMPLE METER/RANGE/PCT | 21.4/ 3/ .35 | 35.9/ 3/ .60 | 78.6/ 3/ 1.44 | 21.7/ 3/ .35 |
| CO2 BCKGRD METER/RANGE/PCT | 2.8/ 3/ .04 | 2.7/ 3/ .04 | 3.3/ 3/ .05 | 3.3/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 18.1/ 2/ 18 | 47.7/ 2/ 48 | 60.1/ 3/ 180 | 18.4/ 2/ 18 |
| NOX BCKGRD METER/RANGE/PPM | .8/ 2/ 1 | .8/ 2/ 1 | .4/ 3/ 1 | 1.0/ 2/ 1 |
| DILUTION FACTOR | 33.72 | 20.42 | 8.37 | 32.89 |
| HC CONCENTRATION PPM | 135 | 128 | 207 | 121 |
| CO CONCENTRATION PPM | 367 | 397 | 1373 | 429 |
| CO2 CONCENTRATION PCT | .30 | .56 | 1.40 | .30 |
| NOX CONCENTRATION PPM | 17.3 | 46.9 | 179.2 | 17.4 |
| HC MASS GRAMS | 14.29 | 15.18 | 25.08 | 12.80 |
| CO MASS GRAMS | 78.18 | 95.41 | 336.35 | 91.31 |
| CO2 MASS GRAMS | 1018.5 | 2125.4 | 5379.6 | 1009.4 |
| NOX MASS GRAMS | 5.64 | 17.22 | 67.11 | 5.67 |
| FUEL KG (LB) | .374 ( .82) | .732 ( 1.61) | 1.888 ( 4.16) | .376 ( .83) |
| KW HR (HP HR) | .77 ( 1.03) | 1.82 ( 2.44) | 5.83 ( 7.81) | .77 ( 1.04) |
| BSHC G/KW HR (G/HP HR) | 18.64 ( 13.90) | 8.34 ( 6.22) | 4.30 ( 3.21) | 16.53 ( 12.33) |
| BSCO G/KW HR (G/HP HR) | 101.96 ( 76.03) | 52.45 ( 39.11) | 57.73 ( 43.05) | 117.93 ( 87.94) |
| BSCO2 G/KW HR (G/HP HR) | 1328.39 ( 990.58) | 1168.34 ( 871.23) | 923.42 ( 688.59) | 1303.69 ( 972.16) |
| BSNOX G/KW HR (G/HP HR) | 7.36 ( 5.49) | 9.47 ( 7.06) | 11.52 ( 8.59) | 7.32 ( 5.46) |
| BSFC KG/KW HR (LB/HP HR) | .488 ( .802) | .403 ( .662) | .324 ( .533) | .486 ( .799) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 9.19 ( 12.32) |
| BSHC G/KW HR (G/HP HR) | 7.33 ( 5.47) |
| BSCO G/KW HR (G/HP HR) | 65.45 ( 48.81) |
| BSCO2 G/KW HR (G/HP HR) | 1038 ( 774) |
| BSNOX G/KW HR (G/HP HR) | 10.41 ( 7.76) |
| BSFC KG/KW HR (LB/HP HR) | .367 ( .603) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-4B. TEST 17-3 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO. 427
ENGINE MODEL 73 GMC 427
ENGINE 7.0 L(427 CID) V-8
CVS NO. 9

TEST NO. 17-3 RUN
DATE 10/25/79
TIME 08:31
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 1

BAROMETER 744.22 MM HG(29.30 IN HG)
DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)

RELATIVE HUMIDITY 50 PCT
ABSOLUTE HUMIDITY 9.1 GM/KG( 63.5 GRAINS/LB)

NOX HUMIDITY C.F. .9489

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7167 | 8089 | 8321 | 7165 |
| TIME SECONDS | 271.9 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 182.9 ( 6460) | 206.1 ( 7279) | 210.4 ( 7430) | 182.7 ( 6453) |
| HC SAMPLE METER/RANGE/PPM | 33.3/ 3/ 333 | 17.9/ 3/ 179 | 23.2/ 3/ 232 | 13.6/ 3/ 136 |
| HC BCKGRD METER/RANGE/PPM | 1.2/ 3/ 12 | 1.3/ 3/ 13 | 1.4/ 3/ 14 | 1.4/ 3/ 14 |
| CO SAMPLE METER/RANGE/PPM | 38.3/ 3/ 910 | 25.5/ 3/ 591 | 63.0/ 3/ 1601 | 90.5/11/ 446 |
| CO BCKGRD METER/RANGE/PPM | .1/ 3/ 2 | .2/ 3/ 5 | .2/ 3/ 5 | 2.6/11/ 8 |
| CO2 SAMPLE METER/RANGE/PCT | 23.2/ 3/ .38 | 37.2/ 3/ .63 | 80.6/ 3/ 1.48 | 22.0/ 3/ .36 |
| CO2 BCKGRD METER/RANGE/PCT | 3.4/ 3/ .05 | 3.5/ 3/ .05 | 3.9/ 3/ .06 | 3.6/ 3/ .06 |
| NOX SAMPLE METER/RANGE/PPM | 15.7/ 2/ 16 | 48.1/ 2/ 48 | 61.5/ 3/ 184 | 18.1/ 2/ 18 |
| NOX BCKGRD METER/RANGE/PPM | .6/ 2/ 1 | .7/ 2/ 1 | .1/ 3/ 0 | .9/ 2/ 1 |
| DILUTION FACTOR | 26.87 | 19.11 | 8.08 | 32.45 |
| HC CONCENTRATION PPM | 321 | 167 | 220 | 122 |
| CO CONCENTRATION PPM | 887 | 571 | 1526 | 428 |
| CO2 CONCENTRATION PCT | .33 | .58 | 1.43 | .30 |
| NOX CONCENTRATION PPM | 15.1 | 47.4 | 184.2 | 17.2 |
| HC MASS GRAMS | 33.91 | 19.81 | 26.66 | 12.90 |
| CO MASS GRAMS | 188.93 | 136.91 | 373.84 | 91.15 |
| CO2 MASS GRAMS | 1092.8 | 2170.6 | 5508.0 | 1011.3 |
| NOX MASS GRAMS | 5.02 | 17.74 | 70.35 | 5.71 |
| FUEL KG (LB) | .472 ( 1.04) | .772 ( 1.70) | 1.948 ( 4.30) | .377 ( .83) |
| KW HR (HP HR) | .75 ( 1.01) | 1.83 ( 2.45) | 5.93 ( 7.95) | .79 ( 1.06) |
| BSHC G/KW HR (G/HP HR) | 45.11 ( 33.64) | 10.85 ( 8.09) | 4.50 ( 3.35) | 16.34 ( 12.19) |
| BSCO G/KW HR (G/HP HR) | 251.34 ( 187.42) | 74.95 ( 55.89) | 63.03 ( 47.00) | 115.48 ( 86.11) |
| BSCO2 G/KW HR (G/HP HR) | 1453.81 (1084.11) | 1188.30 ( 886.12) | 928.68 ( 692.52) | 1281.28 ( 955.45) |
| BSNOX G/KW HR (G/HP HR) | 6.68 ( 4.98) | 9.71 ( 7.24) | 11.86 ( 8.85) | 7.24 ( 5.40) |
| BSFC KG/KW HR (LB/HP HR) | .628 ( 1.032) | .423 ( .695) | .328 ( .540) | .477 ( .785) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 9.30 ( 12.47) |
| BSHC G/KW HR (G/HP HR) | 10.03 ( 7.48) |
| BSCO G/KW HR (G/HP HR) | 85.05 ( 63.42) |
| BSCO2 G/KW HR (G/HP HR) | 1052 ( 785) |
| BSNOX G/KW HR (G/HP HR) | 10.63 ( 7.93) |
| BSFC KG/KW HR (LB/HP HR) | .384 ( .631) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-4B (CONT'D). TEST 17-3 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO. 427
ENGINE MODEL 73 GMC 427
ENGINE 7.0 L(427 CID) V-8
CVS NO. 9

TEST NO. 17-3 RUN
DATE 10/25/79
TIME 09:11 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 1

BAROMETER 744.22 MM HG(29.30 IN HG)
DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)

RELATIVE HUMIDITY 50 PCT
ABSOLUTE HUMIDITY 9.8 GM/KG( 68.3 GRAINS/LB) — NOX HUMIDITY C.F. .9693

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7166 | 8087 | 8318 | 7163 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 182.9 ( 6459) | 206.0 ( 7277) | 210.3 ( 7428) | 182.6 ( 6451) |
| HC SAMPLE METER/RANGE/PPM | 17.5/ 3/ 175 | 16.6/ 3/ 166 | 22.7/ 3/ 227 | 13.7/ 3/ 137 |
| HC BCKGRD METER/RANGE/PPM | 1.4/ 3/ 14 | 1.4/ 3/ 14 | 1.5/ 3/ 15 | 1.5/ 3/ 15 |
| CO SAMPLE METER/RANGE/PPM | 83.7/11/ 390 | 90.4/11/ 445 | 57.8/ 3/ 1446 | 84.4/11/ 396 |
| CO BCKGRD METER/RANGE/PPM | 1.4/11/ 4 | 1.7/11/ 5 | .1/ 3/ 2 | 2.0/11/ 6 |
| CO2 SAMPLE METER/RANGE/PCT | 21.5/ 3/ .35 | 36.3/ 3/ .61 | 79.5/ 3/ 1.46 | 21.0/ 3/ .34 |
| CO2 BCKGRD METER/RANGE/PCT | 3.0/ 3/ .05 | 3.1/ 3/ .05 | 3.6/ 3/ .06 | 3.4/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 17.9/ 2/ 18 | 48.1/ 2/ 48 | 65.6/ 3/ 197 | 17.5/ 2/ 18 |
| NOX BCKGRD METER/RANGE/PPM | .7/ 2/ 1 | .7/ 2/ 1 | .3/ 3/ 1 | .8/ 2/ 1 |
| DILUTION FACTOR | 33.27 | 20.02 | 8.27 | 34.27 |
| HC CONCENTRATION PPM | 161 | 153 | 214 | 122 |
| CO CONCENTRATION PPM | 377 | 428 | 1380 | 381 |
| CO2 CONCENTRATION PCT | .30 | .56 | 1.41 | .29 |
| NOX CONCENTRATION PPM | 17.2 | 47.4 | 196.0 | 16.7 |
| HC MASS GRAMS | 17.03 | 18.15 | 25.93 | 12.90 |
| CO MASS GRAMS | 80.37 | 102.69 | 337.87 | 81.05 |
| CO2 MASS GRAMS | 1013.7 | 2129.5 | 5433.3 | 963.6 |
| NOX MASS GRAMS | 5.84 | 18.12 | 76.43 | 5.66 |
| FUEL KG (LB) | .376 ( .83) | .740 ( 1.63) | 1.906 ( 4.20) | .357 ( .79) |
| KW HR (HP HR) | .75 ( 1.01) | 1.83 ( 2.45) | 5.89 ( 7.90) | .78 ( 1.05) |
| BSHC G/KW HR (G/HP HR) | 22.65 ( 16.89) | 9.93 ( 7.41) | 4.40 ( 3.28) | 16.50 ( 12.30) |
| BSCO G/KW HR (G/HP HR) | 106.91 ( 79.73) | 56.22 ( 41.92) | 57.33 ( 42.75) | 103.67 ( 77.31) |
| BSCO2 G/KW HR (G/HP HR) | 1348.54 (1005.60) | 1165.78 ( 869.32) | 921.93 ( 687.48) | 1232.52 ( 919.09) |
| BSNOX G/KW HR (G/HP HR) | 7.77 ( 5.79) | 9.92 ( 7.40) | 12.97 ( 9.67) | 7.24 ( 5.40) |
| BSFC KG/KW HR (LB/HP HR) | .501 ( .823) | .405 ( .666) | .323 ( .532) | .456 ( .750) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 9.25 ( 12.41) |
| BSHC G/KW HR (G/HP HR) | 8.00 ( 5.96) |
| BSCO G/KW HR (G/HP HR) | 65.05 ( 48.51) |
| BSCO2 G/KW HR (G/HP HR) | 1031 ( 769) |
| BSNOX G/KW HR (G/HP HR) | 11.46 ( 8.55) |
| BSFC KG/KW HR (LB/HP HR) | .365 ( .600) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-5A. TEST 18-2 EMISSIONS RESULTS

COLD TRANSIENT

PROJECT NO. 11-5044-001

ENGINE NO.C 350
ENGINE MODEL 72 CHEV 350
ENGINE 5.7 L(350 CID) V-8
CVS NO. 9

TEST NO.18-1 RUN
DATE 11/14/79
TIME 09:25
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 1

BAROMETER 751.33 MM HG(29.58 IN HG)
DRY BULB TEMP. 21.7 DEG C(71.0 DEG F)

RELATIVE HUMIDITY 51 PCT
ABSOLUTE HUMIDITY 8.3 GM/KG( 58.2 GRAINS/LB)

NOX HUMIDITY C.F. .9267

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7165 | 8086 | 8317 | 7163 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 184.7 ( 6524) | 208.1 ( 7349) | 212.4 ( 7502) | 184.5 ( 6516) |
| HC SAMPLE METER/RANGE/PPM | 24.7/ 3/ 247 | 12.9/ 3/ 129 | 12.0/ 3/ 120 | 18.0/ 3/ 180 |
| HC BCKGRD METER/RANGE/PPM | 1.3/ 3/ 13 | 1.3/ 3/ 13 | 1.3/ 3/ 13 | 1.4/ 3/ 14 |
| CO SAMPLE METER/RANGE/PPM | 45.5/ 3/ 1100 | 32.0/ 3/ 751 | 45.9/ 3/ 1111 | 95.9/11/ 495 |
| CO BCKGRD METER/RANGE/PPM | .1/ 3/ 2 | .2/ 3/ 5 | .2/ 3/ 5 | 1.5/11/ 4 |
| CO2 SAMPLE METER/RANGE/PCT | 16.7/ 3/ .27 | 26.8/ 3/ .44 | 67.3/ 3/ 1.21 | 16.8/ 3/ .27 |
| CO2 BCKGRD METER/RANGE/PCT | 2.2/ 3/ .03 | 2.1/ 3/ .03 | 2.4/ 3/ .04 | 2.3/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 7.7/ 2/ 8 | 29.7/ 2/ 30 | 43.4/ 3/ 130 | 14.5/ 2/ 14 |
| NOX BCKGRD METER/RANGE/PPM | .1/ 2/ 0 | .1/ 2/ 0 | .1/ 3/ 0 | .7/ 2/ 1 |
| DILUTION FACTOR | 33.63 | 25.52 | 10.09 | 40.10 |
| HC CONCENTRATION PPM | 234 | 117 | 108 | 166 |
| CO CONCENTRATION PPM | 1074 | 728 | 1063 | 480 |
| CO2 CONCENTRATION PCT | .23 | .41 | 1.18 | .23 |
| NOX CONCENTRATION PPM | 7.6 | 29.6 | 129.9 | 13.8 |
| HC MASS GRAMS | 24.97 | 13.98 | 13.27 | 17.70 |
| CO MASS GRAMS | 231.02 | 176.36 | 262.84 | 103.17 |
| CO2 MASS GRAMS | 789.8 | 1555.8 | 4575.9 | 788.9 |
| NOX MASS GRAMS | 2.49 | 10.92 | 48.92 | 4.52 |
| FUEL KG (LB) | .388 ( .86) | .592 ( 1.30) | 1.586 ( 3.50) | .318 ( .70) |
| KW HR (HP HR) | .71 ( .95) | 1.50 ( 2.01) | 5.13 ( 6.88) | .67 ( .90) |
| BSHC G/KW HR (G/HP HR) | 35.34 ( 26.35) | 9.35 ( 6.97) | 2.59 ( 1.93) | 26.46 ( 19.73) |
| BSCO G/KW HR (G/HP HR) | 326.95 ( 243.80) | 117.89 ( 87.91) | 51.27 ( 38.23) | 154.21 ( 114.99) |
| BSCO2 G/KW HR (G/HP HR) | 1117.73 ( 833.49) | 1040.03 ( 775.55) | 892.56 ( 665.58) | 1179.17 ( 879.31) |
| BSNOX G/KW HR (G/HP HR) | 3.52 ( 2.63) | 7.30 ( 5.44) | 9.54 ( 7.12) | 6.75 ( 5.04) |
| BSFC KG/KW HR (LB/HP HR) | .550 ( .904) | .396 ( .650) | .309 ( .509) | .475 ( .780) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.00 ( 10.73) |
| BSHC G/KW HR (G/HP HR) | 8.74 ( 6.52) |
| BSCO G/KW HR (G/HP HR) | 96.70 ( 72.11) |
| BSCO2 G/KW HR (G/HP HR) | 964 ( 719) |
| BSNOX G/KW HR (G/HP HR) | 8.36 ( 6.23) |
| BSFC KG/KW HR (LB/HP HR) | .361 ( .593) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-5A (CONT'D). TEST 18-2 EMISSIONS RESULTS

HOT TRANSIENT

PROJECT NO. 11-5044-001

ENGINE NO.C 350
ENGINE MODEL 73 CHEVY
ENGINE 5.7 L(350 CID) V-8
CVS NO. 9

TEST NO.18-2 RUN
DATE 11/16/79
TIME 10:27
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 749.81 MM HG(29.52 IN HG)
DRY BULB TEMP. 21.7 DEG C(71.0 DEG F)

RELATIVE HUMIDITY 50 PCT
ABSOLUTE HUMIDITY 8.2 GM/KG( 57.1 GRAINS/LB) NOX HUMIDITY C.F. .9226

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7165 | 8086 | 8318 | 7163 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 184.3 ( 6510) | 207.6 ( 7334) | 212.0 ( 7487) | 184.1 ( 6502) |
| HC SAMPLE METER/RANGE/PPM | 75.4/ 2/ 75 | 91.3/ 2/ 91 | 15.9/ 3/ 159 | 63.7/ 2/ 64 |
| HC BCKGRD METER/RANGE/PPM | 15.0/ 2/ 15 | 14.9/ 2/ 15 | 1.5/ 3/ 15 | 13.0/ 2/ 13 |
| CO SAMPLE METER/RANGE/PPM | 90.0/11/ 440 | 25.3/ 3/ 735 | 76.6/ 3/ 2176 | 98.1/11/ 516 |
| CO BCKGRD METER/RANGE/PPM | .7/11/ 2 | .1/ 3/ 3 | .3/ 3/ 9 | 2.7/11/ 8 |
| CO2 SAMPLE METER/RANGE/PCT | 16.6/ 3/ .26 | 27.5/ 3/ .44 | 64.6/ 3/ 1.13 | 16.3/ 3/ .25 |
| CO2 BCKGRD METER/RANGE/PCT | 2.5/ 3/ .04 | 3.3/ 3/ .05 | 2.9/ 3/ .04 | 3.1/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 15.1/ 2/ 15 | 36.2/ 2/ 36 | 40.5/ 3/ 121 | 14.1/ 2/ 14 |
| NOX BCKGRD METER/RANGE/PPM | 1.0/ 2/ 1 | 1.2/ 2/ 1 | .3/ 3/ 1 | .8/ 2/ 1 |
| DILUTION FACTOR | 43.82 | 25.86 | 9.89 | 43.61 |
| HC CONCENTRATION PPM | 61 | 77 | 146 | 51 |
| CO CONCENTRATION PPM | 429 | 714 | 2086 | 498 |
| CO2 CONCENTRATION PCT | .22 | .39 | 1.09 | .21 |
| NOX CONCENTRATION PPM | 14.1 | 35.0 | 120.7 | 13.3 |
| HC MASS GRAMS | 6.46 | 9.22 | 17.79 | 5.41 |
| CO MASS GRAMS | 91.97 | 172.75 | 514.86 | 106.77 |
| CO2 MASS GRAMS | 740.6 | 1485.4 | 4236.2 | 694.1 |
| NOX MASS GRAMS | 4.59 | 12.84 | 45.15 | 4.33 |
| FUEL KG (LB) | .285 ( .63) | .563 ( 1.24) | 1.608 ( 3.55) | .277 ( .61) |
| KW HR (HP HR) | .68 ( .91) | 1.53 ( 2.05) | 5.23 ( 7.02) | .67 ( .90) |
| BSHC G/KW HR (G/HP HR) | 9.54 ( 7.12) | 6.04 ( 4.50) | 3.40 ( 2.54) | 8.09 ( 6.04) |
| BSCO G/KW HR (G/HP HR) | 135.94 ( 101.37) | 113.21 ( 84.42) | 98.41 ( 73.38) | 159.60 ( 119.01) |
| BSCO2 G/KW HR (G/HP HR) | 1094.64 ( 816.27) | 973.43 ( 725.89) | 809.68 ( 603.78) | 1037.42 ( 773.60) |
| BSNOX G/KW HR (G/HP HR) | 6.79 ( 5.06) | 8.42 ( 6.28) | 8.63 ( 6.44) | 6.47 ( 4.82) |
| BSFC KG/KW HR (LB/HP HR) | .422 ( .694) | .369 ( .607) | .307 ( .505) | .414 ( .681) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.10 ( 10.87) |
| BSHC G/KW HR (G/HP HR) | 4.80 ( 3.58) |
| BSCO G/KW HR (G/HP HR) | 109.38 ( 81.56) |
| BSCO2 G/KW HR (G/HP HR) | 883 ( 659) |
| BSNOX G/KW HR (G/HP HR) | 8.26 ( 6.16) |
| BSFC KG/KW HR (LB/HP HR) | .337 ( .555) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-5B. TEST 18-3 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.C 350
ENGINE MODEL 72 CHEV 350
ENGINE 5.7 L(350 CID) V-8
CVS NO. 9

TEST NO.18-3 RUN
DATE 11/20/79
TIME 08:49
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 1

BAROMETER 741.68 MM HG(29.20 IN HG)
DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)

RELATIVE HUMIDITY 68 PCT
ABSOLUTE HUMIDITY 12.5 GM/KG( 87.5 GRAINS/LB)

NOX HUMIDITY C.F. 1.0626

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7167 | 8088 | 8319 | 7164 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 182.3 ( 6437) | 205.3 ( 7252) | 209.6 ( 7401) | 182.0 ( 6428) |
| HC SAMPLE METER/RANGE/PPM | 21.9/ 3/ 219 | 13.7/ 3/ 137 | 16.0/ 3/ 160 | 68.3/ 2/ 68 |
| HC BCKGRD METER/RANGE/PPM | 1.8/ 3/ 18 | 1.9/ 3/ 19 | 2.0/ 3/ 20 | 18.7/ 2/ 19 |
| CO SAMPLE METER/RANGE/PPM | 48.5/ 3/ 1182 | 30.3/ 3/ 709 | 75.2/ 3/ 1994 | 23.5/ 3/ 543 |
| CO BCKGRD METER/RANGE/PPM | .1/ 3/ 2 | .1/ 3/ 2 | .1/ 3/ 2 | .1/ 3/ 2 |
| CO2 SAMPLE METER/RANGE/PCT | 15.7/ 3/ .25 | 26.8/ 3/ .44 | 63.4/ 3/ 1.13 | 16.6/ 3/ .26 |
| CO2 BCKGRD METER/RANGE/PCT | 2.6/ 3/ .04 | 2.9/ 3/ .04 | 3.3/ 3/ .05 | 3.3/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 7.6/ 2/ 8 | 30.5/ 2/ 30 | 37.3/ 3/ 112 | 13.3/ 2/ 13 |
| NOX BCKGRD METER/RANGE/PPM | .4/ 2/ 0 | .4/ 2/ 0 | .1/ 3/ 0 | .5/ 2/ 1 |
| DILUTION FACTOR | 34.69 | 25.70 | 10.02 | 41.35 |
| HC CONCENTRATION PPM | 202 | 119 | 142 | 50 |
| CO CONCENTRATION PPM | 1148 | 685 | 1905 | 526 |
| CO2 CONCENTRATION PCT | .21 | .40 | 1.09 | .22 |
| NOX CONCENTRATION PPM | 7.2 | 30.1 | 111.6 | 12.8 |
| HC MASS GRAMS | 21.18 | 14.06 | 17.16 | 5.25 |
| CO MASS GRAMS | 243.61 | 163.76 | 464.82 | 111.56 |
| CO2 MASS GRAMS | 703.7 | 1490.5 | 4165.1 | 716.9 |
| NOX MASS GRAMS | 2.67 | 12.57 | 47.55 | 4.74 |
| FUEL KG (LB) | .364 ( .80) | .565 ( 1.25) | 1.560 ( 3.44) | .287 ( .63) |
| KW HR (HP HR) | .64 ( .86) | 1.46 ( 1.96) | 5.10 ( 6.83) | .65 ( .88) |
| BSHC G/KW HR (G/HP HR) | 33.15 ( 24.72) | 9.64 ( 7.19) | 3.37 ( 2.51) | 8.03 ( 5.99) |
| BSCO G/KW HR (G/HP HR) | 381.26 ( 284.31) | 112.29 ( 83.74) | 91.20 ( 68.01) | 170.59 ( 127.21) |
| BSCO2 G/KW HR (G/HP HR) | 1101.37 ( 821.29) | 1022.09 ( 762.17) | 817.23 ( 609.41) | 1096.25 ( 817.47) |
| BSNOX G/KW HR (G/HP HR) | 4.18 ( 3.12) | 8.62 ( 6.43) | 9.33 ( 6.96) | 7.25 ( 5.40) |
| BSFC KG/KW HR (LB/HP HR) | .569 ( .936) | .387 ( .637) | .306 ( .503) | .438 ( .720) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 7.85 ( 10.52) |
| BSHC G/KW HR (G/HP HR) | 7.35 ( 5.48) |
| BSCO G/KW HR (G/HP HR) | 125.35 ( 93.48) |
| BSCO2 G/KW HR (G/HP HR) | 902 ( 672) |
| BSNOX G/KW HR (G/HP HR) | 8.60 ( 6.42) |
| BSFC KG/KW HR (LB/HP HR) | .354 ( .581) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-5B (CONT'D). TEST 18-3 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.C 350
ENGINE MODEL 72 CHEV 350
ENGINE 5.7 L(350 CID) V-8
CVS NO. 9

TEST NO.18-3 RUN
DATE 11/20/79
TIME 09:29 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 1

BAROMETER 741.68 MM HG(29.20 IN HG)
DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)

RELATIVE HUMIDITY 65 PCT
ABSOLUTE HUMIDITY 11.9 GM/KG( 83.6 GRAINS/LB) — NOX HUMIDITY C.F. 1.0421

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7165 | 8086 | 8317 | 7163 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 182.2 ( 6435) | 205.3 ( 7250) | 209.5 ( 7400) | 182.0 ( 6428) |
| HC SAMPLE METER/RANGE/PPM | 71.2/ 2/ 71 | 82.7/ 2/ 83 | 15.7/ 3/ 157 | 7.2/ 3/ 72 |
| HC BCKGRD METER/RANGE/PPM | 20.0/ 2/ 20 | 19.4/ 2/ 19 | 2.1/ 3/ 21 | 1.7/ 3/ 17 |
| CO SAMPLE METER/RANGE/PPM | 92.8/11/ 466 | 26.8/ 3/ 623 | 76.3/ 3/ 2031 | 25.2/ 3/ 584 |
| CO BCKGRD METER/RANGE/PPM | .2/11/ 1 | .1/ 3/ 2 | .1/ 3/ 2 | .2/ 3/ 5 |
| CO2 SAMPLE METER/RANGE/PCT | 16.3/ 3/ .26 | 27.1/ 3/ .44 | 63.3/ 3/ 1.13 | 16.4/ 3/ .26 |
| CO2 BCKGRD METER/RANGE/PCT | 2.6/ 3/ .04 | 2.8/ 3/ .04 | 2.6/ 3/ .04 | 3.1/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 13.3/ 2/ 13 | 33.6/ 2/ 34 | 35.7/ 3/ 107 | 13.9/ 2/ 14 |
| NOX BCKGRD METER/RANGE/PPM | .8/ 2/ 1 | .8/ 2/ 1 | .2/ 3/ 1 | 1.1/ 2/ 1 |
| DILUTION FACTOR | 42.96 | 26.12 | 10.01 | 41.21 |
| HC CONCENTRATION PPM | 52 | 64 | 138 | 55 |
| CO CONCENTRATION PPM | 454 | 602 | 1943 | 565 |
| CO2 CONCENTRATION PCT | .22 | .40 | 1.09 | .21 |
| NOX CONCENTRATION PPM | 12.5 | 32.8 | 106.6 | 12.8 |
| HC MASS GRAMS | 5.43 | 7.58 | 16.69 | 5.82 |
| CO MASS GRAMS | 96.25 | 143.97 | 473.95 | 119.65 |
| CO2 MASS GRAMS | 736.1 | 1515.4 | 4193.7 | 715.8 |
| NOX MASS GRAMS | 4.55 | 13.43 | 44.50 | 4.65 |
| FUEL KG (LB) | .285 ( .63) | .557 ( 1.23) | 1.574 ( 3.47) | .291 ( .64) |
| KW HR (HP HR) | .64 ( .86) | 1.50 ( 2.02) | 5.10 ( 6.83) | .65 ( .88) |
| BSHC G/KW HR (G/HP HR) | 8.50 ( 6.34) | 5.04 ( 3.76) | 3.27 ( 2.44) | 8.89 ( 6.63) |
| BSCO G/KW HR (G/HP HR) | 150.63 ( 112.33) | 95.76 ( 71.41) | 92.99 ( 69.34) | 182.95 ( 136.42) |
| BSCO2 G/KW HR (G/HP HR) | 1152.00 ( 859.05) | 1007.99 ( 751.66) | 822.85 ( 613.60) | 1094.50 ( 816.17) |
| BSNOX G/KW HR (G/HP HR) | 7.12 ( 5.31) | 8.94 ( 6.66) | 8.73 ( 6.51) | 7.11 ( 5.31) |
| BSFC KG/KW HR (LB/HP HR) | .446 ( .734) | .370 ( .609) | .309 ( .508) | .445 ( .731) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 7.89 ( 10.58) |
| BSHC G/KW HR (G/HP HR) | 4.50 ( 3.36) |
| BSCO G/KW HR (G/HP HR) | 105.64 ( 78.78) |
| BSCO2 G/KW HR (G/HP HR) | 907 ( 677) |
| BSNOX G/KW HR (G/HP HR) | 8.51 ( 6.34) |
| BSFC KG/KW HR (LB/HP HR) | .343 ( .564) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-6A. TEST 19-2 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.
ENGINE MODEL 72 IHC 345
ENGINE 5.7 L(345 CID)
CVS NO. 9

TEST NO.19-2 RUN
DATE 2/ 8/80
TIME 09:00
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 738.89 MM HG(29.09 IN HG)
DRY BULB TEMP. 22.8 DEG C(73.0 DEG F)

RELATIVE HUMIDITY 61 PCT
ABSOLUTE HUMIDITY 10.9 GM/KG( 76.0 GRAINS/LB)

NOX HUMIDITY C.F. 1.0048

BAG RESULTS

| BAG NUMBER | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H20(IN. H20) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H20(IN. H20) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7176 | 8098 | 8334 | 7175 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 181.8 ( 6420) | 204.8 ( 7232) | 209.1 ( 7385) | 181.6 ( 6413) |
| HC SAMPLE METER/RANGE/PPM | 35.7/ 3/ 357 | 15.3/ 3/ 153 | 21.6/ 3/ 216 | 8.7/ 3/ 87 |
| HC BCKGRD METER/RANGE/PPM | 2.6/ 3/ 26 | 2.2/ 3/ 22 | 2.0/ 3/ 20 | 1.7/ 3/ 17 |
| CO SAMPLE METER/RANGE/PPM | 31.4/ 3/ 912 | 34.8/ 3/ 1010 | 56.5/ 2/ 3630 | 22.2/ 3/ 645 |
| CO BCKGRD METER/RANGE/PPM | .7/ 3/ 20 | .4/ 3/ 11 | .3/ 2/ 18 | .1/ 3/ 3 |
| CO2 SAMPLE METER/RANGE/PCT | 21.4/ 3/ .33 | 30.8/ 3/ .49 | 64.4/ 3/ 1.13 | 17.6/ 3/ .27 |
| CO2 BCKGRD METER/RANGE/PCT | 3.1/ 3/ .05 | 3.5/ 3/ .05 | 3.4/ 3/ .05 | 3.2/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 12.7/ 2/ 13 | 31.6/ 2/ 32 | 95.7/ 2/ 96 | 12.0/ 2/ 12 |
| NOX BCKGRD METER/RANGE/PPM | .6/ 2/ 1 | .3/ 2/ 0 | .9/ 2/ 1 | .7/ 2/ 1 |
| DILUTION FACTOR | 29.22 | 22.05 | 8.96 | 39.06 |
| HC CONCENTRATION PPM | 332 | 132 | 198 | 70 |
| CO CONCENTRATION PPM | 869 | 970 | 3464 | 626 |
| CO2 CONCENTRATION PCT | .29 | .45 | 1.08 | .23 |
| NOX CONCENTRATION PPM | 12.1 | 31.3 | 94.9 | 11.3 |
| HC MASS GRAMS | 34.79 | 15.59 | 23.91 | 7.38 |
| CO MASS GRAMS | 184.02 | 231.31 | 843.55 | 132.37 |
| CO2 MASS GRAMS | 965.6 | 1669.8 | 4139.8 | 750.3 |
| NOX MASS GRAMS | 4.23 | 12.32 | 38.14 | 3.95 |
| FUEL KG (LB) | .430 ( .95) | .657 ( 1.45) | 1.747 ( 3.85) | .309 ( .68) |
| KW HR (HP HR) | .71 ( .95) | 1.68 ( 2.26) | 5.51 ( 7.39) | .74 ( 1.00) |
| BSHC G/KW HR (G/HP HR) | 49.24 ( 36.72) | 9.26 ( 6.90) | 4.34 ( 3.24) | 9.91 ( 7.39) |
| BSCO G/KW HR (G/HP HR) | 260.43 ( 194.20) | 137.37 ( 102.44) | 153.09 ( 114.16) | 177.87 ( 132.64) |
| BSCO2 G/KW HR (G/HP HR) | 1366.47 (1018.98) | 991.67 ( 739.49) | 751.32 ( 560.26) | 1008.21 ( 751.83) |
| BSNOX G/KW HR (G/HP HR) | 5.99 ( 4.47) | 7.32 ( 5.46) | 6.92 ( 5.16) | 5.31 ( 3.96) |
| BSFC KG/KW HR (LB/HP HR) | .609 ( 1.001) | .390 ( .641) | .317 ( .521) | .416 ( .684) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.64 ( 11.59) |
| BSHC G/KW HR (G/HP HR) | 9.45 ( 7.04) |
| BSCO G/KW HR (G/HP HR) | 160.94 (120.01) |
| BSCO2 G/KW HR (G/HP HR) | 871 ( 649) |
| BSNOX G/KW HR (G/HP HR) | 6.78 ( 5.06) |
| BSFC KG/KW HR (LB/HP HR) | .364 ( .598) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-6A (CONT'D). TEST 19-2 EMISSIONS RESULTS

HOT TRANSIENT

PROJECT NO. 11-5044-001

ENGINE NO.
ENGINE MODEL 72 IHC 345
ENGINE 5.7 L(345 CID)
CVS NO. 9

TEST NO.19-2 RUN
DATE 2/ 8/80
TIME 09:45
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 738.99 MM HG(29.09 IN HG)
DRY BULB TEMP. 22.2 DEG C(72.0 DEG F)

RELATIVE HUMIDITY 60 PCT
ABSOLUTE HUMIDITY 10.3 GM/KG( 72.2 GRAINS/LB)

NOX HUMIDITY C.F. .9871

BAG RESULTS

| BAG NUMBER | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7177 | 8101 | 8335 | 7176 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 181.8 ( 6421) | 204.8 ( 7235) | 209.1 ( 7386) | 181.6 ( 6414) |
| HC SAMPLE METER/RANGE/PPM | 9.9/ 3/ 99 | 12.3/ 3/ 123 | 22.9/ 3/ 229 | 64.3/ 2/ 64 |
| HC BCKGRD METER/RANGE/PPM | 1.9/ 3/ 19 | 2.0/ 3/ 20 | 2.2/ 3/ 22 | 18.6/ 2/ 19 |
| CO SAMPLE METER/RANGE/PPM | 18.5/ 3/ 537 | 31.0/ 3/ 901 | 61.3/ 2/ 3941 | 21.1/ 3/ 613 |
| CO BCKGRD METER/RANGE/PPM | .9/ 3/ 26 | .7/ 3/ 20 | .6/ 2/ 36 | .3/ 3/ 9 |
| CO2 SAMPLE METER/RANGE/PCT | 18.6/ 3/ .29 | 29.1/ 3/ .46 | 65.3/ 3/ 1.14 | 19.6/ 3/ .30 |
| CO2 BCKGRD METER/RANGE/PCT | 2.9/ 3/ .04 | 3.0/ 3/ .04 | 3.4/ 3/ .05 | 3.2/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 12.7/ 2/ 13 | 33.4/ 2/ 33 | 97.3/ 2/ 97 | 12.7/ 2/ 13 |
| NOX BCKGRD METER/RANGE/PPM | .3/ 2/ 0 | .4/ 2/ 0 | .5/ 2/ 1 | .6/ 2/ 1 |
| DILUTION FACTOR | 38.28 | 23.73 | 8.68 | 36.18 |
| HC CONCENTRATION PPM | 80 | 104 | 210 | 46 |
| CO CONCENTRATION PPM | 499 | 856 | 3747 | 589 |
| CO2 CONCENTRATION PCT | .25 | .42 | 1.10 | .26 |
| NOX CONCENTRATION PPM | 12.4 | 33.0 | 96.9 | 12.1 |
| HC MASS GRAMS | 8.44 | 12.27 | 25.27 | 4.84 |
| CO MASS GRAMS | 105.61 | 204.26 | 912.53 | 124.58 |
| CO2 MASS GRAMS | 820.1 | 1585.6 | 4210.1 | 859.7 |
| NOX MASS GRAMS | 4.26 | 12.77 | 38.25 | 4.15 |
| FUEL KG (LB) | .319 ( .70) | .613 ( 1.35) | 1.805 ( 3.98) | .338 ( .74) |
| KW HR (HP HR) | .74 ( .99) | 1.68 ( 2.25) | 5.51 ( 7.39) | .75 ( 1.01) |
| BSHC G/KW HR (G/HP HR) | 11.46 ( 8.54) | 7.32 ( 5.46) | 4.59 ( 3.42) | 6.44 ( 4.80) |
| BSCO G/KW HP (G/HP HR) | 143.36 ( 106.90) | 121.85 ( 90.86) | 165.61 ( 123.50) | 165.73 ( 123.59) |
| BSCO2 G/KW HP (G/HP HR) | 1113.28 ( 830.17) | 945.85 ( 705.32) | 764.08 ( 569.78) | 1143.69 ( 852.85) |
| BSNOX G/KW HR (G/HP HR) | 5.78 ( 4.31) | 7.62 ( 5.68) | 6.94 ( 5.18) | 5.53 ( 4.12) |
| BSFC KG/KW HR (LB/HP HR) | .433 ( .713) | .366 ( .601) | .327 ( .538) | .449 ( .738) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.67 ( 11.63) |
| BSHC G/KW HR (G/HP HR) | 5.86 ( 4.37) |
| BSCO G/KW HR (G/HP HR) | 155.28 (115.79) |
| BSCO2 G/KW HP (G/HP HR) | 862 ( 643) |
| BSNOX G/KW HR (G/HP HR) | 6.85 ( 5.11) |
| BSFC KG/KW HR (LB/HP HR) | .394 ( .583) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-6B. TEST 19-3 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.
ENGINE MODEL 72 IHC 345
ENGINE 5.7 L(345 CID)
CVS NO. 9

TEST NO.19-3 RUN
DATE 2/13/80
TIME 08:30 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 1

BAROMETER 745.49 MM HG(29.35 IN HG)
DRY BULB TEMP. 22.2 DEG C(72.0 DEG F)

RELATIVE HUMIDITY 51 PCT
ABSOLUTE HUMIDITY 8.7 GM/KG( 60.7 GRAINS/LB) — NOX HUMIDITY C.F. .9370

BAG RESULTS

| | 1 NYNF | 2 LANF | 3 LAF | 4 NYNF |
|---|---|---|---|---|
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7178 | 8101 | 8336 | 7177 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 183.5 ( 6482) | 206.8 ( 7303) | 211.1 ( 7457) | 183.3 ( 6475) |
| HC SAMPLE METER/RANGE/PPM | 39.6/ 3/ 396 | 16.0/ 3/ 160 | 21.5/ 3/ 215 | 71.6/ 2/ 72 |
| HC BCKGRD METER/RANGE/PPM | 1.1/ 3/ 11 | 1.2/ 3/ 12 | 1.2/ 3/ 12 | 10.6/ 2/ 11 |
| CO SAMPLE METER/RANGE/PPM | 38.2/ 3/ 908 | 36.7/ 3/ 869 | 65.8/ 2/ 3467 | 27.6/ 3/ 642 |
| CO BCKGRD METER/RANGE/PPM | .1/ 3/ 2 | .1/ 3/ 2 | .2/ 2/ 8 | .7/ 3/ 16 |
| CO2 SAMPLE METER/RANGE/PCT | 19.5/ 3/ .31 | 28.5/ 3/ .47 | 61.6/ 3/ 1.09 | 17.0/ 3/ .27 |
| CO2 BCKGRD METER/RANGE/PCT | 2.9/ 3/ .04 | 2.8/ 3/ .04 | 2.8/ 3/ .04 | 2.7/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 11.4/ 2/ 11 | 32.7/ 2/ 33 | 94.1/ 2/ 94 | 12.7/ 2/ 13 |
| NOX BCKGRD METER/RANGE/PPM | .6/ 2/ 1 | .7/ 2/ 1 | .9/ 2/ 1 | .8/ 2/ 1 |
| DILUTION FACTOR | 30.35 | 23.52 | 9.24 | 39.29 |
| HC CONCENTRATION PPM | 385 | 149 | 204 | 61 |
| CO CONCENTRATION PPM | 885 | 845 | 3330 | 613 |
| CO2 CONCENTRATION PCT | .27 | .43 | 1.06 | .23 |
| NOX CONCENTRATION PPM | 10.8 | 32.0 | 93.3 | 11.9 |
| HC MASS GRAMS | 40.79 | 17.71 | 24.88 | 6.48 |
| CO MASS GRAMS | 189.19 | 203.46 | 818.73 | 130.92 |
| CO2 MASS GRAMS | 908.3 | 1620.7 | 4085.6 | 775.1 |
| NOX MASS GRAMS | 3.56 | 11.87 | 35.31 | 3.92 |
| FUEL KG (LB) | .421 ( .93) | .629 ( 1.39) | 1.718 ( 3.79) | .316 ( .70) |
| KW HR (HP HR) | .71 ( .95) | 1.70 ( 2.28) | 5.61 ( 7.52) | .73 ( .98) |
| BSHC G/KW HR (G/HP HR) | 57.73 ( 43.05) | 10.42 ( 7.77) | 4.44 ( 3.31) | 8.89 ( 6.63) |
| BSCO G/KW HR (G/HP HR) | 267.74 ( 199.65) | 119.76 ( 89.31) | 146.00 ( 108.87) | 179.55 ( 133.89) |
| BSCO2 G/KW HR (G/HP HR) | 1285.45 ( 958.56) | 953.99 ( 711.39) | 728.56 ( 543.29) | 1063.01 ( 792.68) |
| BSNOX G/KW HR (G/HP HR) | 5.04 ( 3.76) | 6.99 ( 5.21) | 6.30 ( 4.69) | 5.37 ( 4.01) |
| BSFC KG/KW HR (LB/HP HR) | .596 ( .979) | .370 ( .609) | .306 ( .504) | .433 ( .712) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.74 ( 11.72) |
| BSHC G/KW HR (G/HP HR) | 10.28 ( 7.66) |
| BSCO G/KW HR (G/HP HR) | 153.54 (114.49) |
| BSCO2 G/KW HR (G/HP HR) | 845 ( 630) |
| BSNOX G/KW HR (G/HP HR) | 6.25 ( 4.66) |
| BSFC KG/KW HR (LB/HP HR) | .353 ( .580) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-6B (CONT'D). TEST 19-3 EMISSIONS RESULTS

HOT TRANSIENT

PROJECT NO. 11-5044-001

ENGINE NO.
ENGINE MODEL 72 IHC 345
ENGINE 5.7 L(345 CID)
CVS NO. 9

TEST NO.19-3 RUN
DATE 2/13/80
TIME 09:10
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 1

BAROMETER 745.49 MM HG(29.35 IN HG)
DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)

RELATIVE HUMIDITY 43 PCT
ABSOLUTE HUMIDITY 7.8 GM/KG( 54.9 GRAINS/LB)

NOX HUMIDITY C.F. .9137

BAG RESULTS

| BAG NUMBER | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H20(IN. H20) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H20(IN. H20) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7177 | 8100 | 8336 | 7177 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 183.5 ( 6481) | 206.7 ( 7302) | 211.1 ( 7457) | 183.3 ( 6475) |
| HC SAMPLE METER/RANGE/PPM | 72.9/ 2/ 73 | 11.9/ 3/ 119 | 21.6/ 3/ 216 | 20.2/ 2/ 20 |
| HC BCKGRD METER/RANGE/PPM | 10.5/ 2/ 10 | 1.1/ 3/ 11 | 1.1/ 3/ 11 | 1.4/ 2/ 11 |
| CO SAMPLE METER/RANGE/PPM | 92.5/11/ 464 | 36.9/ 3/ 874 | 66.4/ 2/ 3512 | 26.7/ 3/ 620 |
| CO BCKGRD METER/RANGE/PPM | 1.7/11/ 5 | .2/ 3/ 5 | .2/ 2/ 8 | .7/ 3/ 16 |
| CO2 SAMPLE METER/RANGE/PCT | 17.4/ 3/ .28 | 27.7/ 3/ .45 | 61.2/ 3/ 1.09 | 16.9/ 3/ .27 |
| CO2 BCKGRD METER/RANGE/PCT | 2.6/ 3/ .04 | 2.6/ 3/ .04 | 2.7/ 3/ .04 | 2.4/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 12.6/ 2/ 13 | 33.5/ 2/ 33 | 94.6/ 2/ 95 | 12.6/ 2/ 13 |
| NOX BCKGRD METER/RANGE/PPM | .7/ 2/ 1 | .4/ 2/ 0 | .9/ 2/ 1 | 1.1/ 2/ 1 |
| DILUTION FACTOR | 40.54 | 24.26 | 9.26 | 39.73 |
| HC CONCENTRATION PPM | 63 | 108 | 206 | 59 |
| CO CONCENTRATION PPM | 450 | 850 | 3382 | 593 |
| CO2 CONCENTRATION PCT | .24 | .42 | 1.05 | .23 |
| NOX CONCENTRATION PPM | 11.9 | 33.1 | 93.8 | 11.5 |
| HC MASS GRAMS | 6.63 | 12.93 | 25.11 | 6.25 |
| CO MASS GRAMS | 96.13 | 204.71 | 831.64 | 126.67 |
| CO2 MASS GRAMS | 803.2 | 1578.0 | 4060.0 | 784.6 |
| NOX MASS GRAMS | 3.82 | 11.97 | 34.62 | 3.69 |
| FUEL KG (LB) | .307 ( .68) | .612 ( 1.35) | 1.717 ( 3.79) | .316 ( .70) |
| KW HR (HP HR) | .71 ( .95) | 1.71 ( 2.29) | 5.61 ( 7.52) | .74 ( .99) |
| BSHC G/KW HR (G/HP HR) | 9.39 ( 7.00) | 7.58 ( 5.65) | 4.48 ( 3.34) | 8.48 ( 6.32) |
| BSCO G/KW HR (G/HP HR) | 136.05 ( 101.45) | 119.97 ( 89.46) | 148.30 ( 110.59) | 171.95 ( 128.23) |
| BSCO2 G/KW HR (G/HP HR) | 1136.76 ( 847.68) | 924.76 ( 689.59) | 724.00 ( 539.89) | 1065.01 ( 794.18) |
| BSNOX G/KW HR (G/HP HR) | 5.41 ( 4.03) | 7.01 ( 5.23) | 6.17 ( 4.60) | 5.01 ( 3.74) |
| BSFC KG/KW HR (LB/HP HR) | .435 ( .715) | .359 ( .589) | .306 ( .503) | .429 ( .706) |

TOTAL TEST RESULTS 4 BAGS

| | | |
|---|---|---|
| TOTAL KW HR (HP HR) | 8.76 | ( 11.74) |
| BSHC G/KW HR (G/HP HR) | 5.81 | ( 4.34) |
| BSCO G/KW HR (G/HP HR) | 143.78 | (107.22) |
| BSCO2 G/KW HR (G/HP HR) | 825 | ( 615) |
| BSNOX G/KW HR (G/HP HR) | 6.18 | ( 4.61) |
| BSFC KG/KW HR (LB/HP HR) | .377 | ( .554) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | | |
|---|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 | ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 | |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 | (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 | (0.0000) |

20 X 20 FILTERS

| | | | |
|---|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 | ( 0.0) |

# TABLE D-7A. TEST 20-3 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.FORD
ENGINE MODEL 72 FORD 300
ENGINE 4.9 L( 300 CID) I-6
CVS NO. 9

TEST NO.20-3 RUN
DATE 1/17/80
TIME 09:00 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 1

BAROMETER 740.66 MM HG(29.16 IN HG)
DRY BULB TEMP. 22.2 DEG C(72.0 DEG F)

RELATIVE HUMIDITY 53 PCT
ABSOLUTE HUMIDITY 9.2 GM/KG( 64.1 GRAINS/LB) — NOX HUMIDITY C.F. .9514

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H20(IN. H20) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H20(IN. H20) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7166 | 8087 | 8321 | 7165 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 182.0 ( 6427) | 205.0 ( 7240) | 209.3 ( 7392) | 181.8 ( 6420) |
| HC SAMPLE METER/RANGE/PPM | 45.5/ 3/ 455 | 16.1/ 3/ 161 | 13.5/ 3/ 135 | 11.4/ 3/ 114 |
| HC BCKGRD METER/RANGE/PPM | 1.0/ 3/ 10 | 1.1/ 3/ 11 | 1.2/ 3/ 12 | 1.3/ 3/ 13 |
| CO SAMPLE METER/RANGE/PPM | 31.0/ 3/ 726 | 23.3/ 3/ 538 | 56.2/ 3/ 1349 | 88.3/11/ 427 |
| CO BCKGRD METER/RANGE/PPM | .1/ 3/ 2 | .1/ 3/ 2 | .1/ 3/ 2 | .8/11/ 2 |
| CO2 SAMPLE METER/RANGE/PCT | 16.8/ 3/ .27 | 24.0/ 3/ .39 | 51.6/ 3/ .90 | 14.4/ 3/ .23 |
| CO2 BCKGRD METER/RANGE/PCT | 3.1/ 3/ .05 | 3.0/ 3/ .05 | 2.6/ 3/ .04 | 2.8/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 11.6/ 2/ 12 | 36.4/ 2/ 36 | 37.8/ 3/ 113 | 15.7/ 2/ 16 |
| NOX BCKGRD METER/RANGE/PPM | 1.1/ 2/ 1 | 1.3/ 2/ 1 | .2/ 3/ 1 | 1.2/ 2/ 1 |
| DILUTION FACTOR | 34.88 | 29.20 | 12.80 | 42.67 |
| HC CONCENTRATION PPM | 445 | 150 | 124 | 101 |
| CO CONCENTRATION PPM | 707 | 523 | 1349 | 416 |
| CO2 CONCENTRATION PCT | .22 | .35 | .86 | .19 |
| NOX CONCENTRATION PPM | 10.5 | 35.1 | 112.8 | 14.5 |
| HC MASS GRAMS | 46.73 | 17.78 | 14.96 | 10.62 |
| CO MASS GRAMS | 149.91 | 124.83 | 328.67 | 87.99 |
| CO2 MASS GRAMS | 738.6 | 1298.5 | 3301.8 | 619.2 |
| NOX MASS GRAMS | 3.49 | 13.11 | 42.98 | 4.81 |
| FUEL KG (LB) | .354 ( .78) | .489 ( 1.08) | 1.219 ( 2.69) | .249 ( .55) |
| KW HR (HP HR) | .61 ( .82) | 1.23 ( 1.65) | 3.94 ( 5.28) | .57 ( .77) |
| BSHC G/KW HR (G/HP HR) | 76.75 ( 57.23) | 14.42 ( 10.75) | 3.80 ( 2.83) | 18.58 ( 13.86) |
| BSCO G/KW HR (G/HP HR) | 246.21 ( 183.60) | 101.26 ( 75.51) | 83.44 ( 62.22) | 154.01 ( 114.85) |
| BSCO2 G/KW HR (G/HP HR) | 1213.11 ( 904.62) | 1053.30 ( 785.45) | 838.24 ( 625.08) | 1083.82 ( 808.20) |
| BSNOX G/KW HR (G/HP HR) | 5.73 ( 4.27) | 10.64 ( 7.93) | 10.91 ( 8.14) | 8.41 ( 6.27) |
| BSFC KG/KW HR (LB/HP HR) | .581 ( .955) | .397 ( .652) | .309 ( .509) | .437 ( .718) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 6.35 ( 8.52) |
| BSHC G/KW HR (G/HP HR) | 14.18 ( 10.58) |
| BSCO G/KW HR (G/HP HR) | 108.85 ( 81.17) |
| BSCO2 G/KW HR (G/HP HR) | 938 ( 699) |
| BSNOX G/KW HR (G/HP HR) | 10.14 ( 7.56) |
| BSFC KG/KW HR (LB/HP HR) | .369 ( .598) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

| | | |
|---|---|---|
| 90MM FILTER | | |
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |
| 20 X 20 FILTERS | | |
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-7A (CONT'D). TEST 20-3 EMISSIONS RESULTS

HOT TRANSIENT

PROJECT NO. 11-5044-001

ENGINE NO.FORD
ENGINE MODEL 72 FORD 300
ENGINE 0.0 L( 0 CID) I-6
CVS NO. 9

TEST NO.20-3 RUN
DATE 1/17/80
TIME 09:40
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 1

BAROMETER 740.66 MM HG(29.16 IN HG)
DRY BULB TEMP. 22.2 DEG C(72.0 DEG F)

RELATIVE HUMIDITY 54 PCT
ABSOLUTE HUMIDITY 9.2 GM/KG( 64.5 GRAINS/LB)

NOX HUMIDITY C.F. .9529

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7165 | 8086 | 8319 | 7163 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 181.9 ( 6426) | 205.0 ( 7239) | 209.2 ( 7391) | 181.7 ( 6418) |
| HC SAMPLE METER/RANGE/PPM | 17.9/ 3/ 179 | 13.5/ 3/ 135 | 13.7/ 3/ 137 | 12.4/ 3/ 124 |
| HC BCKGRD METER/RANGE/PPM | 1.3/ 3/ 13 | 1.3/ 3/ 13 | 1.5/ 3/ 15 | 1.4/ 3/ 14 |
| CO SAMPLE METER/RANGE/PPM | 79.2/11/ 357 | 89.1/11/ 434 | 56.0/ 3/ 1393 | 85.8/11/ 407 |
| CO BCKGRD METER/RANGE/PPM | .9/11/ 3 | .9/11/ 3 | .1/ 3/ 2 | 1.8/11/ 5 |
| CO2 SAMPLE METER/RANGE/PCT | 15.1/ 3/ .24 | 23.2/ 3/ .38 | 52.1/ 3/ .91 | 14.9/ 3/ .24 |
| CO2 BCKGRD METER/RANGE/PCT | 3.0/ 3/ .05 | 2.7/ 3/ .04 | 3.5/ 3/ .05 | 3.1/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 16.2/ 2/ 16 | 40.8/ 2/ 41 | 40.0/ 3/ 120 | 16.3/ 2/ 16 |
| NOX BCKGRD METER/RANGE/PPM | 1.1/ 2/ 1 | 1.4/ 2/ 1 | .6/ 3/ 2 | .7/ 2/ 1 |
| DILUTION FACTOR | 45.85 | 31.00 | 12.69 | 46.47 |
| HC CONCENTRATION PPM | 166 | 122 | 123 | 110 |
| CO CONCENTRATION PPM | 346 | 421 | 1343 | 393 |
| CO2 CONCENTRATION PCT | .19 | .34 | .86 | .19 |
| NOX CONCENTRATION PPM | 15.1 | 39.4 | 118.3 | 15.6 |
| HC MASS GRAMS | 17.45 | 14.47 | 14.87 | 11.56 |
| CO MASS GRAMS | 73.35 | 100.42 | 327.13 | 83.11 |
| CO2 MASS GRAMS | 648.3 | 1262.9 | 3289.2 | 631.5 |
| NOX MASS GRAMS | 5.02 | 14.74 | 45.14 | 5.17 |
| FUEL KG (LB) | .258 ( .57) | .462 ( 1.02) | 1.214 ( 2.68) | .252 ( .56) |
| KW HR (HP HR) | .56 ( .76) | 1.24 ( 1.66) | 3.93 ( 5.27) | .56 ( .76) |
| BSHC G/KW HR (G/HP HR) | 30.95 ( 23.08) | 11.67 ( 8.70) | 3.78 ( 2.82) | 20.51 ( 15.29) |
| BSCO G/KW HR (G/HP HR) | 130.11 ( 97.02) | 80.96 ( 60.38) | 83.21 ( 62.05) | 147.42 ( 109.93) |
| BSCO2 G/KW HR (G/HP HR) | 1149.98 ( 857.54) | 1018.22 ( 759.28) | 836.64 ( 623.88) | 1120.07 ( 835.23) |
| BSNOX G/KW HR (G/HP HR) | 8.90 ( 6.63) | 11.88 ( 8.86) | 11.48 ( 8.56) | 9.17 ( 6.84) |
| BSFC KG/KW HR (LB/HP HR) | .458 ( .753) | .373 ( .613) | .309 ( .508) | .447 ( .734) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 6.30 ( 8.45) |
| BSHC G/KW HR (G/HP HR) | 9.26 ( 6.91) |
| BSCO G/KW HR (G/HP HR) | 92.71 ( 69.13) |
| BSCO2 G/KW HR (G/HP HR) | 926 ( 690) |
| BSNOX G/KW HR (G/HP HR) | 11.12 ( 8.29) |
| BSFC KG/KW HR (LB/HP HR) | .347 ( .571) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER
SAMPLE FLOW SCM(SCF) 0.000 ( 0.00)
MULTIPLIER FOR G/TEST 0.000
MULTIPLIER FOR G/KW HR (G/HP HR) 0.0000 (0.0000)
MULTIPLIER FOR G/KG FUEL (G/LB FUEL) 0.0000 (0.0000)

20 X 20 FILTERS
SAMPLE FLOW SCM(SCF) 0.00 ( 0.0)

# TABLE D-7B. TEST 20-4 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.FORD
ENGINE MODEL 72 FORD 300
ENGINE 4.9 L( 300 CID) I-6
CVS NO. 9

TEST NO.20-4 RUN
DATE 1/18/80
TIME 09:00 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 1

BAROMETER 743.97 MM HG(29.29 IN HG)
DRY BULB TEMP. 21.7 DEG C(71.0 DEG F)

RELATIVE HUMIDITY 55 PCT
ABSOLUTE HUMIDITY 9.1 GM/KG( 63.4 GRAINS/LB) — NOX HUMIDITY C.F. .9985

BAG RESULTS

| BAG NUMBER | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7165 | 8087 | 8322 | 7165 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 182.8 ( 6456) | 206.0 ( 7274) | 210.3 ( 7428) | 182.6 ( 6450) |
| HC SAMPLE METER/RANGE/PPM | 50.6/ 3/ 506 | 17.1/ 3/ 171 | 14.6/ 3/ 146 | 10.2/ 3/ 102 |
| HC BCKGRD METER/RANGE/PPM | 2.1/ 3/ 21 | 2.1/ 3/ 21 | 2.1/ 3/ 21 | 2.0/ 3/ 20 |
| CO SAMPLE METER/RANGE/PPM | 29.3/ 3/ 684 | 23.7/ 3/ 548 | 55.8/ 3/ 1387 | 90.4/11/ 445 |
| CO BCKGRD METER/RANGE/PPM | .1/ 3/ 2 | .1/ 3/ 2 | .1/ 3/ 2 | 1.4/11/ 4 |
| CO2 SAMPLE METER/RANGE/PCT | 15.3/ 3/ .24 | 23.9/ 3/ .39 | 52.1/ 3/ .91 | 14.2/ 3/ .22 |
| CO2 BCKGRD METER/RANGE/PCT | 2.7/ 3/ .04 | 2.8/ 3/ .04 | 2.6/ 3/ .04 | 3.1/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 11.6/ 2/ 12 | 37.8/ 2/ 38 | 41.0/ 3/ 123 | 15.9/ 2/ 16 |
| NOX BCKGRD METER/RANGE/PPM | 1.3/ 2/ 1 | 1.2/ 2/ 1 | .3/ 3/ 1 | 1.1/ 2/ 1 |
| DILUTION FACTOR | 37.20 | 29.19 | 12.69 | 48.14 |
| HC CONCENTRATION PPM | 486 | 151 | 127 | 82 |
| CO CONCENTRATION PPM | 666 | 532 | 1336 | 431 |
| CO2 CONCENTRATION PCT | .20 | .35 | .87 | .18 |
| NOX CONCENTRATION PPM | 10.3 | 36.6 | 122.2 | 14.8 |
| HC MASS GRAMS | 51.19 | 17.90 | 15.36 | 8.68 |
| CO MASS GRAMS | 141.86 | 127.60 | 327.31 | 91.72 |
| CO2 MASS GRAMS | 678.3 | 1309.4 | 3355.4 | 595.9 |
| NOX MASS GRAMS | 3.43 | 13.69 | 46.62 | 4.91 |
| FUEL KG (LB) | .335 ( .74) | .494 ( 1.09) | 1.235 ( 2.72) | .242 ( .53) |
| KW HR (HP HR) | .55 ( .74) | 1.21 ( 1.62) | 3.93 ( 5.27) | .56 ( .76) |
| BSHC G/KW HR (G/HP HR) | 93.29 ( 69.57) | 14.79 ( 11.03) | 3.91 ( 2.91) | 15.40 ( 11.48) |
| BSCO G/KW HR (G/HP HR) | 258.52 ( 192.78) | 105.43 ( 78.62) | 83.25 ( 62.08) | 162.69 ( 121.32) |
| BSCO2 G/KW HR (G/HP HR) | 1236.13 ( 921.79) | 1081.88 ( 806.76) | 853.46 ( 636.43) | 1056.94 ( 788.16) |
| BSNOX G/KW HR (G/HP HR) | 6.25 ( 4.66) | 11.31 ( 8.44) | 11.86 ( 8.84) | 8.71 ( 6.50) |
| BSFC KG/KW HR (LB/HP HR) | .611 ( 1.005) | .408 ( .671) | .314 ( .517) | .429 ( .706) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 6.25 ( 8.39) |
| BSHC G/KW HR (G/HP HR) | 14.89 ( 11.11) |
| BSCO G/KW HR (G/HP HR) | 110.08 ( 82.09) |
| BSCO2 G/KW HR (G/HP HR) | 950 ( 708) |
| BSNOX G/KW HR (G/HP HR) | 10.98 ( 8.19) |
| BSFC KG/KW HR (LB/HP HR) | .369 ( .606) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-7B (CONT'D). TEST 20-4 EMISSIONS RESULTS

HOT TRANSIENT

PROJECT NO. 11-5044-001

ENGINE NO.FORD
ENGINE MODEL 72 FORD 300
ENGINE 0.0 L( -0 CID) I-6
CVS NO. 9

TEST NO.20-4 RUN
DATE 1/18/80
TIME 10:20
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 1

BAROMETER 743.97 MM HG(29.29 IN HG)
DRY BULB TEMP. 22.2 DEG C(72.0 DEG F)

RELATIVE HUMIDITY 55 PCT
ABSOLUTE HUMIDITY 9.4 GM/KG( 65.7 GRAINS/LB)

NOX HUMIDITY C.F. .9579

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7166 | 8086 | 8320 | 7165 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 182.8 ( 6457) | 205.9 ( 7273) | 210.3 ( 7427) | 182.6 ( 6450) |
| HC SAMPLE METER/RANGE/PPM | 19.5/ 3/ 195 | 12.5/ 3/ 125 | 13.8/ 3/ 138 | 11.3/ 3/ 113 |
| HC BCKGRD METER/RANGE/PPM | 1.4/ 3/ 14 | 1.1/ 3/ 11 | .9/ 3/ 9 | .9/ 3/ 9 |
| CO SAMPLE METER/RANGE/PPM | 78.3/11/ 350 | 90.0/11/ 442 | 55.4/ 3/ 1376 | 85.7/11/ 406 |
| CO BCKGRD METER/RANGE/PPM | .6/11/ 2 | .8/11/ 2 | .1/ 3/ 2 | .5/11/ 1 |
| CO2 SAMPLE METER/RANGE/PCT | 14.6/ 3/ .23 | 22.4/ 3/ .36 | 51.8/ 3/ .90 | 14.0/ 3/ .22 |
| CO2 BCKGRD METER/RANGE/PCT | 2.5/ 3/ .04 | 1.6/ 3/ .02 | 2.3/ 3/ .04 | 2.5/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 16.2/ 2/ 16 | 41.1/ 2/ 41 | 45.5/ 3/ 136 | 16.6/ 2/ 17 |
| NOX BCKGRD METER/RANGE/PPM | .9/ 2/ 1 | .9/ 2/ 1 | .2/ 3/ 1 | .8/ 2/ 1 |
| DILUTION FACTOR | 47.02 | 32.04 | 12.78 | 49.20 |
| HC CONCENTRATION PPM | 181 | 114 | 130 | 104 |
| CO CONCENTRATION PPM | 341 | 428 | 1325 | 396 |
| CO2 CONCENTRATION PCT | .19 | .34 | .87 | .18 |
| NOX CONCENTRATION PPM | 15.3 | 40.2 | 135.9 | 15.8 |
| HC MASS GRAMS | 19.12 | 13.58 | 15.73 | 10.97 |
| CO MASS GRAMS | 72.53 | 102.75 | 324.53 | 84.12 |
| CO2 MASS GRAMS | 649.0 | 1278.5 | 3348.4 | 615.1 |
| NOX MASS GRAMS | 5.13 | 15.18 | 52.38 | 5.29 |
| FUEL KG (LB) | .260 ( .57) | .468 ( 1.03) | 1.232 ( 2.72) | .247 ( .54) |
| KW HR (HP HR) | .55 ( .74) | 1.22 ( 1.63) | 3.94 ( 5.28) | .56 ( .76) |
| BSHC G/KW HR (G/HP HR) | 34.84 ( 25.98) | 11.15 ( 8.32) | 3.99 ( 2.98) | 19.46 ( 14.51) |
| BSCO G/KW HR (G/HP HR) | 132.17 ( 98.56) | 84.37 ( 62.92) | 82.39 ( 61.44) | 149.21 ( 111.27) |
| BSCO2 G/KW HR (G/HP HR) | 1182.68 ( 881.92) | 1049.86 ( 782.88) | 850.07 ( 633.90) | 1091.06 ( 813.61) |
| BSNOX G/KW HR (G/HP HR) | 9.35 ( 6.97) | 12.47 ( 9.30) | 13.30 ( 9.92) | 9.39 ( 7.00) |
| BSFC KG/KW HR (LB/HP HR) | .473 ( .778) | .384 ( .631) | .313 ( .514) | .437 ( .719) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 6.27 ( 8.41) |
| BSHC G/KW HR (G/HP HR) | 9.48 ( 7.07) |
| BSCO G/KW HR (G/HP HR) | 93.14 ( 69.46) |
| BSCO2 G/KW HR (G/HP HR) | 940 ( 701) |
| BSNOX G/KW HR (G/HP HR) | 12.44 ( 9.28) |
| BSFC KG/KW HR (LB/HP HR) | .352 ( .578) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-8A. TEST 21-1 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO. 21 — TEST NO. 21-1 RUN
ENGINE MODEL 7.5 IRC 304 — DATE 2/25/80
ENGINE 5.0 L (305. CID) — TIME 09:00 — GASOLINE EM-267-F
CVS NO. 9 — DYNO NO. 2 — BAG CART NO. 1

BAROMETER 736.6 MM HG(29.00 IN HG) — RELATIVE HUMIDITY 48. PCT
DRY BULB TEMP. 21.7 DEG C(71.0 DEG F) — ABSOLUTE HUMIDITY 7.7 GM/KG( 54.1 GRAINS/LB) — NOX HUMIDITY C.F. .9107

BAG RESULTS

| BAG NUMBER | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER FLOW PRESS. DROP(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET PRESS. DROP(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7177. | 8101. | 8335. | 7177. |
| TIME SECONDS | 271.9 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METERS(SCF) | 185.0 ( 6535.) | 208.5 ( 7363.) | 212.9 ( 7519.) | 184.8 ( 6529.) |
| HC SAMPLE METER/RANGE/PPM | 16.7/ 3/ 167. | 85.1/ 2/ 85. | 17.8/ 3/ 178. | 61.4/ 2/ 61. |
| HC BCKGRD METER/RANGE/PPM | 2.1/ 3/ 21. | 19.2/ 2/ 19. | 2.0/ 3/ 20. | 19.0/ 2/ 19. |
| CO SAMPLE METER/RANGE/PPM | 24.6/ 3/ 570. | 24.8/ 3/ 574. | 89.2/ 3/2501. | 84.5/11/ 396. |
| CO BCKGRD METER/RANGE/PPM | .1/ 3/ 2. | .1/ 3/ 2. | .1/ 3/ 2. | 2.0/11/ 6. |
| CO2 SAMPLE METER/RANGE/PCT | 20.2/ 3/ .33 | 28.1/ 3/ .46 | 56.2/ 3/ .99 | 16.8/ 3/ .27 |
| CO2 BCKGRD METER/RANGE/PCT | 2.8/ 3/ .04 | 2.6/ 3/ .04 | 3.0/ 3/ .05 | 2.5/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 13.2/ 2/ 13. | 33.4/ 2/ 33. | 96.0/ 2/ 96. | 12.8/ 2/ 13. |
| NOX BCKGRD METER/RANGE/PPM | .6/ 2/ 1. | .6/ 2/ 1. | .9/ 2/ 1. | 1.0/ 2/ 1. |
| DILUTION FACTOR | 33.71 | 25.45 | 10.74 | 42.85 |
| HC CONCENTRATION PPM | 147. | 67. | 160. | 43. |
| CO CONCENTRATION PPM | 555. | 558. | 2413. | 383. |
| CO2 CONCENTRATION PCT | .28 | .42 | .95 | .23 |
| NOX CONCENTRATION PPM | 12.6 | 32.8 | 95.2 | 11.8 |
| HC MASS GRAMS | 15.65 | 8.01 | 19.63 | 4.57 |
| CO MASS GRAMS | 119.61 | 135.56 | 598.13 | 82.37 |
| CO2 MASS GRAMS | 960.5 | 1617.9 | 3688.7 | 780.1 |
| NOX MASS GRAMS | 4.07 | 11.92 | 35.30 | 3.81 |
| FUEL KG (LB) | .378 ( .83) | .585 ( 1.29) | 1.479 ( 3.26) | .291 ( .64) |
| KW HR (HP HR) | .57 ( .77) | 1.42 ( 1.91) | 4.71 ( 6.31) | .65 ( .87) |
| BSHC G/KW HR (G/HP HR) | 27.39 ( 20.42) | 5.64 ( 4.21) | 4.17 ( 3.11) | 7.07 ( 5.27) |
| BSCO G/KW HR (G/HP HR) | 209.37 ( 156.13) | 95.42 ( 71.15) | 127.11 ( 94.78) | 127.42 ( 95.02) |
| BSCO2 G/KW HR (G/HP HR) | 1681.26 (1253.71) | 1138.78 ( 849.19) | 783.88 ( 584.54) | 1206.69 ( 899.83) |
| BSNOX G/KW HR (G/HP HR) | 7.12 ( 5.31) | 8.39 ( 6.26) | 7.50 ( 5.59) | 5.89 ( 4.39) |
| BSFC G/KW HR (G/HP HR) | .661 ( 1.087) | .412 ( .677) | .314 ( .517) | .451 ( .741) |

TOTAL TEST RESULTS (4 BAG)

| | | |
|---|---|---|
| TOTAL HC MASS (GRAMS) | 7.34 | ( 9.35) |
| BSHC G/KW HR (G/HP HR) | 6.52 | ( 4.86) |
| BSCO G/KW HR (G/HP HR) | 127.40 | ( 95.00) |
| BSCO2 G/KW HR (G/HP HR) | 960. | ( 716.) |
| BSNOX G/KW HR (G/HP HR) | 7.56 | ( 5.64) |
| BSFC KG/KW HR (LB/HP HR) | .512 | ( .842) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW SCM(SCF) | 0.000 | ( 0.00) |
| MULTIPLIER FOR G/TEST | 0.000 | |
| MULTIPLIER FOR G/KW HR (G/HP HR) | 0.0000 | (0.0000) |
| MULTIPLIER FOR G/KG FUEL (G/LB FUEL) | 0.0000 | (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW SCM(SCF) | 0.00 | ( 0.0) |

# TABLE D-8A (CONT'D). TEST 21-1 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO. 21 — TEST NO. 21-1 RUN
ENGINE MODEL 79 IHC 304 — DATE 2/25/80
ENGINE 5.0 L (304, CID) — TIME 09:40 — GASOLINE EM-267-F
CVS NO. 9 — DYNO NO. 2 — BAG CART NO. 1

BAROMETER 751.59 MM HG(29.59 IN HG) — RELATIVE HUMIDITY 48. PCT
DRY BULB TEMP. 22.2 DEG C(72.0 DEG F) — ABSOLUTE HUMIDITY 8.1 GM/KG( 56.6 GRAINS/LB) — NOX HUMIDITY C.F. .9204

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P RS. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P RS. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7177. | 8100. | 8335. | 7177. |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STP, CU. METRES(SCF) | 185.1 ( 6537.) | 208.5 ( 7365.) | 212.9 ( 7521.) | 184.9 ( 6531.) |
| HC SAMPLE METER/RANGE/PPM | 78.9/ 2/ 79. | 79.4/ 2/ 79. | 17.3/ 3/ 173. | 66.4/ 2/ 66. |
| HC BCKGRD METER/RANGE/PPM | 16.8/ 2/ 17. | 18.0/ 2/ 18. | 1.8/ 3/ 18. | 17.9/ 2/ 18. |
| CO SAMPLE METER/RANGE/PPM | 69.8/11/ 294. | 96.1/11/ 497. | 89.1/ 3/2497. | 84.8/11/ 399. |
| CO BCKGRD METER/RANGE/PPM | .7/11/ 2. | .7/11/ 2. | .2/ 3/ 5. | 2.2/11/ 6. |
| CO2 SAMPLE METER/RANGE/PCT | 17.5/ 3/ .28 | 27.6/ 3/ .45 | 56.8/ 3/ 1.00 | 17.9/ 3/ .29 |
| CO2 BCKGRD METER/RANGE/PCT | 2.5/ 3/ .04 | 2.9/ 3/ .04 | 2.4/ 3/ .04 | 2.9/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 13.4/ 2/ 13. | 35.5/ 2/ 36. | 32.8/ 3/ 98. | 13.6/ 2/ 14. |
| NOX BCKGRD METER/RANGE/PPM | .7/ 2/ 1. | .7/ 2/ 1. | .3/ 3/ 1. | .8/ 2/ 1. |
| DILUTION FACTOR | 42.39 | 26.30 | 10.65 | 40.38 |
| HC CONCENTRATION PPM | 62. | 62. | 157. | 49. |
| CO CONCENTRATION PPM | 285. | 483. | 2406. | 384. |
| CO2 CONCENTRATION PCT | .24 | .41 | .97 | .24 |
| NOX CONCENTRATION PPM | 12.7 | 34.8 | 97.6 | 12.8 |
| HC MASS GRAMS | 6.67 | 7.47 | 19.25 | 5.22 |
| CO MASS GRAMS | 61.52 | 117.31 | 596.68 | 82.74 |
| CO2 MASS GRAMS | 820.8 | 1567.4 | 3768.9 | 822.6 |
| NOx MASS GRAMS | 4.14 | 12.79 | 36.59 | 4.17 |
| FUEL KG (LB) | .296 ( .65) | .560 ( 1.23) | 1.503 ( 3.31) | .306 ( .67) |
| KW HP (HP HR) | .59 ( .80) | 1.47 ( 1.97) | 4.71 ( 6.32) | .66 ( .89) |
| BSHC G/KW HR (G/HP HR) | 11.23 ( 8.38) | 5.09 ( 3.80) | 4.08 ( 3.04) | 7.89 ( 5.88) |
| BSCO G/KW HR (G/HP HR) | 103.59 ( 77.25) | 80.03 ( 59.68) | 126.60 ( 94.40) | 125.07 ( 93.26) |
| BSCO2 G/KW HR (G/HP HR) | 1382.17 (1030.68) | 1069.30 ( 797.37) | 799.64 ( 596.29) | 1243.48 ( 927.27) |
| BSNOX G/KW HR (G/HP HR) | 6.98 ( 5.20) | 8.72 ( 6.50) | 7.76 ( 5.79) | 6.31 ( 4.70) |
| BSFC KG/KW HR (LB/HP HR) | .498 ( .819) | .382 ( .628) | .319 ( .524) | .462 ( .759) |

TOTAL TEST RESULTS - 4 BAGS

| | | |
|---|---|---|
| TOTAL KW HR (HP HR) | 7.43 ( | 9.97) |
| PSHC G/KW HR (G/HP HR) | 5.19 ( | 3.87) |
| BSCO G/KW HR (G/HP HR) | 115.44 ( | 86.08) |
| BSCO2 G/KW HR (G/HP HR) | 939. ( | 700.) |
| BSNOX G/KW HR (G/HP HR) | 7.76 ( | 5.79) |
| BSFC KG/KW HR (LB/HP HR) | .458 ( | .689) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW SCM(SCF) | 0.000 ( | 0.00) |
| MULTIPLIER FOR G/TEST | 0.000 | |
| MULTIPLIER FOR G/KW HR (G/HP HR) | 0.0000 | (0.0000) |
| MULTIPLIER FOR G/KG FUEL (G/LB FUEL) | 0.0000 | (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW SCM(SCF) | 0.00 ( | 0.0) |

# TABLE D-8B. TEST 21-2 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO. 21 — TEST NO. 21-2 RUN
ENGINE MODEL 73 IHC 304 — DATE 2/26/80
ENGINE 5.0 L(304. CID) — TIME 08:40 — GASOLINE EM-267-F
CVS NO. 9 — DYNO NO. 2 — BAG CART NO. 1

BAROMETER 753.87 MM HG(29.68 IN HG) — RELATIVE HUMIDITY 46. PCT
DRY BULB TEMP. 21.7 DEG C(71.0 DEG F) — ABSOLUTE HUMIDITY 7.4 GM/KG( 51.7 GRAINS/LB) — NOX HUMIDITY C.F. .9011

BAG RESULTS

| BAG NUMBER | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7178. | 8100. | 8334. | 7175. |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 185.7 ( 6559.) | 209.2 ( 7389.) | 213.6 ( 7545.) | 185.5 ( 6550.) |
| HC SAMPLE METER/RANGE/PPM | 24.5/ 3/ 245. | 87.3/ 2/ 87. | 17.1/ 3/ 171. | 56.7/ 2/ 57. |
| HC BCKGRD METER/RANGE/PPM | 1.3/ 3/ 13. | 12.4/ 2/ 12. | 1.4/ 3/ 14. | 12.7/ 2/ 13. |
| CO SAMPLE METER/RANGE/PPM | 29.8/ 3/ 696. | 23.7/ 3/ 548. | 86.0/ 3/2379. | 82.9/11/ 384. |
| CO BCKGRD METER/RANGE/PPM | .1/ 3/ 2. | .1/ 3/ 2. | .3/ 3/ 7. | 2.6/11/ 8. |
| CO2 SAMPLE METER/RANGE/PCT | 19.7/ 3/ .32 | 28.0/ 3/ .46 | 56.9/ 3/ 1.00 | 17.3/ 3/ .28 |
| CO2 BCKGRD METER/RANGE/PCT | 2.5/ 3/ .04 | 2.1/ 3/ .03 | 2.7/ 3/ .04 | 2.5/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 13.6/ 2/ 14. | 37.0/ 2/ 37. | 34.8/ 3/ 104. | 14.0/ 2/ 14. |
| NOX BCKGRD METER/RANGE/PPM | .6/ 2/ 1. | .2/ 2/ 0. | .1/ 3/ 0. | .5/ 2/ 1. |
| DILUTION FACTOR | 32.75 | 25.65 | 10.73 | 41.95 |
| HC CONCENTRATION PPM | 232. | 75. | 158. | 44. |
| CO CONCENTRATION PPM | 680. | 533. | 2292. | 369. |
| CO2 CONCENTRATION PCT | .28 | .43 | .96 | .24 |
| NOX CONCENTRATION PPM | 13.0 | 36.8 | 104.1 | 13.5 |
| HC MASS GRAMS | 24.89 | 9.10 | 19.50 | 4.74 |
| CO MASS GRAMS | 146.97 | 129.83 | 570.15 | 79.70 |
| CO2 MASS GRAMS | 950.6 | 1645.0 | 3771.8 | 811.1 |
| NOX MASS GRAMS | 4.17 | 13.27 | 38.34 | 4.32 |
| FUEL KG (LB) | .397 ( .88) | .592 ( 1.31) | 1.491 ( 3.29) | .300 ( .66) |
| KW HR (HP HR) | .59 ( .79) | 1.48 ( 1.99) | 4.74 ( 6.36) | .68 ( .91) |
| BSHC G/KW HR (G/HP HR) | 42.45 ( 31.66) | 6.14 ( 4.58) | 4.11 ( 3.07) | 7.00 ( 5.22) |
| BSCO G/KW HR (G/HP HR) | 250.66 ( 186.92) | 87.67 ( 65.38) | 120.20 ( 89.63) | 117.80 ( 87.84) |
| BSCO2 G/KW HR (G/HP HR) | 1621.19 (1208.92) | 1110.82 ( 828.34) | 795.19 ( 592.97) | 1198.91 ( 894.02) |
| BSNOX G/KW HR (G/HP HR) | 7.11 ( 5.30) | 8.96 ( 6.68) | 8.08 ( 6.03) | 6.38 ( 4.76) |
| BSFC KG/KW HR (LB/HP HR) | .678 ( 1.114) | .400 ( .657) | .314 ( .517) | .443 ( .729) |

TOTAL TEST RESULTS 4 BAGS

| | | |
|---|---|---|
| TOTAL KW HR (HP HR) | 7.49 | ( 10.04) |
| BSHC G/KW HR (G/HP HR) | 7.78 | ( 5.80) |
| BSCO G/KW HR (G/HP HR) | 123.77 | ( 92.29) |
| BSCO2 G/KW HR (G/HP HR) | 959. | ( 715.) |
| BSNOX G/KW HR (G/HP HR) | 8.03 | ( 5.99) |
| BSFC KG/KW HR (LB/HP HR) | .371 | ( .610) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW SCM(SCF) | 0.000 | ( 0.00) |
| MULTIPLIER FOR G/TEST | 0.000 | |
| MULTIPLIER FOR G/KW HR (G/HP HR) | 0.0000 | (0.0000) |
| MULTIPLIER FOR G/KG FUEL (G/LB FUEL) | 0.0000 | (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW SCM(SCF) | 0.00 | ( 0.0) |

# TABLE D-8B (CONT'D). TEST 21-2 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO. 21 — TEST NO. 21-2 RUN
ENGINE MODEL 73 IHC 304 — DATE 2/26/80
ENGINE 5.0 L(304. CID) — TIME 01:00 — GASOLINE EM-267-F
CVS NO. 9 — DYNO NO. 2 — BAG CART NO. 1

PARAMETER 751.33 MM HG(29.56 IN HG) — RELATIVE HUMIDITY 46. PCT
DRY BULB TEMP. 21.7 DEG C(71.0 DEG F) — ABSOLUTE HUMIDITY 7.5 GM/KG( 52.4 GRAINS/LB) — NOX HUMIDITY C.F. .9040

BAG RESULTS

| BAG NUMBER | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7174. | 8097. | 8332. | 7173. |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 184.9 ( 6532.) | 208.4 ( 7360.) | 212.8 ( 7516.) | 184.7 ( 6525.) |
| HC SAMPLE METER/RANGE/PPM | 75.9/ 2/ 76. | 81.5/ 2/ 82. | 17.3/ 3/ 173. | 57.8/ 2/ 58. |
| HC BCKGRD METER/RANGE/PPM | 14.8/ 2/ 15. | 15.5/ 2/ 16. | 1.5/ 3/ 15. | 15.7/ 2/ 16. |
| CO SAMPLE METER/RANGE/PPM | 71.3/11/ 303. | 95.1/11/ 488. | 86.5/ 3/2398. | 82.0/11/ 377. |
| CO BCKGRD METER/RANGE/PPM | .2/11/ 1. | .5/11/ 1. | .2/ 3/ 5. | 1.4/11/ 4. |
| CO2 SAMPLE METER/RANGE/PCT | 17.5/ 3/ .28 | 27.1/ 3/ .44 | 56.5/ 3/ .99 | 17.5/ 3/ .28 |
| CO2 BCKGRD METER/RANGE/PCT | 2.6/ 3/ .04 | 2.5/ 3/ .04 | 2.6/ 3/ .04 | 2.5/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 14.0/ 2/ 14. | 39.2/ 2/ 39. | 35.2/ 3/ 106. | 14.1/ 2/ 14. |
| NOX BCKGRD METER/RANGE/PPM | .5/ 2/ 1. | .6/ 2/ 1. | .1/ 3/ 0. | .6/ 2/ 1. |
| DILUTION FACTOR | 42.31 | 26.80 | 10.78 | 41.59 |
| HC CONCENTRATION PPM | 61. | 67. | 159. | 42. |
| CO CONCENTRATION PPM | 296. | 475. | 2312. | 366. |
| CO2 CONCENTRATION PCT | .24 | .41 | .96 | .24 |
| NOX CONCENTRATION PPM | 13.5 | 38.6 | 105.3 | 13.5 |
| HC MASS GRAMS | 6.55 | 8.00 | 19.56 | 4.53 |
| CO MASS GRAMS | 63.81 | 115.20 | 572.97 | 78.66 |
| CO2 MASS GRAMS | 815.1 | 1555.2 | 3732.1 | 819.4 |
| NOX MASS GRAMS | 4.32 | 13.92 | 38.76 | 4.32 |
| FUEL KG (LB) | .295 ( .65) | .555 ( 1.22) | 1.480 ( 3.26) | .302 ( .67) |
| KW HR (HP HR) | .61 ( .82) | 1.50 ( 2.02) | 4.74 ( 6.35) | .67 ( .90) |
| BSHC G/KW HR (G/HP HR) | 10.76 ( 8.03) | 5.32 ( 3.97) | 4.13 ( 3.08) | 6.77 ( 5.04) |
| BSCO G/KW HR (G/HP HR) | 104.80 ( 78.15) | 76.62 ( 57.14) | 120.99 ( 90.22) | 117.58 ( 87.68) |
| BSCO2 G/KW HR (G/HP HR) | 1338.63 ( 998.22) | 1034.45 ( 771.39) | 788.06 ( 587.66) | 1224.71 ( 913.27) |
| BSNOX G/KW HR (G/HP HR) | 7.10 ( 5.29) | 9.26 ( 6.90) | 8.18 ( 6.10) | 6.45 ( 4.81) |
| BSFC KG/KW HR (LB/HP HR) | .485 ( .797) | .369 ( .607) | .312 ( .514) | .451 ( .742) |

TOTAL TEST RESULTS 4 BAGS

| | | |
|---|---|---|
| TOTAL KW HR (HP HR) | 7.52 ( 10.08) | |
| BSHC G/KW HR (G/HP HR) | 5.14 ( 3.83) | |
| BSCO G/KW HR (G/HP HR) | 110.50 ( 82.40) | |
| BSCO2 G/KW HR (G/HP HR) | 921. ( 687.) | |
| BSNOX G/KW HR (G/HP HR) | 8.16 ( 6.08) | |
| BSFC KG/KW HR (LB/HP HR) | .350 ( .576) | |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW SCM(SCF) | 0.000 | ( 0.00) |
| MULTIPLIER FOR G/TEST | 0.000 | |
| MULTIPLIER FOR G/KW HR (G/HP HR) | 0.0000 | (0.0000) |
| MULTIPLIER FOR G/KG FUEL (G/LB FUEL) | 0.0000 | (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW SCM(SCF) | 0.00 | ( 0.0) |

# TABLE D-9A. TEST 22-3 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO. 22 — TEST NO. 22-3 RUN
ENGINE FAMILY 79 GMC 366 — DATE 3/12/80
ENGINE 6.0 L (366 CID) V-8 — TIME 9:00 — GASOLINE EM-267-F
CVS NO. 7 — DYNO NO. 2 — BAG CART NO. 1

BAROMETER 734.57 MM HG(28.92 IN HG) — RELATIVE HUMIDITY 51. PCT
DRY BULB TEMP. 22.8 DEG C(73.0 DEG F) — ABSOLUTE HUMIDITY 9.1 GM/KG( 63.7 GRAINS/LB) — NOX HUMIDITY C.F. .9498

BAG RESULTS

| BAG NUMBER | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7168. | 8089. | 8320. | 7165. |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METERS(SCF) | 180.4 ( 6373.) | 203.3 ( 7179.) | 207.4 ( 7327.) | 180.2 ( 6364.) |
| HC SAMPLE METER /RANGE/PPM | 25.8/ 3/ 258. | 17.3/ 3/ 173. | 27.1/ 3/ 271. | 89.7/ 2/ 90. |
| HC BCKGRD METER/RANGE/PPM | 1.2/ 3/ 12. | 1.3/ 3/ 13. | 1.4/ 3/ 14. | 14.2/ 2/ 14. |
| CO SAMPLE METER/RANGE/PPM | 42.8/ 3/1028. | 41.9/ 3/1004. | 76.7/ 2/4332. | 24.4/ 3/ 565. |
| CO BCKGRD METER/RANGE/PPM | .2/ 3/ 5. | .2/ 3/ 5. | .2/ 2/ 8. | .4/ 3/ 9. |
| CO2 SAMPLE METER/RANGE/PCT | 20.6/ 3/ .33 | 32.6/ 3/ .54 | 66.0/ 3/ 1.18 | 18.3/ 3/ .29 |
| CO2 BCKGRD METER/RANGE/PCT | 2.7/ 3/ .04 | 2.7/ 3/ .04 | 3.1/ 3/ .05 | 3.0/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 14.3/ 2/ 14. | 34.2/ 2/ 34. | 86.3/ 2/ 86. | 13.8/ 2/ 14. |
| NOX BCKGRD METER/RANGE/PPM | 1.0/ 2/ 1. | .9/ 2/ 1. | 1.2/ 2/ 1. | 1.7/ 2/ 2. |
| DILUTION FACTOR | 29.25 | 20.39 | 8.24 | 37.52 |
| HC CONCENTRATION PPM | 246. | 161. | 259. | 76. |
| CO CONCENTRATION PPM | 1000. | 973. | 4155. | 544. |
| CO2 CONCENTRATION PCT | .29 | .50 | 1.14 | .25 |
| NOX CONCENTRATION PPM | 13.3 | 33.3 | 85.2 | 12.1 |
| HC MASS GRAMS | 25.64 | 18.83 | 30.95 | 7.89 |
| CO MASS GRAMS | 210.14 | 230.28 | 1003.74 | 114.08 |
| CO2 MASS GRAMS | 964.8 | 1872.3 | 4336.2 | 819.1 |
| NOX MASS GRAMS | 4.37 | 12.31 | 32.13 | 3.98 |
| FUEL KG (LB) | .434 ( .96) | .723 ( 1.59) | 1.895 ( 4.18) | .323 ( .71) |
| KW HR (HP HR) | .63 ( .85) | 1.61 ( 2.16) | 5.26 ( 7.05) | .64 ( .86) |
| PSEC G/KW HR (G/HP HR) | 40.44 ( 30.15) | 11.69 ( 8.72) | 5.89 ( 4.39) | 12.29 ( 9.17) |
| PSEC G/KG FUEL (G/LB FUEL) | 331.37 ( 247.10) | 142.95 ( 106.60) | 190.98 ( 142.42) | 177.85 ( 132.62) |
| PSEC2 G/KW HR (G/HP HR) | 1521.30 (1134.44) | 1162.24 ( 866.69) | 825.06 ( 615.25) | 1276.89 ( 952.18) |
| PSEC3 G/KW HR (G/HP HR) | 6.89 ( 5.14) | 7.64 ( 5.70) | 6.11 ( 4.56) | 6.20 ( 4.62) |
| PSEC NOX G/KW HR (G/HP HR) | .684 ( 1.125) | .449 ( .738) | .361 ( .593) | .503 ( .827) |

TOTAL TEST RESULTS 4 BAGS — PARTICULATE DATA, TOTAL FOR 4 BAGS

| | | |
|---|---|---|
| TOTAL G/TEST (MI/GAL) | 8.14 ( 10.92) | 90MM FILTER |
| PSEC G/KW HR (G/HP HR) | 10.23 ( 7.63) | SAMPLE FLOW SCM(SCF) 0.000 ( 0.00) |
| PSEC G/KG FUEL (G/LB FUEL) | 141.30 (142.71) | MULTIPLIER FOR G/TEST 0.000 |
| PSEC2 G/KW HR (G/HP HR) | 982. ( 732.) | MULTIPLIER FOR G/KW HR (G/HP HR) 0.0000 (0.0000) |
| PSEC3 G/KW HR (G/HP HR) | 4.46 ( 4.83) | MULTIPLIER FOR G/KG FUEL (G/LB FUEL) 0.0000 (0.0000) |
| PSEC NOX G/KW HR (G/HP HR) | .414 ( .681) | |
| | | 20 X 20 FILTERS |
| | | SAMPLE FLOW SCM(SCF) 0.00 ( 0.0) |

# TABLE D-9A (CONT'D). TEST 22-3 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO. 22 — TEST NO. 22-3 RUN
ENGINE MODEL 74 GEC 360 — DATE 3/12/780
ENGINE 6.0 L (360. CID) V-8 — TIME 9:40 — GASOLINE EM-267-F
CVS NO. 6 — DYNO NO. 2 — BAG CART NO. 1

BAROMETER 736.47 MM HG(28.92 IN HG) — RELATIVE HUMIDITY 49. PCT
DRY BULB TEMP. 22.2 DEG C(73.0 DEG F) — ABSOLUTE HUMIDITY 8.7 GM/KG( 61.2 GRAINS/LB) — NOX HUMIDITY C.F. .9391

BAG RESULTS

| BAG NUMBER | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| FLOWRATE ORIFICE P MM H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| FLOWRATE INLET P MM H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| FLOWRATE INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| FLOWRATE REVOLUTIONS | 7167. | 8090. | 8322. | 7166. |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METERS(SCF) | 180.4 ( 6372.) | 203.3 ( 7180.) | 207.5 ( 7329.) | 180.2 ( 6365.) |
| HC SAMPLE METER/RANGE/PPM | 93.0/ 2/ 93. | 13.5/ 3/ 135. | 26.5/ 3/ 265. | 77.3/ 2/ 77. |
| HC BCKGRD METER/RANGE/PPM | 12.5/ 2/ 13. | 1.2/ 3/ 12. | 1.2/ 3/ 12. | 12.0/ 2/ 12. |
| CO SAMPLE METER/RANGE/PPM | 23.5/ 3/ 543. | 37.7/ 3/ 895. | 76.2/ 2/4290. | 97.3/11/ 509. |
| CO BCKGRD METER/RANGE/PPM | .1/ 3/ 2. | .1/ 3/ 2. | .2/ 2/ 8. | 3.9/11/ 11. |
| CO2 SAMPLE METER/RANGE/PCT | 18.3/ 3/ .29 | 30.2/ 3/ .50 | 65.6/ 3/ 1.18 | 17.8/ 3/ .28 |
| CO2 BCKGRD METER/RANGE/PCT | 2.3/ 3/ .04 | 2.2/ 3/ .03 | 2.6/ 3/ .04 | 2.3/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 12.8/ 2/ 13. | 33.1/ 2/ 33. | 88.4/ 2/ 88. | 13.8/ 2/ 14. |
| NOX BCKGRD METER/RANGE/PPM | 1.8/ 2/ 2. | 2.0/ 2/ 2. | 2.0/ 2/ 2. | 1.8/ 2/ 2. |
| DILUTION FACTOR | 37.71 | 22.34 | 8.30 | 39.18 |
| HC CONCENTRATION PPM | 81. | 124. | 254. | 66. |
| CO CONCENTRATION PPM | 529. | 870. | 4118. | 487. |
| CO2 CONCENTRATION PCT | .26 | .47 | 1.14 | .25 |
| NOX CONCENTRATION PPM | 11.0 | 31.2 | 86.6 | 12.0 |
| HC MASS GRAMS | 8.41 | 14.48 | 30.45 | 6.82 |
| CO MASS GRAMS | 111.22 | 205.96 | 995.04 | 102.18 |
| CO2 MASS GRAMS | 654.7 | 1739.1 | 4332.2 | 826.0 |
| NOX MASS GRAMS | 3.58 | 11.39 | 32.30 | 3.90 |
| FUEL KG (LB) | .333 ( .73) | .665 ( 1.47) | 1.889 ( 4.16) | .318 ( .70) |
| KW HR (HP HR) | .66 ( .89) | 1.60 ( 2.14) | 5.27 ( 7.07) | .64 ( .86) |
| HSEC G/KW HR (G/HP HR) | 12.68 ( 9.46) | 9.07 ( 6.77) | 5.78 ( 4.31) | 10.63 ( 7.93) |
| NMHC G/KW HR (G/HP HR) | 167.67 ( 125.03) | 129.02 ( 96.21) | 188.81 ( 140.79) | 159.29 ( 118.78) |
| HSCO2 G/KW HR (G/HP HR) | 1288.56 ( 960.88) | 1089.39 ( 812.36) | 822.03 ( 612.99) | 1287.64 ( 960.20) |
| HSNOX G/KW HR (G/HP HR) | 5.40 ( 4.03) | 7.14 ( 5.32) | 6.13 ( 4.57) | 6.08 ( 4.53) |
| HSFC KG/KW HR (LB/HP HR) | .502 ( .825) | .416 ( .685) | .358 ( .589) | .495 ( .815) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL HC MASS GRAMS | 8.17 ( 10.96) |
| HSEC G/KW HR (G/HP HR) | 7.36 ( 5.49) |
| NMHC G/KW HR (G/HP HR) | 173.09 (129.08) |
| HSCO2 G/KW HR (G/HP HR) | 749. ( 707.) |
| HSNOX G/KW HR (G/HP HR) | 6.76 ( 4.67) |
| HSFC KG/KW HR (LB/HP HR) | .392 ( .645) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | |
|---|---|
| SAMPLE FLOW SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR G/TEST | 0.000 |
| MULTIPLIER FOR G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | |
|---|---|
| SAMPLE FLOW SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-9B. TEST 22-4 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO. 22 — TEST NO. 22-4 RUN
ENGINE FAMILY 79 CPC 360 — DATE 3/17/80
ENGINE 6.0 LITER (360 CID) V-8 — TIME 09:00 — GASOLINE EM-267-F
CAR NO. 9 — DYNO NO. 2 — BAG CART NO. 1

BAROMETER 742.0 MM HG(29.29 IN HG) — RELATIVE HUMIDITY 52. PCT
DRY BULB TEMP. 22.2 DEG C(72.0 DEG F) — ABSOLUTE HUMIDITY 8.9 GM/KG( 62.1 GRAINS/LB) — NOX HUMIDITY C.F. .9430

BAG RESULTS

| BAG NUMBER | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P PR. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P PR. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7169. | 8091. | 8322. | 7166. |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METERS(SCF) | 182.6 ( 6448.) | 205.7 ( 7265.) | 209.9 ( 7415.) | 182.3 ( 6440.) |
| HC SAMPLE METER/RANGE/PPM | 35.2/ 3/ 352. | 17.9/ 3/ 179. | 27.6/ 3/ 276. | 72.1/ 2/ 72. |
| HC BLOWER METER/RANGE/PPM | 1.2/ 3/ 12. | 1.4/ 3/ 14. | 1.3/ 3/ 13. | 13.0/ 2/ 13. |
| CO SAMPLE METER/RANGE/PPM | 44.3/ 3/1068. | 40.2/ 3/ 960. | 77.6/ 2/4408. | 22.3/ 3/ 515. |
| CO BLOWER METER/RANGE/PPM | .1/ 3/ 2. | .1/ 3/ 2. | .1/ 2/ 4. | .3/ 3/ 7. |
| CO2 SAMPLE METER/RANGE/PCT | 20.8/ 3/ .34 | 32.8/ 3/ .55 | 67.2/ 3/ 1.21 | 18.8/ 3/ .30 |
| CO2 BLOWER METER/RANGE/PCT | 2.4/ 3/ .04 | 2.5/ 3/ .04 | 2.7/ 3/ .04 | 2.7/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 15.5/ 2/ 16. | 37.1/ 2/ 37. | 82.4/ 2/ 82. | 14.3/ 2/ 14. |
| NOX BLOWER METER/RANGE/PPM | .5/ 2/ 1. | .5/ 2/ 1. | .8/ 2/ 1. | 1.4/ 2/ 1. |
| DILUTION FACTOR | 28.23 | 20.39 | 8.08 | 37.34 |
| HC CONCENTRATION PPM | 340. | 166. | 265. | 59. |
| CO CONCENTRATION PPM | 1041. | 931. | 4228. | 496. |
| CO2 CONCENTRATION PCT | .30 | .51 | 1.17 | .26 |
| NOX CONCENTRATION PPM | 15.0 | 36.6 | 81.7 | 12.9 |
| HC MASS GRAMS | 35.85 | 19.66 | 32.04 | 6.25 |
| CO MASS GRAMS | 221.29 | 223.07 | 1033.70 | 105.40 |
| CO2 MASS GRAMS | 1002.6 | 1919.3 | 4502.8 | 872.0 |
| NOX MASS GRAMS | 4.95 | 13.59 | 30.94 | 4.25 |
| FUEL KG (LB) | .462 ( 1.02) | .735 ( 1.62) | 1.964 ( 4.33) | .333 ( .73) |
| HP HR (KW HR) | .62 ( .83) | 1.57 ( 2.11) | 5.28 ( 7.09) | .63 ( .85) |
| HC G/KG FUEL (G/LB FUEL) | 57.85 ( 43.14) | 12.48 ( 9.31) | 6.06 ( 4.52) | 9.86 ( 7.35) |
| CO G/KG FUEL (G/LB FUEL) | 357.15 ( 266.32) | 141.68 ( 105.65) | 195.60 ( 145.86) | 166.20 ( 123.93) |
| CO2 G/KG FUEL (G/LB FUEL) | 1618.21 (1206.70) | 1218.99 ( 909.00) | 852.04 ( 635.37) | 1374.95 (1025.30) |
| NOX G/KG FUEL (G/LB FUEL) | 7.98 ( 5.95) | 8.63 ( 6.44) | 5.85 ( 4.37) | 6.71 ( 5.00) |
| HC G/KW HR (G/HP HR) | .745 ( 1.225) | .467 ( .768) | .372 ( .611) | .526 ( .864) |

TOTAL TEST RESULTS (4 BAGS)

| | |
|---|---|
| TOTAL HC G (HP HR) | 6.11 ( 10.88) |
| RSLT CO G/KG FUEL (G/HP HR) | 11.54 ( 8.62) |
| RSLT CO2 G/KG FUEL (G/HP HR) | 195.17 (145.54) |
| RSLT NOX G/KG FUEL (G/HP HR) | 1023. ( 763.) |
| RSLT CO G/MI (G/KM) | 6.12 ( 4.54) |
| RSLT HC G/MI (G/KM) | .431 ( .708) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | |
|---|---|
| SAMPLE FLOW SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR G/TEST | 0.000 |
| MULTIPLIER FOR G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | |
|---|---|
| SAMPLE FLOW SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-9B (CONT'D). TEST 22-4 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO. 22 — TEST NO. 22-4 RUN
ENGINE MODEL 73 CYC 366 — DATE 3/17/80
ENGINE 6.6 LITER (400 CID) V-8 — TIME 09:40 — GASOLINE EM-267-F
CVS NO. 4 — DYNO NO. 2 — BAG CART NO. 1

BAROMETER 742.70 MM HG(29.24 IN HG) — RELATIVE HUMIDITY 53. PCT
DRY BULB TEMP. 22.8 DEG C(73.0 DEG F) — ABSOLUTE HUMIDITY 9.4 GM/KG( 65.5 GRAINS/LB) — NOX HUMIDITY C.F. .9575

BAG RESULTS

| BAG NUMBER | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P PV. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| PUMPS INLET P PV. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| PUMPS INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| METER REVOLUTIONS | 7167. | 8089. | 8322. | 7166. |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METERS(SCF) | 182.5 ( 6446.) | 205.6 ( 7263.) | 209.9 ( 7415.) | 182.3 ( 6440.) |
| HC SAMPLE METER/RANGE/PPM | 80.9/ 2/ 81. | 13.7/ 3/ 137. | 25.9/ 3/ 259. | 76.2/ 2/ 76. |
| HC BORGNE METER/RANGE/PPM | 12.3/ 2/ 12. | 1.3/ 3/ 13. | 1.2/ 3/ 12. | 11.6/ 2/ 12. |
| CO SAMPLE METER/RANGE/PPM | 22.3/ 3/ 515. | 34.7/ 3/ 819. | 75.5/ 2/4231. | 22.9/ 3/ 529. |
| CO BORGNE METER/RANGE/PPM | .1/ 3/ 2. | .3/ 3/ 7. | .2/ 2/ 8. | .2/ 3/ 5. |
| CO2 SAMPLE METER/RANGE/PCT | 19.1/ 3/ .31 | 32.4/ 3/ .54 | 68.5/ 3/ 1.23 | 20.0/ 3/ .32 |
| CO2 BORGNE METER/RANGE/PCT | 2.6/ 3/ .04 | 2.9/ 3/ .04 | 3.0/ 3/ .05 | 3.2/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 12.0/ 2/ 12. | 33.7/ 2/ 34. | 83.8/ 2/ 84. | 14.5/ 2/ 15. |
| NOX BORGNE METER/RANGE/PPM | .1/ 2/ 0. | .1/ 2/ 0. | .4/ 2/ 0. | .2/ 2/ 0. |
| DILUTION FACTOR | 36.74 | 21.20 | 8.05 | 35.18 |
| HC CONCENTRATION PPM | 69. | 125. | 248. | 65. |
| CO CONCENTRATION PPM | 501. | 790. | 4052. | 512. |
| CO2 CONCENTRATION PCT | .27 | .50 | 1.19 | .27 |
| NOX CONCENTRATION PPM | 11.9 | 33.6 | 83.4 | 14.3 |
| HC MASS GRAMS | 7.26 | 14.78 | 30.09 | 6.83 |
| CO MASS GRAMS | 106.38 | 189.10 | 990.51 | 108.75 |
| CO2 MASS GRAMS | 894.9 | 1869.3 | 4588.6 | 915.0 |
| NOX MASS GRAMS | 3.98 | 12.66 | 32.09 | 4.78 |
| FUEL KG (LB) | .342 ( .75) | .698 ( 1.54) | 1.967 ( 4.34) | .349 ( .77) |
| WK HP (HP HR) | .63 ( .85) | 1.59 ( 2.13) | 5.28 ( 7.08) | .66 ( .89) |
| BSFC G/KW HR (G/HP HR) | 11.44 ( 8.53) | 9.30 ( 6.94) | 5.70 ( 4.25) | 10.29 ( 7.68) |
| BSCO G/KW HR (G/HP HR) | 167.75 ( 125.09) | 119.00 ( 88.74) | 187.69 ( 139.96) | 163.95 ( 122.25) |
| BSCO2 G/KW HR (G/HP HR) | 1411.11 (1052.26) | 1176.33 ( 877.19) | 869.47 ( 648.36) | 1379.35 (1028.58) |
| BSNOX G/KW HR (G/HP HR) | 6.27 ( 4.68) | 7.96 ( 5.94) | 6.08 ( 4.53) | 7.20 ( 5.37) |
| BSHC G/KW HR (G/HP HR) | .539 ( .887) | .439 ( .722) | .373 ( .613) | .526 ( .865) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL HC MASS GRAMS | 9.16 ( 10.95) |
| BSHC G/KW HR (G/HP HR) | 7.22 ( 5.38) |
| BSCO G/KW HR (G/HP HR) | 170.64 (127.39) |
| BSCO2 G/KW HR (G/HP HR) | 1013. ( 755.) |
| BSNOX G/KW HR (G/HP HR) | 6.53 ( 4.89) |
| BSHC G/KG FUEL (G/LB FUEL) | .411 ( .776) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-10A. TEST 11-6 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.GM366
ENGINE MODEL 73 GM 366
ENGINE 6.0 L(366 CID) V-8
CVS NO. 4

TEST NO. 11-6 RUN
DATE 6/ 1/79
TIME 09:12
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 741.93 MM HG(29.21 IN HG)
DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)

RELATIVE HUMIDITY 57 PCT
ABSOLUTE HUMIDITY 11.9 GM/KG( 83.2 GRAINS/LB)

NOX HUMIDITY C.F. 1.0403

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7166 | 8087 | 8319 | 7163 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 182.3 ( 6439) | 205.4 ( 7253) | 209.6 ( 7404) | 182.0 ( 6430) |
| HC SAMPLE METER/RANGE/PPM | 54.9/ 3/ 549 | 29.2/ 3/ 292 | 24.6/ 3/ 246 | 14.0/ 3/ 140 |
| HC BCKGRD METER/RANGE/PPM | 2.5/ 3/ 25 | 2.9/ 3/ 29 | 2.0/ 3/ 20 | 2.0/ 3/ 20 |
| CO SAMPLE METER/RANGE/PPM | 73.2/ 3/ 2153 | 48.5/ 3/ 1428 | 83.1/ 2/ 5397 | 31.7/ 3/ 936 |
| CO BCKGRD METER/RANGE/PPM | 1.1/ 3/ 34 | 1.2/ 3/ 37 | .7/ 2/ 42 | .7/ 2/ 42 |
| CO2 SAMPLE METER/RANGE/PCT | 19.3/ 3/ .31 | 31.8/ 3/ .53 | 60.8/ 3/ 1.07 | 19.3/ 3/ .31 |
| CO2 BCKGRD METER/RANGE/PCT | 3.4/ 3/ .05 | 3.3/ 3/ .05 | 3.4/ 3/ .05 | 3.4/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 6.6/ 2/ 7 | 23.4/ 2/ 23 | 30.5/ 2/ 30 | 7.5/ 2/ 8 |
| NOX BCKGRD METER/RANGE/PPM | .1/ 2/ 0 | .1/ 2/ 0 | .3/ 2/ 0 | .3/ 2/ 0 |
| DILUTION FACTOR | 23.26 | 14.23 | 8.31 | 32.17 |
| HC CONCENTRATION PPM | 525 | 265 | 228 | 121 |
| CO CONCENTRATION PPM | 2069 | 1353 | 5150 | 874 |
| CO2 CONCENTRATION PCT | .26 | .48 | 1.02 | .26 |
| NOX CONCENTRATION PPM | 6.5 | 23.3 | 30.2 | 7.2 |
| HC MASS GRAMS | 55.21 | 31.33 | 27.62 | 12.67 |
| CO MASS GRAMS | 439.27 | 323.66 | 1257.28 | 185.18 |
| CO2 MASS GRAMS | 872.2 | 1809.1 | 3932.4 | 869.0 |
| NOX MASS GRAMS | 2.36 | 4.52 | 12.61 | 2.61 |
| FUEL KG (LB) | .548 ( 1.21) | .762 ( 1.68) | 1.890 ( 4.17) | .378 ( .83) |
| KW HR (HP HR) | .70 ( .93) | 1.56 ( 2.09) | 5.11 ( 6.85) | .70 ( .94) |
| BSHC G/KW HR (G/HP HR) | 79.38 ( 59.20) | 20.14 ( 15.02) | 5.41 ( 4.03) | 18.02 ( 13.44) |
| BSCO G/KW HR (G/HP HR) | 631.64 ( 471.01) | 208.09 ( 155.17) | 246.17 ( 183.57) | 263.45 ( 196.45) |
| BSCO2 G/KW HR (G/HP HR) | 1259.21 ( 939.26) | 1163.13 ( 867.34) | 769.94 ( 574.14) | 1236.25 ( 921.87) |
| BSNOX G/KW HR (G/HP HR) | 3.39 ( 2.53) | 6.12 ( 4.57) | 2.47 ( 1.84) | 3.72 ( 2.77) |
| BSFC KG/KW HR (LB/HP HR) | .788 ( 1.295) | .490 ( .805) | .370 ( .608) | .538 ( .885) |

TOTAL TEST RESULTS 4 BAGS

| | | |
|---|---|---|
| TOTAL KW HR (HP HR) | 8.06 | ( 10.81) |
| BSHC G/KW HR (G/HP HR) | 15.73 | ( 11.73) |
| BSCO G/KW HR (G/HP HR) | 273.58 | (204.01) |
| BSCO2 G/KW HR (G/HP HR) | 928 | ( 692) |
| BSNOX G/KW HR (G/HP HR) | 3.36 | ( 2.51) |
| BSFC KG/KW HR (LB/HP HR) | .444 | ( .730) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | | |
|---|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 | ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 | |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 | (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 | (0.0000) |

20 X 20 FILTERS

| | | | |
|---|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 | ( 0.0) |

# TABLE D-10A (CONT'D). TEST 11-6 EMISSIONS RESULTS

HOT TRANSIENT

PROJECT NO. 11-5044-001

ENGINE NO.GM366
ENGINE MODEL 73 GM 366
ENGINE 6.0 L(366 CID) V-8
CVS NO. 9

TEST NO. 11-6 RUN
DATE 6/ 1/79
TIME 09:53
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 741.93 MM HG(29.21 IN HG)
DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)

RELATIVE HUMIDITY 55 PCT
ABSOLUTE HUMIDITY 11.6 GM/KG( 81.2 GRAINS/LB)

NOX HUMIDITY C.F. 1.0298

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7163 | 8085 | 8317 | 7163 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 182.2 ( 6436) | 205.3 ( 7252) | 209.6 ( 7402) | 182.0 ( 6430) |
| HC SAMPLE METER/RANGE/PPM | 32.6/ 3/ 326 | 25.0/ 3/ 250 | 28.4/ 3/ 284 | 20.6/ 3/ 206 |
| HC BCKGRD METER/RANGE/PPM | 2.0/ 3/ 20 | 2.2/ 3/ 22 | 1.9/ 3/ 19 | 1.7/ 3/ 17 |
| CO SAMPLE METER/RANGE/PPM | 24.7/ 3/ 732 | 43.5/ 3/ 1281 | 79.4/ 2/ 5157 | 29.2/ 3/ 863 |
| CO BCKGRD METER/RANGE/PPM | .7/ 3/ 21 | .9/ 3/ 28 | .3/ 2/ 18 | .9/ 3/ 28 |
| CO2 SAMPLE METER/RANGE/PCT | 17.8/ 3/ .29 | 30.2/ 3/ .50 | 61.5/ 3/ 1.08 | 18.6/ 3/ .30 |
| CO2 BCKGRD METER/RANGE/PCT | 3.1/ 3/ .05 | 2.9/ 3/ .04 | 3.1/ 3/ .05 | 2.9/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 8.5/ 2/ 9 | 22.8/ 2/ 23 | 35.2/ 2/ 35 | 8.0/ 2/ 8 |
| NOX BCKGRD METER/RANGE/PPM | .3/ 2/ 0 | .3/ 2/ 0 | .4/ 2/ 0 | .6/ 2/ 1 |
| DILUTION FACTOR | 34.37 | 20.61 | 8.33 | 33.15 |
| HC CONCENTRATION PPM | 307 | 229 | 267 | 140 |
| CO CONCENTRATION PPM | 695 | 1220 | 4942 | 817 |
| CO2 CONCENTRATION PCT | .24 | .46 | 1.04 | .26 |
| NOX CONCENTRATION PPM | 8.2 | 22.5 | 34.8 | 7.4 |
| HC MASS GRAMS | 32.22 | 27.13 | 32.31 | 19.90 |
| CO MASS GRAMS | 147.38 | 291.79 | 1206.08 | 173.14 |
| CO2 MASS GRAMS | 799.8 | 1723.2 | 3949.6 | 854.3 |
| NOX MASS GRAMS | 2.95 | 4.11 | 14.39 | 2.66 |
| FUEL KG (LB) | .357 ( .79) | .715 ( 1.58) | 1.891 ( 4.17) | .375 ( .83) |
| KW HR (HP HR) | .67 ( .89) | 1.56 ( 2.09) | 5.11 ( 6.85) | .70 ( .94) |
| BSHC G/KW HR (G/HP HR) | 48.41 ( 36.10) | 17.44 ( 13.00) | 6.33 ( 4.72) | 28.31 ( 21.11) |
| BSCO G/KW HR (G/HP HR) | 221.45 ( 165.13) | 187.59 ( 139.89) | 236.14 ( 176.09) | 246.31 ( 183.68) |
| BSCO2 G/KW HR (G/HP HR) | 1201.73 ( 896.13) | 1107.87 ( 826.14) | 783.10 ( 583.96) | 1215.35 ( 906.29) |
| BSNOX G/KW HR (G/HP HR) | 4.43 ( 3.30) | 5.85 ( 4.37) | 2.82 ( 2.10) | 3.78 ( 2.82) |
| BSFC KG/KW HR (LB/HP HR) | .537 ( .883) | .460 ( .756) | .370 ( .609) | .533 ( .877) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.03 ( 10.77) |
| BSHC G/KW HR (G/HP HR) | 13.89 ( 10.36) |
| BSCO G/KW HR (G/HP HR) | 226.41 (168.84) |
| BSCO2 G/KW HR (G/HP HR) | 919 ( 685) |
| BSNOX G/KW HR (G/HP HR) | 3.62 ( 2.70) |
| BSFC KG/KW HR (LB/HP HR) | .416 ( .683) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-10B. TEST 11-8 EMISSIONS RESULTS

COLD TRANSIENT ,PROJECT NO. 11-5044-001

ENGINE NO.GM366
ENGINE MODEL 73 GM 366
ENGINE 6.0 L(366 CID) V-8
CVS NO. 9

TEST NO. 11-8 RUN
DATE 6/ 7/79
TIME 08:42
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 735.33 MM HG(28.95 IN HG)
DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)

RELATIVE HUMIDITY 60 PCT
ABSOLUTE HUMIDITY 12.8 GM/KG( 89.3 GRAINS/LB) NOX HUMIDITY C.F. 1.0721

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7159 | 8080 | 8312 | 7158 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 180.4 ( 6372) | 203.3 ( 7179) | 207.5 ( 7328) | 180.2 ( 6365) |
| HC SAMPLE METER/RANGE/PPM | 65.4/ 3/ 654 | 37.6/ 3/ 376 | 32.2/ 3/ 322 | 24.3/ 3/ 243 |
| HC BCKGRD METER/RANGE/PPM | 2.1/ 3/ 21 | 3.0/ 3/ 30 | 2.7/ 3/ 27 | 2.9/ 3/ 29 |
| CO SAMPLE METER/RANGE/PPM | 48.9/ 3/ 1440 | 49.7/ 3/ 1464 | 82.1/ 2/ 5332 | 30.8/ 3/ 910 |
| CO BCKGRD METER/RANGE/PPM | .3/ 3/ 9 | .1/ 3/ 3 | .7/ 2/ 42 | 1.5/ 3/ 46 |
| CO2 SAMPLE METER/RANGE/PCT | 21.3/ 3/ .35 | 33.3/ 3/ .56 | 65.6/ 3/ 1.16 | 19.4/ 3/ .31 |
| CO2 BCKGRD METER/RANGE/PCT | 3.4/ 3/ .05 | 3.2/ 3/ .05 | 3.0/ 3/ .05 | 2.8/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 9.2/ 2/ 9 | 24.5/ 2/ 24 | 43.5/ 2/ 43 | 7.5/ 2/ 8 |
| NOX BCKGRD METER/RANGE/PPM | .1/ 2/ 0 | .1/ 2/ 0 | .1/ 2/ 0 | .3/ 2/ 0 |
| DILUTION FACTOR | 24.32 | 18.22 | 7.85 | 31.47 |
| HC CONCENTRATION PPM | 634 | 348 | 298 | 215 |
| CO CONCENTRATION PPM | 1394 | 1417 | 5073 | 843 |
| CO2 CONCENTRATION PCT | .30 | .51 | 1.12 | .27 |
| NOX CONCENTRATION PPM | 9.1 | 24.4 | 43.4 | 7.2 |
| HC MASS GRAMS | 65.95 | 40.75 | 35.71 | 22.34 |
| CO MASS GRAMS | 292.80 | 335.28 | 1225.56 | 176.98 |
| CO2 MASS GRAMS | 975.6 | 1846.4 | 4273.4 | 895.6 |
| NOX MASS GRAMS | 3.37 | 10.17 | 18.47 | 2.66 |
| FUEL KG (LB) | .519 ( 1.14) | .805 ( 1.77) | 1.990 ( 4.39) | .342 ( .86) |
| KW HR (HP HR) | .70 ( .94) | 1.59 ( 2.13) | 5.07 ( 6.80) | .69 ( .92) |
| BSHC G/KW HR (G/HP HR) | 93.83 ( 69.97) | 25.71 ( 19.17) | 7.04 ( 5.25) | 32.47 ( 24.21) |
| BSCO G/KW HR (G/HP HR) | 416.55 ( 310.62) | 211.49 ( 157.71) | 241.73 ( 180.26) | 257.25 ( 191.83) |
| BSCO2 G/KW HR (G/HP HR) | 1387.90 (1034.96) | 1196.20 ( 892.01) | 842.87 ( 628.53) | 1301.85 ( 970.79) |
| BSNOX G/KW HR (G/HP HR) | 4.79 ( 3.57) | 6.42 ( 4.79) | 3.64 ( 2.72) | 3.87 ( 2.89) |
| BSFC KG/KW HR (LB/HP HR) | .738 ( 1.213) | .508 ( .834) | .392 ( .645) | .570 ( .938) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.05 ( 10.79) |
| BSHC G/KW HR (G/HP HR) | 20.48 ( 15.27) |
| BSCO G/KW HR (G/HP HR) | 252.37 (188.19) |
| BSCO2 G/KW HR (G/HP HR) | 999 ( 745) |
| BSNOX G/KW HR (G/HP HR) | 4.31 ( 3.21) |
| BSFC KG/KW HR (LB/HP HR) | .461 ( .757) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE D-10B (CONT'D). TEST 11-8 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.GM366
ENGINE MODEL 73 GM 366
ENGINE 6.0 L.(366 CID) V-8
CVS NO. 9

TEST NO. 11-8 RUN
DATE 6/ 7/79
TIME 09:22 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 2

BAROMETER 735.33 MM HG(28.95 IN HG)
DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)

RELATIVE HUMIDITY 58 PCT
ABSOLUTE HUMIDITY 12.4 GM/KG( 86.6 GRAINS/LB) — NOX HUMIDITY C.F. 1.0576

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7161 | 8082 | 8313 | 7159 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 180.5 ( 6374) | 203.3 ( 7181) | 207.5 ( 7329) | 180.2 ( 6366) |
| HC SAMPLE METER/RANGE/PPM | 37.4/ 3/ 374 | 29.0/ 3/ 290 | 29.9/ 3/ 299 | 23.0/ 3/ 230 |
| HC BCKGRD METER/RANGE/PPM | 3.0/ 3/ 30 | 3.0/ 3/ 30 | 3.0/ 3/ 30 | 2.9/ 3/ 29 |
| CO SAMPLE METER/RANGE/PPM | 24.3/ 3/ 720 | 42.1/ 3/ 1240 | 78.6/ 2/ 5105 | 30.8/ 3/ 910 |
| CO BCKGRD METER/RANGE/PPM | .3/ 3/ 9 | .7/ 3/ 21 | 0.0/ 2/ 0 | .8/ 3/ 24 |
| CO2 SAMPLE METER/RANGE/PCT | 18.2/ 3/ .29 | 30.1/ 3/ .50 | 59.8/ 3/ 1.05 | 19.2/ 3/ .31 |
| CO2 BCKGRD METER/RANGE/PCT | 3.0/ 3/ .05 | 2.9/ 3/ .04 | 3.8/ 3/ .06 | 3.0/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 8.6/ 2/ 9 | 22.9/ 2/ 23 | 34.0/ 2/ 34 | 8.6/ 2/ 9 |
| NOX BCKGRD METER/RANGE/PPM | .3/ 2/ 0 | .5/ 2/ 1 | .7/ 2/ 1 | .8/ 2/ 1 |
| DILUTION FACTOR | 33.48 | 20.67 | 8.53 | 31.81 |
| HC CONCENTRATION PPM | 345 | 261 | 273 | 202 |
| CO CONCENTRATION PPM | 694 | 1185 | 4906 | 864 |
| CO2 CONCENTRATION PCT | .25 | .46 | 1.00 | .26 |
| NOX CONCENTRATION PPM | 8.3 | 22.4 | 33.4 | 7.8 |
| HC MASS GRAMS | 35.90 | 30.66 | 32.61 | 20.99 |
| CO MASS GRAMS | 145.84 | 280.55 | 1185.33 | 181.37 |
| CO2 MASS GRAMS | 819.5 | 1649.7 | 3796.7 | 874.6 |
| NOX MASS GRAMS | 3.03 | 4.22 | 14.01 | 2.85 |
| FUEL KG (LB) | .366 ( .81) | .705 ( 1.54) | 1.817 ( 4.01) | .387 ( .85) |
| KW HR (HP HR) | .67 ( .90) | 1.57 ( 2.11) | 5.08 ( 6.81) | .69 ( .92) |
| BSHC G/KW HR (G/HP HR) | 53.34 ( 39.77) | 19.52 ( 14.56) | 6.42 ( 4.79) | 30.51 ( 22.75) |
| BSCO G/KW HR (G/HP HR) | 216.70 ( 161.59) | 178.65 ( 133.22) | 233.45 ( 174.08) | 263.63 ( 196.59) |
| BSCO2 G/KW HR (G/HP HR) | 1217.60 ( 907.97) | 1082.37 ( 807.12) | 747.75 ( 557.60) | 1271.29 ( 948.00) |
| BSNOX G/KW HR (G/HP HR) | 4.51 ( 3.36) | 5.87 ( 4.38) | 2.76 ( 2.06) | 4.15 ( 3.09) |
| BSFC KG/KW HR (LB/HP HR) | .545 ( .895) | .449 ( .739) | .358 ( .588) | .562 ( .924) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.01 ( 10.74) |
| BSHC G/KW HR (G/HP HR) | 15.00 ( 11.19) |
| BSCO G/KW HR (G/HP HR) | 223.89 (166.95) |
| BSCO2 G/KW HR (G/HP HR) | 898 ( 670) |
| BSNOX G/KW HR (G/HP HR) | 3.64 ( 2.71) |
| BSFC KG/KW HR (LB/HP HR) | .409 ( .672) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

## APPENDIX E

### $NO_x$ BASELINE ENGINE TUNE-UP RECORD SHEETS

| Table Number | Engine Number | Description |
|---|---|---|
| E-1 | 14 | 1972 Ford 361 |
| E-2 | 15 | 1973 Chevrolet 454 |
| E-3 | 16 [a] | 1972 Dodge 413 |
| E-4 | 17 | 1973 GMC 427 |
| E-5 | 18 | 1972 Chevrolet 350 |
| E-6 | 19 [a] | 1972 IHC 345 |
| E-7 | 20 | 1972 Ford 300 |
| E-8 | 21 | 1973 IHC 304 |
| E-9 | 22 | 1973 GMC 366 |
| E-10 | 11 [b] | 1973 GMC 366 |

[a] More extensive tune-ups were conducted starting with Engine 16. Modified tune-up data sheets were used starting with Engine 19.

[b] Engine 11 was retested as Engine 22.

TABLE E-1. ENGINE 14 TUNE-UP SPECIFICATIONS
CHECK LIST

M/Y 1972 Manufacturer Ford Displacement 361 Engine No. 14

| | Manufacturer Spec. | As Received | After Tune-up |
|---|---|---|---|
| Carburetor Type Manufacturer & Serial No. | | 2 Bore Holley D3AF-9510-CA | |
| Fuel Pressure | 4½ - 6½ | | |
| Curb Idle Speed (engine oil over 200°F) | | 750 rpm | |
| Fast Idle Speed (if auto) | none | | none |
| Choke Setting (if auto) | none | | |
| Dashpot Gap | | | |
| Governor No. | | | |
| Governor Speed A. No Load B. Fully Loaded | 3800 3600 | | 3600 |
| Distributor Type | -- | | -- |
| Manufacturer & Serial No. | D3TF 12102 CA | Autolite C8TF 12102A | -- |
| Vacuum Advance No. | | | |
| Dwell | 24-30 27° .017 | 26.5° | 26.5° |
| Timing @ RPM | 6° BTDC 6° Damper | 10° | 6° |
| Primary Resistor Valve | | | |
| Total Advance @ RPM & In. Hg. | | | |
| Mech. Adv. RPM & Deg. Adv. 1. 2. 3. 4. 5. 6. 7. | advance starts at 500 Max - 11° at 2000 | | 300 - Starts 2000 - 12° |

TABLE E-1 (Cont'd). ENGINE 14 TUNE-UP SPECIFICATIONS
CHECK LIST

M/Y 1972 Manufacturer Ford Displacement 361 Engine No. 14

| | Manufacturer Spec. | As Received | After Tune-Up |
|---|---|---|---|
| Vac. Adv. Curve In. Hg. & Deg. Adv. 1. 2. 3. 4. | advance starts at 5<br><br><br>max 7¼ at 20 | | 6" - Starts<br>13" - 7°<br>20" - 7° |
| Spark Plugs Type & Manuf. | BF-31 Autolite | BF-42 Autolite | |
| Spark Plug Gap | .030 | .028 | .030 |
| Spark Plug Torque (in lbs.) | 15-20 ft-lbs | | 15-20 ft-lbs |
| Max. Engine Torque @ RPM | 345 at 2000<br>278 at 2400 | | |
| Max. Engine HP @ RPM | 210 at 4000<br>153 at 3600 | | |
| Flywheel Bolt Torque | 75-85 ft-lbs | | |
| Cylinder Compression 1. 2. 3. 4. 5. 6. 7. 8. | plus or minus 20 lbs | 110<br>105<br>110<br>80<br>120<br>120<br>105<br>120 | |

Comments:

TABLE E-2. ENGINE 15 TUNE-UP SPECIFICATIONS
CHECK LIST

M/Y 1972 Manufacturer Dodge Displacement 413 Engine No. 15

| | Manufacturer Spec. | As Received | After Tune-Up |
|---|---|---|---|
| | — | 4-bore Holley 3698395 2802 List -6495 | — |
| Fuel Pressure | 3½ - 5 | — | 4 |
| Curb Idle Speed (engine oil over 200°F) | — | 720 | 700 |
| Fast Idle Speed (if auto) | — | — | — |
| Choke Setting (if auto) | — | — | — |
| Dashpot Gap | — | — | — |
| Governor No. | — | — | — |
| Governor Speed A. No Load B. Fully Loaded | N.A. | — | N.A. |
| Distributor Type | Electronic ignition - rotation cc | — | |
| Manufacturer & Serial No. | 3656839 | 3656839 | — |
| Vacuum Advance No. | N.D. | N.D. | — |
| Dwell | 28·32 | 39° | 30° |
| Timing @ RPM | 5° Damper | 15° | 5° |
| Primary Resistor Valve | -- | — | — |
| Total Advance @ RPM & In. Hg. | 23° @ 1900 + 13½ | — | 22° @ 1900 + 13½ |
| Mech. Adv. RPM & Deg. Adv. 1. 2. 3. 4. 5. 6. | Advance starts 1-4 at 550<br>Full advance 13½ @ 1900 | — | 1 at 550<br>13 at 1900 |

TABLE E-2 (Cont'd). ENGINE 15 TUNE-UP SPECIFICATIONS
CHECK LIST

M/Y 1972 Manufacturer Dodge Displacement 413 Engine No. 15

| | Manufacturer Spec. | As Received | After Tune-Up |
|---|---|---|---|
| Vac. Adv. Curve In. Hg. & Deg. Adv. 1. 2. 3. 4. | 9½" of vacuum to start plunger<br>9½" at 13½ is max. adv.<br>Dist. deg. at vacuum | — — | Start at 9½"<br>9° at 13½" |
| Spark Plugs Type & Manuf. | Champion N-6 | Champion N-6 | Champion N-6 |
| Spark Plug Gap | .035 | .035 | .035 |
| Spark Plug Torque (in lbs.) | 30 ft-lbs | — | 30 ft-lbs |
| Max. Engine Torque @ RPM | — | — | N.A. |
| Max. Engine HP @ RPM | — | — | N.A. |
| Flywheel Bolt Torque | 55 ft. lbs | — | — |
| Cylinder Compression 1. 2. 3. 4. 5. 6. 7. 8. | 100 minimum compression pressure<br>Maximum variation between cylinders, 40 psi | Left Front Right<br>105 110<br>110 105<br>105 105<br>100 105 | — |

Comments:

TABLE E-3. ENGINE 16 TUNE-UP SPECIFICATIONS
CHECK LIST

M/Y 1973 Manufacturer CHEVROLET Displacement 454 Engine No. 16

| | Manufacturer Spec. | As Received | After Tune-up |
|---|---|---|---|
| Carburetor Type Manufacturer & Serial No. | ROCHESTER Model 7043207 | | ROCHESTER QUADRAJET |
| Fuel Pressure | 7½ - 8 psi | | 8 psi |
| Curb Idle Speed (engine oil over 200°F) | 700 rpm | | 700 rpm |
| Fast Idle Speed (if auto) | 1600 rpm | 1150 rpm | 1600 rpm |
| Choke Setting (if auto) | See specification 13 | | set per specification 13 |
| Dashpot Gap | | | |
| Governor No. | | | |
| Governor Speed A. No Load B. Fully Loaded | N. A | | N. A. |
| Distributor Type | Points | | |
| Manufacturer & Serial No. | Delco 1112113 | | Delco 1112113 |
| Vacuum Advance No. | C 3032 | | C 3032 |
| Dwell | ± 1 @ 1750 rpm | | < 1 @ 1750 rpm |
| Timing @ RPM | | | |
| Primary Resistor Value | 1.77 - 2.01 | | 2.00 |
| Total Advance @ RPM & In. Hg. | 17° @ 2100 & 15 | | 18° @ 2100 & 15 |
| Dist. Adv. 1. & Deg. Adv. 2. 3. 4. 5. 6. | 550 - 0°<br>775 - 1°<br>1205 - 3°<br>1650 - 6°<br>2100 - 9° | | 550 - 0°<br>775 - 0.5°<br>1205 - 3<br>1650 - 5<br>2100 - 8 |

TABLE E-3 (Cont'd). ENGINE 16 TUNE-UP SPECIFICATIONS
CHECK LIST

M/Y 1973 Manufacturer CHEVROLET Displacement 454 Engine No. 16

| | Manufacturer Spec. | As Received | After Tune-Up |
|---|---|---|---|
| Vac. Adv. Curve In. Hg. & Deg. Adv. 1. 2. 3. 4. | 6" - 0°<br>15" - 10° | | 6" - 0°<br>15" - 10° |
| Spark Plugs Type & Manuf. | R44T - AC | | R44T - AC |
| Spark Plug Gap | .035 | | .035 |
| Spark Plug Torque (in lbs.) | 15 ft-lbs | | 15 ft-lbs |
| Max. Engine Torque @ RPM | 355 @ 2800 | | 303 @ 2800 |
| Max. Engine HP @ RPM | 315 @ 4000 | | 283 @ 3900 |
| Flywheel Bolt Torque | 110 ft-lb | | 110 ft-lb |
| Cylinder Compression 1. 2. 3. 4. 5. 6. 7. 8. | 150(-20) | 120<br>135<br>120<br>125<br>125<br>125*<br>120<br>120<br>*After Valve Replacement | |

Comments: Valves 1 Turn Down
Head Bolts 80 ft. lb.

TABLE E-4. ENGINE 17 TUNE-UP SPECIFICATIONS
CHECK LIST

M/Y 1973 Manufacturer GMC Displacement 427 Engine No. 17

| | Manufacturer Spec. | As Received | After Tune-up |
|---|---|---|---|
| Carburetor Type<br>Manufacturer & Serial No. | | | |
| Fuel Pressure | 7-9 lbs | -- | 7.5 |
| Curb Idle Speed<br>(engine oil over 200°F) | 550 | 700 | 530 |
| Fast Idle Speed<br>(if auto) | -- | — | — |
| Choke Setting<br>(if auto) | -- | — | — |
| Dashpot Gap | -- | — | — |
| Governor No. | -- | — | Replaced with Unit |
| Governor Speed<br>A. No Load<br>B. Fully Loaded | 4000 RPM | Not functioning | 4000 rpm |
| Distributor Type | Delco Remy | | |
| Manufacturer & Serial No. | 1111365 (2K16) | 1111365 (2K16) | 1111365 (2K16) |
| Vacuum Advance No. | N.A. | N.A. | N.A. |
| Dwell | 28 - 32 | | 30° |
| Timing<br>@ RPM | 8° @ 550 | 7° @ 550 | 8° @ 550 |
| Primary<br>Resistor Valve | — | — | — |
| Total Advance<br>@ RPM & In. Hg. | 13 @ 2200 | N.A. | 13 @ 2200 |
| Mech. Adv. 1.<br>RPM & Deg. Adv. 2.<br>3.<br>4.<br>5.<br>6.<br>7. | 1 @ 600 rpm - Advance starts<br>13 @ 2200 rpm - Full advance | N.A. | 1 at 600 rpm<br>13 at 2200 rpm |

TABLE E-4 (Cont'd). ENGINE 17 TUNE-UP SPECIFICATIONS
CHECK LIST

M/Y 1973 Manufacturer GMC Displacement 427 Engine No. 17

| | Manufacturer Spec. | As Received | After Tune-Up |
|---|---|---|---|
| Vac. Adv. Curve In. Hg. & Deg. Adv. 1. 2. 3. 4. | N.A. | N.A. | N.A. |
| Spark Plugs Type & Manuf. | R44T AC | R42T AC | R44T AC |
| Spark Plug Gap | 0.035 | 0.035 | 0.035 |
| Spark Plug Torque (in lbs.) | 15 ft. lbs. | — — | 15 ft. lbs. |
| Max. Engine Torque @ RPM | 360 @ 2800 | 270 @ 2800 | 320 @ 2800 |
| Max. Engine HP @ RPM | 230 @ 4000 | 154 @ 4000 | 203 @ 3800 |
| Flywheel Bolt Torque | 60 ft. lbs. | — — | 60 ft. lbs. |
| Cylinder Compression 1. 2. 3. 4. 5. 6. 7. 8. | Lowest reading must be within 80% of highest reading. | 110<br>110<br>100<br>100<br>125<br>110<br>100<br>120 | N.A. |
| Idle Air/Fuel | 50 rpm Lean Drop from 600 rpm | CO - 6.5 % | Set using 50 rpm Lean Drop CO - 1.1 to 1.4 |

Comments:

TABLE E-5. ENGINE 18 TUNE-UP SPECIFICATIONS
CHECK LIST

M/Y 1972 Manufacturer CHEVROLET Displacement 350 Engine No. 18

| | Manufacturer Spec. | As Received | After Tune-up |
|---|---|---|---|
| Carburetor Type Manufacturer & Serial No. | | | |
| Fuel Pressure | 7 to 8½ | -- | 8 |
| Curb Idle Speed (engine oil over 200°F) | 600 | -- | 600 |
| Fast Idle Speed (if auto) | -- | -- | N.A. |
| Choke Setting (if auto) | -- | -- | N.A. |
| Dashpot Gap | -- | -- | N.A. |
| Governor No. | N.A. | -- | N.A. |
| Governor Speed A. No Load B. Fully Loaded | N.A. | N.A. | N.A. |
| Distributor Type | Delco Remy - Points | -- | Delco Remy - Points |
| Manufacturer & Serial No. | 1112047 (2A19) | 1112047 (2A19) | 1112047 (2A19) |
| Vacuum Advance No. | C-3036 | -- | -- |
| Dwell | 29° - 31° | -- | 30° |
| Timing @ RPM | 8° @ 600 w. AT | -- | 8° @ 600 |
| Primary Resistor Valve | 1.77 - 2.01 | -- | 1.83 |
| Total Advance @ RPM & In. Hg. | 33° @ 4200 + 15.5 | -- | 31 @ 4200 + 15.5 |
| Mech. Adv. RPM & Deg. Adv. 1. | 0° @ 865 | -- | 0° @ 865 |
| 2. | 2° @ 1335 | | 2° @ 1335 |
| 3. | 11° @ 2400 | | 11° @ 2400 |
| 4. | 18° @ 4200 | | 16° @ 4200 |
| 5. | | | |
| 6. | | | |

TABLE E-5 (Cont'd). ENGINE 18 TUNE-UP SPECIFICATIONS
CHECK LIST

M/Y 1972 Manufacturer CHEVROLET Displacement 350 Engine No. 18

| | | Manufacturer Spec. | As Received | After Tune-Up |
|---|---|---|---|---|
| Vac. Adv. Curve In. Hg. & Deg. Adv. | 1.<br>2.<br>3.<br>4. | 0° @ 8" Hg<br>15° @ 15.5" Hg | — — | 1° @ 8" Hg<br>15° @ 15.5" Hg |
| Spark Plugs Type & Manuf. | | R44T AC | R44T AC | R44T AC |
| Spark Plug Gap | | .035 | .035 | .035 |
| Spark Plug Torque (in lbs.) | | 15 ft. lbs | — — | 15 ft. lbs |
| Max. Engine Torque @ RPM | | 290 @ 2400 | — — | — — |
| Max. Engine HP @ RPM | | 175 @ 4000 | — — | — — |
| Flywheel Bolt Torque | | 60 ft. lbs | — — | 60 ft. lbs. |
| Cylinder Compression | 1.<br>2.<br>3.<br>4.<br>5.<br>6.<br>7.<br>8. | Lowest readings must be within 80% of highest readings. | 135<br>125<br>140<br>135<br>130<br>125<br>130<br>150 | N.A. |

* 630 to 600 Lean Drop used for Idle Adjustment - Resultant CO was 2.0 to 2.4 %

Comments:

TABLE E-6. ENGINE 19 TUNE-UP SPECIFICATIONS

# ENGINE INFORMATION



ENGINE MANUFACTURE [IHC] SERIAL NO. [1099236] DYNO [Cell 2] DATE RECEIVED [1977]

MODEL YEAR [1972] DISPLACEMENT [345] BLOCK CONFIGURATION [V] NO. CYLINDERS [8]

SOURCE of ENGINE [TRUCK] EXHAUST PIPE DIA. [3"] RATED H.P. [197] @ [4000] RPM

RATED MAX. Tq. [309] @ [2200] RPM OIL TYPE [SE]

Engine 19

| MANUFACTURER SPECIFICATIONS | AS RECEIVED | AFTER TUNE UP |
|---|---|---|
| **-SECONDARY IGNITION-** | | |
| A) INITIAL TIMING [TDC] @ [700]* RPM on No. 8 Cylinder | [ ] DEG. @ [ ] RPM | [TCD] DEG. @ [700] RPM. |
| B) MAG TIMING OFFSET [N.A.] | [ ] | [N.A.] |
| C) MAX. COIL OUTPUT *1 [28 KV. MIN.] | [ ] KV. | [24] KV. |
| D) MAX. OUTPUT VARIATION (SNAP ACCEL) [5K MAX.] | [ ] KV. | [4] KV. |
| E) SPARK PLUG MANUFACTURE [Champion] TYPE [J6] GAP [.030] TQ [28-30] | MANUFACTURE [ ] TYPE [ ] GAP [ ] TQ [ ] | MANUFACTURE [Champion] TYPE [J6] GAP [.030] TQ [28-30] |
| F) FIRING ORDER [18436572] | | |
| **-ENGINE-** | | |
| A) OIL PRESS [N.D.] PSI @ [1500] RPM | [ ] PSI @ [ ] RPM | [38] PSI @ [1500] RPM |
| B) THERMOSTAT TEMP. [N.A. Use] 195°F | | |
| C) ACTUAL MAX. TQ [N.D.] LB FT. [2200] RPM | [ ] LB FT. [ ] RPM. | [279] LB FT. [2200] RPM |
| D) ACTUAL RATED HP [N.D.] [4000] RPM | [ ] LB FT. [ ] RPM | [152] [4000] RPM |
| $\frac{HP \times 5252}{SPD.}$ = TQ [N.D.] | [ ] HP | [—] |
| E) FLY WHEEL BOLT TORQUE [45-55] | TQ [ ] | TQ [55] |

*1 EXCEPT IF SPEC. IS NOTED AS LESS

TABLE E-6 (Cont'd). ENGINE 19 TUNE-UP SPECIFICATIONS

# ENGINE INFORMATION CONT.



F) COMPRESSION

*2

SPEC. 143

± 10

New

Low 80% of High in General Tune-Up Section

| | FIRST | FIFTH | WET |
|---|---|---|---|
| 1 | — | 125 | |
| 2 | — | 125 | |
| 3 | — | 120 | |
| 4 | — | 125 | |
| 5 | — | 125 | |
| 6 | — | 125 | |
| 7 | — | 115 | |
| 8 | — | 120 | |

H) RPM DROP PER. CYLINDER

| | |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| 8 | |

I) CARB. BALANCE

*4

1) ODD FIRING

— RPM — %CO

2) EVEN FIRING

— RPM — %CO

J) CHECK VAC. HOSE, FITTINGS ON CARB, & MANIFOLD VAC. LINES [✓] ok

K) CHECK ALL GASKETS AND REPLACE IF NESSARY (TAPPET, INTAKE, PAN, CARB. BASE. [✓] ok

L) LASH VALVES & TQ. HEAD BOLTS

VALVE SPEC. NONE

HEAD BOLTS 90-100 TQ FT LB.

*2 IF NO SPEC. 80% of MAX.

*4 MAX. VARIATION of 10 to 20 RPM & CO CLOSE TO BEING THE SAME.

COMMENTS:

TABLE E-6 (Cont'd). ENGINE 19 TUNE-UP SPECIFICATIONS

# DISTRIBUTOR INFORMATION**



| | MANUFACTURER SPECIFICATIONS | AS RECEIVED | AFTER TUNE UP |
|---|---|---|---|
| A) MANUFACTURER | N.D. | | IHC |
| B) TYPE (ELEC, POINT, ETC. & GAP | POINTS-.019 | | .019 |
| C) SERIAL NUMBER | — — | | — — |
| D) MODEL NUMBER | 433142 | 433142 | 433142 |
| E) VACUUM ADVANCE NO. | N.D. | | N.D. |
| F) DWELL 28-32 DEGREES | | DEG. | 30 DEG. |
| G) DWELL VARIATION | N.D. @ N.D. RPM | @ RPM | N.D. @ N.D. RPM |
| H) PRIMARY RESISTOR VALUE | N.D. Ω | Ω | 1.8 Ω |
| I) POINT RESISTANCE .25 VOLTS DC (OR) GOOD OR BAD | | VOLTS DC | .06 VOLTS DC |

J) MECHANICAL ADVANCE CURVE

| | MANUFACTURER SPECIFICATIONS | | | | AS RECEIVED | | | | AFTER TUNE UP | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DISTRIBUTOR | | ENGINE | | DISTRIBUTOR | | ENGINE | | DISTRIBUTOR | | ENGINE | |
| | RPM | DEG. | RPM | DEG. | RPM | DEG. | RPM | DEG. | RPM | DEG. | RPM | DEG. |
| 1 | 400 | 0-1 | 800 | 0-2 | | | | | 300 | 0 | 600 | 0 |
| 2 | 900 | 4-6 | 1800 | 8-12 | | | | | 400 | 1 | 800 | 2 |
| 3 | 2000 | 15-17 | 4000 | 30-34 | | | | | 900 | 6 | 1800 | 12 |
| 4 | | | | | | | | | 2000 | 15 | 4000 | 30 |
| 5 | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | |

K) VACUUM ADVANCE CURVE @ N.A. RPM

| | MANUFACTURER SPECIFICATIONS | | | | AS RECEIVED | | | | AFTER TUNE UP | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DISTRIBUTOR | | ENGINE | | DISTRIBUTOR | | ENGINE | | DISTRIBUTOR | | ENGINE | |
| | "Hg | DEG. | "Hg | DEG. | "Hg | DEG. | "Hg | DEG. | "Hg | DEG. | "Hg | DEG. |
| 1 | 5-7 | Start | 5-7 | Start | | | | | 3 | 0 | 3 | 0 |
| 2 | 8.5 | 2-4 | 8.5 | 4-8 | | | | | 5 | 0 | 5 | 0 |
| 3 | | | | | | | | | 7 | 1 | 7 | 2 |
| 4 | | | | | | | | | 8.5 | 3 | 8.5 | 6 |
| 5 | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | |

** From IH TRUCK SERVICE MANUAL for Distributor Number 433142-C91

TABLE E-6 (Cont'd). ENGINE 19 TUNE-UP SPECIFICATIONS

# CARBURETION INFORMATION



| | MANUFACTURER SPECIFICATIONS | AS RECEIVED | AFTER TUNE UP |
|---|---|---|---|
| A) MANUFACTURER | Holley | Holley | Holley |
| B) SERIAL NUMBER | N.D. | | N.D. |
| C) MODEL NUMBER | A54578-C91 | 151786-R99 | 454578-C91 |
| D) LIST NUMBER | N.D. | 1710 55 | 6391-2 |
| E) CARB. TYPE 1-2-4 VENTURRI | 2 | | 2 |
| F) CURB IDLE: AUTO | N.A. RPM | A RPM | A N.A. RPM |
| F) CURB IDLE: MANUAL | 700 *RPM | M RPM | M 700 RPM |
| G) THROTTLE KICKER ENERGIZED | N.A. SET N.A. | ENERGIZED RPM. SET RPM | ENERGIZED N.A. RPM SET N.A. RPM |
| H) STEP UP SOLENOID: CONNECTED | N.A. RPM | CONNECTED RPM | CONNECTED N.A. RPM |
| H) STEP UP SOLENOID: DISCONNECTED | N.A. RPM | DISCONNECTED RPM | DISCONNECTED N.A RPM |
| I) IDLE CO | *≈3% % @ 700 RPM | CO % @ RPM | CO 1.4 % @ 700 RPM |
| I) IDLE HC | N.A. PPM * 3 Turns Open | HC PPM | HC 200 PPM |
| J) POWER VALVE SETTING CO | START N.D. % FULL N.D. % | CO START % FULL % | CO START .3 % FULL 5.0 % |
| J) POWER VALVE SETTING @ | N.D. INCHES Hg N.D. | @ INCHES Hg | @ 1.5 INCHES Hg 2000 RPM |
| K) FUEL TYPE | N.A. @ 5.5 PSI | FUEL TYPE @ PSI | FUEL TYPE N.A. @ 5.6 PSI |
| L) NEEDLE SEAT LEAKDOWN | (GOOD, BAD) | (GOOD, BAD) | Good (GOOD, BAD) |
| L) VOLUME | PT. PER SEC. | VOLUME PT. PER SEC. | VOLUME — PT PER — SEC |
| M) GOVERNOR TYPE | None | | N.A. |
| N) GOVERNOR SETTING NO LOAD | N.A. RPM | NO LOAD RPM | NO LOAD N.A. RPM |
| N) GOVERNOR SETTING FULL LOAD | N.A. RPM | FULL LOAD RPM | FULL LOAD N.A. RPM |
| O) CHOKE SETTING | Manual | | Manual |
| P) FAST IDLE | N.A. RPM | RPM | N.A. RPM |

COMMENTS:

*Based on 1973 Operator's Manual - All other items based on MOTOR TRUCK & DIESEL REPAIR MANUAL

TABLE E-7. ENGINE 20 TUNE-UP SPECIFICATIONS

# ENGINE INFORMATION



ENGINE MANUFACTURE [FORD] SERIAL NO. [F60BCN42126] DYNO [Cell 2] DATE RECEIVED [1979]

MODEL YEAR [1972] DISPLACEMENT [300] BLOCK CONFIGURATION [I] NO. CYLINDERS [6]

SOURCE of ENGINE [TRUCK] EXHAUST PIPE DIA. [2.5] RATED H.P. [165] @ [3600] RPM

RATED MAX. Tq. [294] @ [2000] RPM OIL TYPE [SE]

Engine 20

| MANUFACTURER SPECIFICATIONS | AS RECEIVED | AFTER TUNE UP |
|---|---|---|
| **-SECONDARY IGNITION-** | | |
| A) INITIAL TIMING [6°] @ [600] RPM | [ ] DEG. @ [ ] RPM | [6] DEG. @ [600] RPM. |
| B) MAG TIMING OFF SET [N.A.] | [—] | [—] |
| C) MAX. COIL OUTPUT *1 28 KV. MIN. | [ ] KV. | [20] KV. |
| D) MAX. OUTPUT VARIATION (SNAP ACCEL) 5K.MAX. | [ ] KV. | [4] KV. |
| E) SPARK PLUG MANUFACTURE [Autolite] | MANUFACTURE [ ] | MANUFACTURE [ ] |
| TYPE [BF-42] GAP [.034] TQ [N.D.] | TYPE [ ] GAP [ ] TQ [ ] | TYPE [ ] GAP [.034] TO [20 FT-LB] |
| F) FIRING ORDER [153624] | | |
| **-ENGINE-** | | |
| A) OIL PRESS [35-60] PSI @ [2000] RPM | [ ] PSI @ [ ] RPM | [45] PSI @ [2000] RPM |
| B) THERMOSTAT TEMP. [195] | | |
| C) ACTUAL MAX. TQ [294] LB FT. [2000] RPM | [ ] LB FT. [ ] RPM. | [218] LB FT. [2000] RPM |
| D) ACTUAL RATED HP [165] [3600] RPM | [ ] [ ] RPM | [120] HP [3600] RPM |
| $\frac{HP \times 5252}{SPD.}$ = TQ [241] | [ ] | [175] |
| E) FLY WHEEL BOLT TORQUE [75-85] | TQ [ ] | TQ [80] |

*1 EXCEPT IF SPEC. IS NOTED AS LESS

TABLE E-7 (Cont'd). ENGINE 20 TUNE-UP SPECIFICATIONS

# ENGINE INFORMATION CONT.



## F) COMPRESSION

*2 SPEC. [ ]

± [ ]

* Lowest 75% of Highest

| | FIRST | FIFTH | WET |
|---|---|---|---|
| 1 | 95 | 120 | |
| 2 | 100 | 120 | |
| 3 | 95 | 115 | |
| 4 | 100 | 130 | |
| 5 | 100 | 130 | |
| 6 | 100 | 135 | |
| 7 | | | |
| 8 | | | |

## H) RPM DROP PER. CYLINDER

| | |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| 8 | |

## I) CARB. BALANCE

*4

1) ODD FIRING

[ ] RPM [ ] %CO

2) EVEN FIRING

[ ] RPM [ ] %CO

J) CHECK VAC. HOSE, FITTINGS ON CARB, & MANIFOLD VAC. LINES [ ] OK

K) CHECK ALL GASKETS AND REPLACE IF NESSARY (TAPPET, INTAKE, PAN, CARB. BASE. [ ] OK

L) LASH VALVES & TQ. HEAD BOLTS

VALVE SPEC. [.100 to .150] HEAD BOLTS [60-70] TQ FT LB.

*2 IF NO SPEC. 80% of MAX.

*4 MAX. VARIATION of 10 to 20 RPM & CO CLOSE TO BEING THE SAME.

COMMENTS:

Engine as-received did not have an air cleaner or a thermostat.

TABLE E-7 (Cont'd). ENGINE 20 TUNE-UP SPECIFICATIONS

# DISTRIBUTOR INFORMATION



| | MANUFACTURER SPECIFICATIONS | AS RECEIVED | AFTER TUNE UP |
|---|---|---|---|
| A) MANUFACTURER | MOTORCRAFT | MOTORCRAFT | MOTORCRAFT |
| B) TYPE (ELEC, POINT, ETC. | POINT - .027 | | .027 |
| C) SERIAL NUMBER | N.D | | N.D. |
| D) MODEL NUMBER | D2TF 12127EA | D3TF 12127 GA | C9TZ-12127-FRM on Box C6TF-12127-AG on Unit |
| E) VACUUM ADVANCE NO. | N.D. | N.D. | N.D. * Same unit from as-received distributor (it required some rework on the rebuilt dist. |
| F) DWELL 35-39 DEGREES | | DEG. | 37 DEG. |
| G) DWELL VARIATION | N.D. @ N.D. RPM | @ RPM | N.D. @ N.D RPM |
| H) PRIMARY RESISTOR VALVE | 1.30-1.40 Ω | Ω | 1.4 Ω |
| I) POINT RESISTANCE | 0.25 VOLTS DC MAX. (OR) GOOD OR BAD | VOLTS DC | 0.21 VOLTS DC |

J) MECHANICAL ADVANCE CURVE

| | MANUFACTURER SPECIFICATIONS | | | | AS RECEIVED | | | | AFTER TUNE UP | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DISTRIBUTOR | | ENGINE | | DISTRIBUTOR | | ENGINE | | DISTRIBUTOR | | ENGINE | |
| | RPM | DEG. | RPM | DEG. | RPM | DEG. | RPM | DEG. | RPM | DEG. | RPM | DEG. |
| 1 | 500 | 0-½ | | | 500 | 1 | | | 500 | ½ | | |
| 2 | 1000 | 4½-6½ | | | 1000 | 7 | | | 1000 | 5 | | |
| 3 | 1500 | 6-8¼ | | | 1500 | 8½ | | | 1500 | 6½ | | |
| 4 | 2000 | 7½-10 | | | 2000 | 10 | | | 2000 | 8 | | |
| 5 | 750 | 1-3 | | | 250 | Set 0 | | | 750 | 2 | | |
| 6 | 250 | Set 0 | | | | | | | 250 | Set 0 | | |
| 7 | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | |

K) VACUUM ADVANCE CURVE @ N.A. RPM

| | MANUFACTURER SPECIFICATIONS | | | | AS RECEIVED | | | | AFTER TUNE UP | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DISTRIBUTOR | | ENGINE | | DISTRIBUTOR | | ENGINE | | DISTRIBUTOR | | ENGINE | |
| | "Hg | DEG. | "Hg | DEG. | "Hg | DEG. | | DEG. | "Hg | DEG. | "Hg | DEG. |
| 1 | 5 | <2½ | | | 5 | 4 | | | 5 | 2 | | |
| 2 | 10 | 6-9 | | | 10 | 9 | | | 10 | 6 | | |
| 3 | 15 | 10-13 | | | 15 | 12 | | | 15 | 10 | | |
| 4 | 20 | 10-13 | | | 20 | 12 | | | 20 | 10 | | |
| 5 | 0 | 0 | | | 0 | 0 | | | 0 | 0 | | |
| 6 | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | |

TABLE E-7 (Cont'd). ENGINE 20 TUNE-UP SPECIFICATIONS

# CARBURETION INFORMATION



| | MANUFACTURER SPECIFICATIONS | AS RECEIVED | AFTER TUNE UP |
|---|---|---|---|
| A) MANUFACTURER | -- | CARTER for MOTORCRAFT | CARTER for MOTORCRAFT |
| B) SERIAL NUMBER | N.A. | N.A. | N.A. |
| C) MODEL NUMBER | C9TF-F (9510) | YF 6425 S | D2HF KA on (D2TZ-9510-AA Carb. Repl. Kit) Silver Tag |
| D) LIST NUMBER | 9510 | -- | 9510 |
| E) CARB. TYPE 1-2-4 VENTURI | 1 | 1 | 1 |
| F) CURB IDLE: AUTO | N.A. RPM | A -- RPM | A -- RPM |
| F) CURB IDLE: MANUAL | 600 RPM | M -- RPM | M 600 RPM |
| G) THROTTLE KICKER: ENERGIZED | N.A. SET N.A. | ENERGIZED -- RPM. SET -- RPM | ENERGIZED N.A. RPM SET N.A. RPM |
| H) STEP UP SOLENOID: CONNECTED | N.A. RPM | CONNECTED -- RPM | CONNECTED N.A. RPM |
| H) STEP UP SOLENOID: DISCONNECTED | N.A. RPM | DISCONNECTED -- RPM | DISCONNECTED N.A. RPM |
| I) IDLE CO | No Spec % @ N.A. RPM | CO -- % @ -- RPM | CO ≈3.0 % @ 600 RPM |
| I) IDLE HC | No Spec PPM | HC -- PPM | HC 1600* PPM as Hexane |
| J) POWER VALVE SETTING CO | START No Spec % FULL No Spec % | START CO -- % FULL -- % | START CO .4 % FULL 3.2 |
| J) POWER VALVE SETTING @ | N.A. INCHES Hg N.A. | @ -- INCHES Hg -- | @ 3 INCHES Hg 2 |
| K) FUEL TYPE | N.A. @ 4½-5½ PSI | FUEL TYPE -- @ -- PSI | FUEL TYPE N.A. @ 5½ PSI |
| L) NEEDLE SEAT LEAKDOWN | No Spec (GOOD, BAD) | -- (GOOD, BAD) | Good (GOOD, BAD) |
| L) VOLUME | N.A. PT. PER N.A. SEC. | VOLUME -- PT. PER -- SEC. | VOLUME -- PT PER -- SEC |
| M) GOVERNOR TYPE | N.A. | -- | N.A. |
| N) GOVERNOR SETTING NO LOAD | N.A. RPM | NO LOAD -- RPM | NO LOAD N.A. RPM |
| N) GOVERNOR SETTING FULL LOAD | N.A. RPM | FULL LOAD -- RPM | FULL LOAD N.A. RPM |
| O) CHOKE SETTING | MANUAL | -- | MANUAL |
| P) FAST IDLE | 1400 RPM | -- RPM | N.A. RPM |
| Q) DASHPOT SETTING | 7/64 to 1/8 | | 1/8 |

COMMENTS:

* 1400 ppm was lowest HC attainable. Was attained with increase in CO. HC increased rapidly as CO was decreased below 2.5%

TABLE E-8. ENGINE 21 TUNE-UP SPECIFICATIONS

# ENGINE INFORMATION



ENGINE MANUFACTURE IHC SERIAL NO. [illegible] DYNO 2 DATE RECEIVED JAN/22/80

MODEL YEAR 73 DISPLACEMENT 304 BLOCK CONFIGURATION V NO. CYLINDERS 8

SOURCE of ENGINE [illegible] EXHAUST PIPE DIA. [ ] RATED H.P.[2] 147 @ 3900 RPM

RATED MAX. Tq.[2] 240 @ 2400 RPM OIL TYPE SE

Engine 21

| MANUFACTURER SPECIFICATIONS | AS RECEIVED | AFTER TUNE UP |
|---|---|---|
| **-SECONDARY IGNITION-** | | |
| A) INITIAL TIMING TDC @ 700 RPM on Cyl. #8 | [ ] DEG. @ [ ] RPM | TDC DEG. @ 700 RPM. |
| B) MAG TIMING OFF SET N.A. | [ ] | N.A. |
| C) MAX. COIL OUTPUT *1 28 Kv. MIN. | [ ] KV. | 32 KV. |
| D) MAX. OUTPUT VARIATION (SNAP ACCEL) 5K MAX. | [ ] KV. | 5 KV. |
| E) SPARK PLUG MANUFACTURE Champion | MANUFACTURE [ ] | MANUFACTURE CHAMPION |
| TYPE J6 GAP .030 TQ 27-32 | TYPE [ ] GAP [ ] TQ [ ] | TYPE J-6 GAP .030 TO 30 |
| F) FIRING O.E.PER 1243572 | | |
| **-ENGINE-** | | |
| A) OIL PRESS N.D. PSI @ [illegible] RPM | [ ] PSI @ [ ] RPM | 40 PSI @ 1500 RPM |
| B) THERMOSTAT TEMP. N.D. Use | | |
| C) ACTUAL MAX. TQ 240 LB FT 2400 RPM | [ ] LB FT. [ ] RPM. | 218 LB FT. 2400 RPM |
| D) ACTUAL RATED HP 147 3900 RPM | [ ] [ ] RPM | 124 3900 RPM |
| $\frac{HP \times 5252}{SPD.} = TQ$ 198 | [ ] HP | 167 |
| E) FLY WHEEL BOLT TORQUE 45-55 | TQ [ ] | TQ 50 |

*1 EXCEPT IF SPEC. IS NOTED AS LESS

2 MOTOR TRUCK AND DIESEL REPAIR MANUAL

TABLE E-8 (Cont'd). ENGINE 21 TUNE-UP SPECIFICATIONS

# ENGINE INFORMATION CONT.



## F) COMPRESSION

*2 SPEC. 145

± 10

| | FIRST | FIFTH | WET |
|---|---|---|---|
| 1 | 100 | 125 | |
| 2 | 100 | 125 | |
| 3 | 100 | 130 | |
| 4 | 100 | 135 | |
| 5 | 100 | 135 | |
| 6 | 100 | 130 | |
| 7 | 100 | 130 | |
| 8 | 100 | 130 | |

## H) RPM DROP PER. CYLINDER

| | |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| 8 | |

## I) CARB. BALANCE *4

1) ODD FIRING

[ ] RPM [ ] %CO

2) EVEN FIRING

[ ] RPM [ ] %CO

J) CHECK VAC. HOSE, FITTINGS ON CARB, & MANIFOLD VAC. LINES [✓] ok

K) CHECK ALL GASKETS AND REPLACE IF NESSARY (TAPPET, INTAKE, PAN, CARB. BASE. [✓] ok

L) LASH VALVES & TQ. HEAD BOLTS IF NESSARY. N/A [✓]

VALVE SPEC. Zero HEAD BOLTS 90-100 TQ FT LB.

*2 IF NO SPEC. 80% of MAX.

*4 MAX. VARIATION of 10 to 20 RPM & CO CLOSE TO BEING THE SAME.

COMMENTS:

TABLE E-8 (Cont'd). ENGINE 21 TUNE-UP SPECIFICATIONS

# DISTRIBUTOR INFORMATION



| | MANUFACTURER SPECIFICATIONS | AS RECEIVED | AFTER TUNE UP |
|---|---|---|---|
| A) MANUFACTURER | N. D. | | N.D. |
| B) TYPE (ELEC, POINT, ETC. | POINT | | POINT |
| C) SERIAL NUMBER | -- | | -- |
| D) MODEL NUMBER | 428095-C91 | | 428095-C91 |
| E) VACUUM ADVANCE NO. | N.D. | | N.D. |
| F) DWELL 27-32 DEGREES .019 GAP | | DEG. | 30 DEG. .019 GAP |
| G) DWELL VARIATION N.D. @ N.D. RPM | | @ RPM | N.D. @ N.D. RPM |
| H) PRIMARY RESISTOR VALUE N.D. Ω | | Ω | 1.6 Ω |
| I) POINT RESISTANCE Use .25 VOLTS DC (OR) GOOD OR BAD | | VOLTS DC | .20 VOLTS DC |

J) MECHANICAL ADVANCE CURVE

| | MANUFACTURER SPECIFICATIONS | | | | AS RECEIVED | | | | AFTER TUNE UP | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DISTRIBUTOR | | ENGINE | | DISTRIBUTOR | | ENGINE | | DISTRIBUTOR | | ENGINE | |
| | RPM | DEG. | RPM | DEG. | RPM | DEG. | RPM | DEG. | RPM | DEG. | RPM | DEG. |
| 1 | 100 | 0 | | | | | | | 350 | 0 | | |
| 2 | 400 | 4 | | | | | | | 400 | 1/2 | | |
| 3 | 1100 | 9-11 | | | | | | | 1100 | 11 | | |
| 4 | 2000 | 15-17 | | | | | | | 2000 | 15 | | |
| 5 | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | |

K) VACUUM ADVANCE CURVE @ N.D. RPM

| | MANUFACTURER SPECIFICATIONS | | | | AS RECEIVED | | | | AFTER TUNE UP | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DISTRIBUTOR | | ENGINE | | DISTRIBUTOR | | ENGINE | | DISTRIBUTOR | | ENGINE | |
| | "Hg | DEG. | "Hg | DEG. | | DEG. | | DEG. | "Hg | DEG. | "Hg | DEG. |
| 1 | 3 | 0 | | | | | | | 3 | 0 | | |
| 2 | 5 | Start | | | | | | | 5 | Start | | |
| 3 | 7 | Start | | | | | | | 7 | 1/2 | | |
| 4 | 11 | 2-4 | | | | | | | 11 | 4 | | |
| 5 | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | |



From IHC TRUCK SERVICE MANUAL - CTS-9981-K

TABLE E-8 (Cont'd). ENGINE 21 TUNE-UP SPECIFICATIONS

# CARBURETION INFORMATION



| | MANUFACTURER SPECIFICATIONS | AS RECEIVED | AFTER TUNE UP |
|---|---|---|---|
| A) MANUFACTURER | HOLLEY | HOLLEY | HOLLEY |
| B) SERIAL NUMBER | - - | - - | - - |
| C) MODEL NUMBER | 427908-C9 For This Unit SIF 29 | 427908-C9 | 427908-C9 |
| D) LIST NUMBER | N.D. | | 6394-1 |
| E) CARB. TYPE 1-2-4 VENTURRI | 2 | | 2 |
| F) IDLE: AUTO | - - RPM | A RPM | A - - RPM |
| IDLE: MANUAL | 700 * RPM | M RPM | M 700 RPM |
| G) THROTTLE KICKER SOLENOID | ENERGIZED N.A. SET N.A. | ENERGIZED RPM. SET RPM | ENERGIZED N.A. RPM SET N.A. RPM |
| H) STEP UP SOLENOID: | CONNECTED N.A. RPM | CONNECTED RPM | CONNECTED N.A. RPM |
| | DISCONNECTED N.A. RPM | DISCONNECTED RPM | DISCONNECTED N.A. RPM |
| I) IDLE CO | 2.0 % @ 707 RPM | CO 8 % @ 700 RPM | CO Set 1.5 % @ 700 RPM |
| IDLE HC | N.A. PPM Per Tag on the Engine | HC 2000+ PPM** Problems | HC 250 PPM *** |
| J) POWER VALVE SETTING CO | START N.D. % FULL 11.2 % | CO START % FULL | CO START - - % FULL - - |
| @ | N.D. INCHES Hg 11.0 | @ INCHES Hg | @ - - INCHES Hg - - |
| K) FUEL TYPE | N.A. @ 5.5 PSI | FUEL TYPE @ PSI | FUEL TYPE - - @ 6.0 PSI |
| L) NEEDLE SEAT LEAKDOWN | N.D. (GOOD, BAD) | (GOOD, BAD) | ✓ (GOOD, BAD) |
| VOLUME | N.D. PT. PER N.D. SEC. | VOLUME PT. PER SEC. | VOLUME - - PT PER - - SEC |
| M) GOVERNOR TYPE | N.A. | | N.A. |
| N) GOVERNOR SETTING NO LOAD | N.A. RPM | NO LOAD RPM | NO LOAD N.A. RPM |
| FULL LOAD | N.A RPM | FULL LOAD RPM | FULL LOAD N.A. RPM |
| O) CHOKE SETTING | N.D. | | N.A. |
| P) FAST IDLE | N.D. Use 1500 RPM | RPM | N.A RPM |



COMMENTS:

* Based on 1973 IHC Operator's Manual

** External and internal fuel leaks. Bowl gasket and an O'ring were bad.

*** Idle mixture was very sensitive to small changes in adjustment of the mixture screws.

TABLE E-9. ENGINE 22 TUNE-UP SPECIFICATIONS

# ENGINE INFORMATION



ENGINE MANUFACTURE GMC SERIAL NO. T0818T0A DYNO 2 DATE RECEIVED N.D.

MODEL YEAR 73 DISPLACEMENT 366 BLOCK CONFIGURATION V NO. CYLINDERS 8

SOURCE of ENGINE TRUCK EXHAUST PIPE DIA. [ ] RATED H.P. 200 [a] @ 4000 RPM

RATED MAX. Tq. 310 [a] @ 2800 RPM OIL TYPE SE

Engine 22

| MANUFACTURER SPECIFICATIONS | AS RECEIVED | AFTER TUNE UP |
|---|---|---|
| **-SECONDARY IGNITION-** | | |
| A) INITIAL TIMING [ ] @ 550 RPM | [ ] DEG. @ [ ] RPM | 8 DEG. @ 550 RPM. |
| B) MAG TIMING OFF SET N.A. | [ ] | N A |
| C) MAX. COIL OUTPUT *1 28 Kv. MIN. | [ ] KV. | 20 KV. |
| D) MAX. OUTPUT VARIATION (SNAP ACCEL) 5K max. | [ ] KV. | 3 KV. |
| E) SPARK PLUG MANUFACTURE AC | MANUFACTURE [ ] | MANUFACTURE AC |
| TYPE R43T [b] GAP .025 TQ 15 | TYPE [ ] GAP [ ] TQ [ ] | TYPE R43T GAP .035 TO 15 ft-lb |
| F) FIRING ORDER 1 8 4 3 6 5 7 2 | | |
| **-ENGINE-** | | |
| A) OIL PRESS N.D. PSI @ N.D. RPM | [ ] PSI @ [ ] RPM | 48 PSI @ 2000 RPM |
| B) THERMOSTAT TEMP. 190°F | | |
| C) ACTUAL MAX. TQ 310 [a] LB FT. 2800 RPM | [ ] LB FT. [ ] RPM. | 285 LB FT. 2800 RPM |
| D) ACTUAL RATED HP 200 [a] 4000 RPM | [ ] [ ] RPM | 234 HP 4000 RPM |
| $\frac{H.P. \times 5252}{SPD.} = TQ$ 267 | [ ] | 307 |
| E) FLY WHEEL BOLT TORQUE 60-70 | TQ [ ] | TQ [ ] LB FT |

*1 EXCEPT IF SPEC. IS NOTED AS LESS

[a] Per MOTOR MANUAL [b] Per Chevrolet 1973 M.D. Service Manual - Ign. Sys. 6Y-46

TABLE E-9 (Cont'd). ENGINE 22 TUNE-UP SPECIFICATIONS

# ENGINE INFORMATION CONT.



F) COMPRESSION

*2

SPEC. [ -- ]

± [ -- ]

Use Lower 75%, if [illegible]

| | FIRST | FIFTH | WET |
|---|---|---|---|
| 1 | 110 | 120 | |
| 2 | 95 | 130 | |
| 3 | 90 | 115 | |
| 4 | 100 | 125 | |
| 5 | 100 | 120 | |
| 6 | 100 | 125 | |
| 7 | 95 | 135 | |
| 8 | 100 | 120 | |

H) RPM DROP PER. CYLINDER

| | |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| 8 | |

I) CARB. BALANCE

*4

1) ODD FIRING

[ ] RPM [ ] %CO

2) EVEN FIRING

[ ] RPM [ ] %CO

J) CHECK VAC. HOSE, FITTINGS ON CARB, & MANIFOLD VAC. LINES [✓] ok

K) CHECK ALL GASKETS AND REPLACE IF NESSARY (TAPPET, INTAKE, PAN, CARB. BASE. [✓] ok

L) LASH VALVES & TQ. HEAD BOLTS IF NESSARY. N/A [✓]

VALVE SPEC. [1 Turn] HEAD BOLTS [60-65] TQ FT LB.

*2 IF NO SPEC. 80% of MAX.

*4 MAX. VARIATION of 10 to 20 RPM & CO CLOSE TO BEING THE SAME.

COMMENTS:

TABLE E-9 (Cont'd). ENGINE 22 TUNE-UP SPECIFICATIONS

# DISTRIBUTOR INFORMATION



| | MANUFACTURER SPECIFICATIONS | AS RECEIVED | AFTER TUNE UP |
|---|---|---|---|
| A) MANUFACTURER | Delco-Remy | | Delco - Remy |
| B) TYPE (ELEC, POINT, ETC. | POINT | | — — |
| C) SERIAL NUMBER | — — | | — — |
| D) MODEL NUMBER | 1111365 | | 1111365 |
| E) VACUUM ADVANCE NO. | N.A. | | N.A. |
| F) DWELL | 27-32 DEGREES | DEG. | 30 DEG. |
| | N.S. GAP | | N.S. GAP |
| G) DWELL VARIATION | N.D. @ N.D. RPM | @ RPM | N.D. @ N.D RPM |
| H) PRIMARY RESISTOR VALVE | 1.31-1.89 Ω | Ω | 1.30 Ω |
| I) POINT RESISTANCE | Vc 0.25 VOLTS DC | VOLTS DC | 0.21 VOLTS DC |
| | (OR) GOOD OR BAD | | |

J) MECHANICAL ADVANCE CURVE

| | MANUFACTURER SPECIFICATIONS | | | | AS RECEIVED | | | | AFTER TUNE UP | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DISTRIBUTOR | | ENGINE | | DISTRIBUTOR | | ENGINE | | DISTRIBUTOR | | ENGINE | |
| | RPM | DEG. | RPM | DEG. | RPM | DEG. | RPM | DEG. | RPM | DEG. | RPM | DEG. |
| 1 | 300 | 0 | | | | | | | 300 | 0 | | |
| 2 | 625 | 0-1 | | | | | | | 600 | 1 | | |
| 3 | 1200 | 7.5-9.5 | | | | | | | 1200 | 8.5 | | |
| 4 | 2200 | 12-14 | | | | | | | 2200 | 13 | | |
| 5 | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | |

K) VACUUM ADVANCE CURVE @ N.A. RPM

| | MANUFACTURER SPECIFICATIONS | | | | AS RECEIVED | | | | AFTER TUNE UP | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DISTRIBUTOR | | ENGINE | | DISTRIBUTOR | | ENGINE | | DISTRIBUTOR | | ENGINE | |
| | "Hg | DEG. | "Hg | DEG. | RPM | DEG. | RPM | DEG. | RPM | DEG. | RPM | DEG. |
| 1 | N.A. | | | | | | | | N.A. | N.A. | | |
| 2 | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | |

TABLE E-9 (Cont'd). ENGINE '22 TUNE-UP SPECIFICATIONS

# CARBURETION INFORMATION



| | MANUFACTURER SPECIFICATIONS | AS RECEIVED | AFTER TUNE UP |
|---|---|---|---|
| A) MANUFACTURER | — | HOLLEY | HOLLEY |
| B) SERIAL NUMBER | — | — | — |
| C) MODEL NUMBER | — | 685981 | 685981 |
| D) LIST NUMBER | — | 6292 * | 6292 * |
| E) CARB. TYPE 1-2-4 VENTURRI | N.D. | | 4 |
| F) CURB IDLE: AUTO | 550 RPM | A RPM | A — RPM |
| F) CURB IDLE: MANUAL | 550 RPM | M RPM | M 550 RPM |
| G) THROTTLE KICKER: ENERGIZED | N.A. SET N.A. | ENERGIZED RPM. SET RPM | ENERGIZED — RPM SET — RPM |
| H) STEP UP SOLENOID: CONNECTED | 550 RPM | CONNECTED RPM | CONNECTED N.A. RPM |
| H) STEP UP SOLENOID: DISCONNECTED | 450 RPM | DISCONNECTED RPM | DISCONNECTED N.A. RPM |
| I) IDLE: CO | — % @ — RPM | CO % @ RPM | CO 1.6 % @ 550 RPM |
| I) IDLE: HC | — PPM 50 RPM Lean Drop | HC PPM | HC N.D. PPM |
| J) POWER VALVE SETTING: CO START | N.D. % | CO START % | CO START — % |
| J) POWER VALVE SETTING: CO FULL | N.D. % | CO FULL % | CO FULL — % |
| J) POWER VALVE SETTING @ | N.D. INCHES Hg N.D | @ INCHES Hg | @ — INCHES Hg — |
| K) FUEL TYPE | N.A. @ 7-9 PSI | FULL TYPE @ PSI | FULL TYPE N.A. @ 7.5 PSI |
| L) NEEDLE SEAT LEAK DOWN | T.D. (GOOD, BAD) | (GOOD, BAD) | V (GOOD, BAD) |
| L) VOLUME | N.D. PT. PER N.D SEC. | VOLUME PT. PER SEC. | VOLUME — PT PER — SEC. |
| M) GOVERNOR TYPE | — | | — |
| N) GOVERNOR SETTING: NO LOAD | 2400 RPM | NO LOAD RPM | NO LOAD — RPM |
| N) GOVERNOR SETTING: FULL LOAD | 4000 RPM | FULL LOAD RPM | FULL LOAD 4080 RPM |
| O) CHOKE SETTING | N.S. | | Not Used |
| P) FAST IDLE | 1800-2400 RPM | RPM | N.A. RPM |

**COMMENTS:**

*According to MOTOR TRUCK AND DIESEL REPAIR MANUAL - 6292 is a 1972 Model Unit accepted based on 2/5/72 telecon from Tim Cox - EPA

TABLE E-10. ENGINE 11 TUNE-UP SPECIFICATIONS

CHECK LIST

M/Y 1913 Manufacturer GMC Displacement 366 Engine No. 11*

| | Manufacturer Spec. | As Received | After Tune-up |
|---|---|---|---|
| Carburetor Type<br>Manufacturer & Serial No. | 4-BORE<br>HOLLEY - 685981 LIST 6292 | | |
| Fuel Pressure | 7-9 psi | | |
| Curb Idle Speed<br>(engine oil over 200°F) | HOT IDLE SPEED 550 RPM | 765 | |
| Fast Idle Speed<br>(if auto) | manual | | |
| Choke Setting<br>(if auto) | manual | | |
| Dashpot Gap | none | | |
| Governor No. | | | |
| Governor Speed<br>A. No Load<br>B. Fully Loaded | 4000 | | |
| Distributor Type | | | |
| Manufacturer & Serial No. | Delco-Remy 1111365 | | |
| Vacuum Advance No. | | | |
| Dwell | 28-32 | 27 | |
| Timing<br>@ RPM | 80 | 14° | |
| Primary<br>Resistor Valve | | | |
| Total Advance<br>@ RPM & In. Hg. | | | |
| Mech. Adv.<br>RPM & Deg. Adv. 1.<br>2.<br>3.<br>4.<br>5.<br>6. | 1° at 625 | 1° - 450<br>3° - 625<br>8° - 1000<br>9° - 1200<br>10° - 1500<br>10° - 1800 | |

TABLE E-10 (Cont'd) ENGINE 11 TUNE-UP SPECIFICATIONS

CHECK LIST

M/Y 1973 Manufacturer GMC Displacement 366 Engine No. 11

| | | Manufacturer Spec. | As Received | After Tune-Up |
|---|---|---|---|---|
| Vac. Adv. Curve In. Hg. & Deg. Adv. | 1.<br>2.<br>3.<br>4. | None | | |
| Spark Plugs Type & Manuf. | | R44T AC | R45T AC | |
| Spark Plug Gap | | .035 | .035 | |
| Spark Plug Torque (in lbs.) | | 15 ft. lbs. | | |
| Max. Engine Torque @ RPM | | 310 at 2800 | | |
| Max. Engine HP @ RPM | | 200 at 4000 | | |
| Flywheel Bolt Torque | | 60 ft. lbs. | | |
| Cylinder Compression | 1.<br>2.<br>3.<br>4.<br>5.<br>6.<br>7.<br>8. | 150 ± 20 psi | 128<br>146<br>130<br>127<br>125<br>130<br>130<br>142 | |

Comments: * Engine 11 was subsequently retested as Engine 22.

# APPENDIX F

## TEST RESULTS ON NEW ENGINES

## Engines 1, 6[a], 7, 8[a] and 10

| Table Number | Description |
|---|---|
| F-1 thru F-5 | Summary of Results |
| F-6 thru F-10 | Transient Test Computer Printouts |
| F-11 thru F-15 | Nine-Mode Computer Printouts |

[a]Engines 6 and 8 are repeat tests of Engine 1

TABLE F-1. ENGINE 1 SUMMARY OF RESULTS
1978 IHC 404

TRANSIENT CYCLE

| | | TEST 1-8 | | | TEST 1-9 | | | |
|---|---|---|---|---|---|---|---|---|
| | | Cold | Hot | Composite | Cold | Hot | Composite | Average |
| HC, | g/kW-hr | 8.02 | 3.32 | 3.99 | 7.98 | 3.25 | 3.93 | 3.96 |
| CO, | g/kW-hr | 127.12 | 88.96 | 94.41 | 130.00 | 91.37 | 96.89 | 95.65 |
| $CO_2$, | g/kW-hr | 1152. | 1147. | 1148. | 1176. | 1144. | 1149. | 1149. |
| NOX, | g/kW-hr | 7.33 | 7.60 | 7.60 | 7.13 | 7.68 | 7.60 | 7.60 |
| SFC, | kg/kW-hr | 0.434 | 0.409 | 0.413 | 0.443 | 0.409 | 0.414 | 0.414 |
| WORK, | kW-hr | 8.28 | 8.60 | 8.63 | 8.74 | 8.55 | 8.58 | 8.61 |
| POWER, | kW | 27.21 | 26.53 | 26.62 | 26.96 | 26.38 | 26.47 | 26.56 |

NINE MODE

| | | Test 1-11 | Test 1-13 | Average |
|---|---|---|---|---|
| HC, | g/kW-hr | 1.863 | 1.798 | 1.831 |
| CO, | g/kW-hr | 46.605 | 43.678 | 45.142 |
| $CO_2$, | g/kW-hr | -- | -- | -- |
| NOX, | g/kW-hr | 6.972 | 7.130 | 7.051 |
| SFC, | kg/kW-hr | 0.460 | 0.459 | 0.460 |
| | | -- | -- | -- |

ENGINE DESCRIPTION

Engine: 1978 IHC 404 CID V-8 S/N 404-053483
Rated Power: 189 Hp @ 3600 rpm
Rated Torque: 323 ft-lbs @ 2200 rpm
Measured Idle Speed: 545 rpm

TRANSIENT CYCLE AVERAGE VALUES

| | | | | g/kg Fuel | g/km[a] |
|---|---|---|---|---|---|
| HC, | g/kW-hr (g/hp-hr) | 3.96 (2.95) | HC | 9.57 | 3.28 |
| CO, | g/kW-hr (g/hp-hr) | 95.65 (71.33) | CO | 39.60 | 79.11 |
| NOX, | g/kW-hr (g/hp-hr) | 7.60 (5.67) | NOX | 18.36 | 6.29 |
| SFC, | kg/kW-hr (lb/hp-hr) | 0.414 (0.681) | FUEL CONS. | - | 342. |
| WORK, | kW-hr (hp-hr) | 8.61 (11.55) | | | |

[a] Using a composite value of 10.41 km for the Transient Cycle.

TABLE F-1 (Cont'd). ENGINE 1 SUMMARY OF RESULTS
1978 IHC 404

TRANSIENT CYCLE MODAL RESULTS [b]

| | Cold Cycle | | | | Hot Cycle | | | |
|---|---|---|---|---|---|---|---|---|
| Test 1-8 | NYNF | LANF | LAF | NYNF | NYNF | LANF | LAF | NYNF |
| HC, gram | 37.49 | 21.19 | 8.58 | 3.48 | 7.75 | 8.40 | 8.06 | 4.34 |
| CO, gram | 362.42 | 301.38 | 348.54 | 108.81 | 109.75 | 193.80 | 354.41 | 106.63 |
| $CO_2$, gram | 1215.3 | 2221.0 | 5656.7 | 1067.9 | 1068.1 | 2091.7 | 5608.8 | 1093.3 |
| NOX, gram | 3.98 | 9.37 | 46.82 | 4.45 | 4.68 | 10.06 | 46.18 | 4.77 |
| FUEL, kg | 0.600 | 0.871 | 1.964 | 0.394 | 0.399 | 0.764 | 1.952 | 0.403 |
| KW-HR | 0.91 | 1.77 | 5.35 | 0.79 | 0.79 | 1.71 | 5.30 | 0.79 |
| TEST 1-9 | | | | | | | | |
| HC, gram | 36.29 | 20.70 | 8.82 | 3.94 | 6.87 | 8.59 | 8.13 | 4.18 |
| CO, gram | 349.06 | 288.47 | 385.06 | 113.23 | 114.87 | 194.82 | 354.94 | 116.94 |
| $CO_2$ gram | 1183.0 | 2382.6 | 5627.8 | 1077.8 | 1059.7 | 2097.2 | 5534.5 | 1096.0 |
| NOX, gram | 3.72 | 9.88 | 44.41 | 4.32 | 4.61 | 10.11 | 46.63 | 4.33 |
| FUEL, kg | 0.582 | 0.915 | 1.974 | 0.400 | 0.398 | 0.766 | 1.929 | 0.408 |
| KW-HR | 0.90 | 1.75 | 5.30 | 0.78 | 0.77 | 1.70 | 5.30 | 0.78 |



POWER MAPPING (TQ in ft-lb) @ Temp. - 78° Baro. - 29.10

| RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ |
|---|---|---|---|---|---|---|---|---|---|
| - | | 1100 | 273 | 2100 | 291 | 3100 | 262 | 4100 | |
| - | | 1200 | 275 | 2200 | 291 | 3200 | 255 | 4200 | |
| - | | 1300 | 277 | 2300 | 291 | 3300 | 249 | 4300 | |
| 400 | 212 | 1400 | 279 | 2400 | 291 | 3400 | 243 | 4400 | |
| 500 | 254 | 1500 | 282 | 2500 | 289 | 3500 | 237 | 4500 | |
| 600 | 260 | 1600 | 285 | 2600 | 287 | 3600 | 231 | 4600 | |
| 700 | 258 | 1700 | 288 | 2700 | 285 | 3700 | - | 4700 | |
| 800 | 258 | 1800 | 289 | 2800 | 282 | 3800 | | 4800 | |
| 900 | 263 | 1900 | 291 | 2900 | 277 | 3900 | | 4900 | |
| 1000 | 268 | 2000 | 291 | 3000 | 269 | 4000 | | 5000 | |

[b] Barometric Pressure: Test 1-8 = 735 mm Hg Test 1-9 = 734 mm Hg.

TABLE F-2. ENGINE 6 SUMMARY OF RESULTS
1978 IHC 404

TRANSIENT CYCLE

| | | TEST 6-3 | | | TEST 6-4 | | | |
|---|---|---|---|---|---|---|---|---|
| | | Cold | Hot | Composite | Cold | Hot | Composite | Average |
| HC, | g/kW-hr | 8.21 | 5.02 | 5.48 | 10.12 | 5.84 | 6.45 | 5.97 |
| CO, | g/kW-hr | 128.93 | 96.44 | 101.08 | 146.40 | 97.81 | 104.75 | 102.92 |
| $CO_2$, | g/kW-hr | 1070. | 1060. | 1061. | 1118. | 1097. | 1100. | 1081. |
| NOX, | g/kW-hr | 7.33 | 8.22 | 8.09 | 7.24 | 9.07 | 8.81 | 8.45 |
| SFC, | kg/kW-hr | 0.409 | 0.387 | 0.390 | 0.435 | 0.400 | 0.405 | 0.398 |
| WORK, | kW-hr | 9.11 | 8.96 | 8.98 | 8.81 | 8.61 | 8.64 | 8.81 |
| POWER, | kW | 28.19 | 27.64 | 27.71 | 27.18 | 26.56 | 26.65 | 27.18 |
| KW-HR DEV.[b] | | 5.9 | 4.2 | -- | 2.3 | 0.0 | -- | -- |

NINE MODE

| | | Test 6-3 | Test 6-4 | Average |
|---|---|---|---|---|
| HC, | g/kW-hr | 1.704 | 1.446 | 1.575 |
| CO, | g/kW-hr | 43.194 | 40.632 | 41.913 |
| $CO_2$, | g/kW-hr | -- | -- | -- |
| NOX, | g/kW-hr | 8.354 | 8.698 | 8.526 |
| SFC, | kg/kW-hr | 0.391 | 0.389 | 0.390 |

ENGINE DESCRIPTION

Engine: 1978 IHC 404 CID V-8 S/N 404-053483
Rated Power: 189 hp at 3600 rpm
Rated Torque: 323 ft-lbs at 2200 rpm
Measured Idle Speed: 545 rpm

TRANSIENT CYCLE AVERAGE VALUES

| | | | | | g/kg Fuel | g/km[a] |
|---|---|---|---|---|---|---|
| HC, | g/kW-hr (g/hp-hr) | 5.97 | (4.45) | HC | 15.00 | 5.05 |
| CO, | g/kW-hr (g/hp-hr) | 102.92 | (76.75) | CO | 258.59 | 87.10 |
| NOX, | g/kW-hr (g/hp-hr) | 8.45 | (6.30) | NOX | 21.23 | 7.15 |
| SFC, | kg/kW-hr (lb/hp-hr) | 0.398 | (0.655) | FUEL CONS. | -- | 337. |
| WORK, | kW-hr (hp-hr) | 8.81 | (11.81) | | | |

[a] Using a composite value of 10.41 km for the Transient Cycle.
[b] Test kW-hr minus Reference kW-hr divided by the Reference kW-hr times 100%.

TABLE F-2 (Cont'd). ENGINE 6 SUMMARY OF RESULTS
1978 IHC 404

TRANSIENT CYCLE MODAL RESULTS [C]

| | Cold Cycle | | | | Hot Cycle | | | |
|---|---|---|---|---|---|---|---|---|
| TEST 6-3 | NYNF | LANF | LAF | NYNF | NYNF | LANF | LAF | NYNF |
| HC, gram | 25.72 | 27.42 | 13.86 | 7.81 | 12.00 | 15.61 | 9.64 | 7.76 |
| CO, gram | 242.57 | 314.24 | 513.06 | 104.99 | 139.41 | 217.62 | 405.83 | 101.29 |
| $CO_2$, gram | 1183.1 | 2079.0 | 5485.2 | 1002.8 | 976.5 | 1997.2 | 5509.1 | 1017.3 |
| NOX, gram | 2.82 | 10.86 | 47.42 | 5.67 | 4.38 | 11.94 | 51.68 | 5.62 |
| FUEL, kg | 0.519 | 0.838 | 1.997 | 0.376 | 0.389 | 0.753 | 1.947 | 0.379 |
| KW-HR | 0.82 | 1.78 | 5.77 | 0.75 | 0.72 | 1.72 | 5.78 | 0.73 |
| TEST 6-4 | | | | | | | | |
| HC, gram | 22.25 | 37.68 | 20.00 | 9.17 | 13.74 | 16.70 | 11.61 | 8.23 |
| CO, gram | 232.73 | 412.18 | 549.90 | 100.68 | 146.38 | 213.19 | 377.88 | 104.20 |
| $CO_2$, gram | 1175.0 | 2169.9 | 5521.0 | 983.6 | 955.9 | 2005.9 | 5436.5 | 1046.0 |
| NOX, gram | 2.76 | 11.05 | 44.39 | 5.61 | 4.06 | 12.94 | 54.98 | 6.09 |
| FUEL, kg | 0.508 | 0.926 | 2.030 | 0.369 | 0.388 | 0.755 | 1.913 | 0.390 |
| KW-HR | 0.73 | 1.79 | 5.57 | 0.71 | 0.69 | 1.66 | 5.54 | 0.71 |



POWER MAPPING (TQ in ft-lb) @ Temp. - 80 F Baro. - 29.11 In. Hg

| RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ |
|---|---|---|---|---|---|---|---|---|---|
| - | | 1100 | 274 | 2100 | 300 | 3100 | 272 | 4100 | |
| - | | 1200 | 277 | 2200 | 300 | 3200 | 267 | 4200 | |
| - | | 1300 | 281 | 2300 | 299 | 3300 | 261 | 4300 | |
| 400 | 209 | 1400 | 285 | 2400 | 298 | 3400 | 255 | 4400 | |
| 500 | 255 | 1500 | 288 | 2500 | 296 | 3500 | 249 | 4500 | |
| 600 | 266 | 1600 | 291 | 2600 | 293 | 3600 | 242 | 4600 | |
| 700 | 267 | 1700 | 294 | 2700 | 290 | 3700 | 236 | 4700 | |
| 800 | 265 | 1800 | 296 | 2800 | 286 | 3800 | 231 | 4800 | |
| 900 | 267 | 1900 | 298 | 2900 | 282 | 3900 | 225 | 4900 | |
| 1000 | 270 | 2000 | 299 | 3000 | 277 | 4000 | 220 | 5000 | |

[C]Barometric Pressure: Test 6-3 = 753 mm Hg Test 6-4 = 749 mm Hg.

TABLE F-3. ENGINE 7 SUMMARY OF RESULTS
1978 Chevrolet 454

TRANSIENT CYCLE

| | TEST 7-2 | | | TEST 7-3 | | | |
|---|---|---|---|---|---|---|---|
| | Cold | Hot | Composite | Cold | Hot | Composite | Average |
| HC, g/kW-hr | 6.21 | 2.79 | 3.28 | 7.46 | 2.68 | 3.36 | 3.32 |
| CO, g/kW-hr | 80.13 | 68.52 | 70.18 | 75.85 | 65.24 | 66.76 | 68.47 |
| $CO_2$, g/kW-hr | 1070. | 1096. | 1092. | 1069. | 1019. | 1026. | 1059. |
| NOX, g/kW-hr | 9.24 | 8.95 | 8.99 | 8.65 | 8.39 | 8.43 | 8.71 |
| SFC, kg/kW-hr | 0.383 | 0.382 | 0.382 | 0.382 | 0.356 | 0.360 | 0.371 |
| WORK, kW-hr | 9.86 | 10.45 | 10.37 | 10.30 | 10.66 | 10.61 | 10.49 |
| POWER, kW | 30.42 | 32.24 | 31.98 | 31.78 | 32.89 | 32.73 | 32.36 |
| KW-HR DEV.[b] | -5.4 | 0.2 | -- | -1.2 | 2.3 | -- | -- |

NINE MODE

| | Test 7-1 | Test 7-2 | Average |
|---|---|---|---|
| HC, g/kW-hr | 0.787 | 0.731 | 0.759 |
| CO, g/kW-hr | 27.021 | 26.069 | 26.545 |
| $CO_2$, g/kW-hr | -- | -- | -- |
| NOX, g/kW-hr | 7.617 | 7.998 | 7.808 |
| SFC, kg/kW-hr | 0.386 | 0.402 | 0.394 |

ENGINE DESCRIPTION

Engine: 1978 Chevrolet 454 CID S/N 364776
Rated Power: 240 hp at 3800 rpm
Rated Torque: 370 ft-lbs at 2800 rpm
Measured Idle Speed: 680 rpm

TRANSIENT CYCLE AVERAGE VALUES

| | | | | g/kg Fuel | g/km[a] |
|---|---|---|---|---|---|
| HC, | g/kW-hr | (g/hp-hr) | 3.32 2.48 | HC 8.95 | 3.35 |
| CO, | g/kW-hr | (g/hp-hr) | 68.47 51.06 | CO 184.56 | 69.00 |
| NOX, | g/kW-hr | (g/hp-hr) | 8.71 6.50 | NOX 23.48 | 8.78 |
| SFC, | kg/kW-hr | (lb/hp-hr) | 0.371 0.610 | FUEL CONS. -- | 374. |
| WORK, | kW-hr | (hp-hr) | 10.49 14.07 | | |

[a] Using a composite value of 10.41 km for the Transient Cycle.
[b] Test kW-hr minus Reference kW-hr divided by the Reference kW-hr times 100%.

TABLE F-3 (Cont'd). ENGINE 7 SUMMARY OF RESULTS
1978 Chevrolet 454

TRANSIENT CYCLE MODAL RESULTS [c]

| | Cold Cycle | | | | Hot Cycle | | | |
|---|---|---|---|---|---|---|---|---|
| TEST 7-2 | NYNF | LANF | LAF | NYNF | NYNF | LANF | LAF | NYNF |
| HC, gram | 26.23 | 22.13 | 9.16 | 3.75 | 7.93 | 9.52 | 7.31 | 4.44 |
| CO, gram | 172.87 | 208.24 | 285.52 | 123.57 | 141.04 | 167.23 | 283.93 | 123.59 |
| $CO_2$, gram | 1121.6 | 2449.1 | 5823.3 | 1162.0 | 1343.6 | 2446.7 | 6323.3 | 1333.0 |
| NOX, gram | 2.65 | 18.10 | 64.33 | 6.01 | 7.05 | 17.23 | 63.23 | 5.95 |
| FUEL, kg | 0.465 | 0.897 | 1.986 | 0.431 | 0.501 | 0.864 | 2.141 | 0.486 |
| KW-HR | 0.50 | 2.04 | 6.60 | 0.72 | 0.89 | 2.05 | 6.62 | 0.89 |
| TEST 7-3 | | | | | | | | |
| HC, gram | 43.34 | 20.89 | 8.32 | 4.31 | 8.21 | 8.83 | 7.11 | 4.39 |
| CO, gram | 196.87 | 206.71 | 262.31 | 115.05 | 149.91 | 174.30 | 250.84 | 120.58 |
| $CO_2$, gram | 1152.7 | 2513.0 | 5987.8 | 1350.2 | 1224.1 | 2387.3 | 5898.5 | 1350.9 |
| NOX, gram | 3.55 | 17.05 | 63.15 | 5.33 | 5.66 | 14.40 | 64.19 | 5.18 |
| FUEL, kg | 0.504 | 0.916 | 2.026 | 0.487 | 0.468 | 0.848 | 1.991 | 0.490 |
| KW-HR | 0.62 | 2.08 | 6.68 | 0.91 | 0.92 | 2.11 | 6.71 | 0.92 |



POWER MAPPING (TQ in ft-lb) @ Temp. - 84°F Baro. - 28.89 in Hg

| RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ |
|---|---|---|---|---|---|---|---|---|---|
| - | | 1100 | 318 | 2100 | 362 | 3100 | 346 | 4100 | |
| - | | 1200 | 326 | 2200 | 363 | 3200 | 342 | 4200 | |
| - | | 1300 | 334 | 2300 | 363 | 3300 | 338 | 4300 | |
| 400 | 284 | 1400 | 340 | 2400 | 362 | 3400 | 333 | 4400 | |
| 500 | 314 | 1500 | 346 | 2500 | 361 | 3500 | 314 | 4500 | |
| 600 | 318 | 1600 | 350 | 2600 | 360 | 3600 | 296 | 4600 | |
| 700 | 316 | 1700 | 354 | 2700 | 358 | 3700 | 240 | 4700 | |
| 800 | 313 | 1800 | 357 | 2800 | 356 | 3800 | 213 | 4800 | |
| 900 | 306 | 1900 | 360 | 2900 | 353 | 3900 | 0 | 4900 | |
| 1000 | 309 | 2000 | 361 | 3000 | 350 | 4000 | | 5000 | |

[c] Barometric Pressure: Test 7-2 = 751 mm Hg Test 7-3 = 749 mm Hg.

TABLE F-4. ENGINE 8 SUMMARY OF RESULTS
1978 IHC 404

TRANSIENT CYCLE

| | | TEST 8-4 | | | TEST 8-5 | | | |
|---|---|---|---|---|---|---|---|---|
| | | Cold | Hot | Composite | Cold | Hot | Composite | Average |
| HC, | g/kW-hr | 17.55 | 3.00 | 5.08 | 14.02 | 3.72 | 5.19 | 5.14 |
| CO, | g/kW-hr | 127.87 | 69.58 | 77.91 | 119.88 | 70.27 | 77.36 | 77.64 |
| $CO_2$, | g/kW-hr | 1081. | 1071. | 1072. | 1103. | 1092. | 1094. | 1083. |
| NOX, | g/kW-hr | 6.17 | 7.04 | 6.92 | 5.51 | 6.64 | 6.48 | 6.70 |
| SFC, | kg/kW-hr | 0.422 | 0.375 | 0.382 | 0.421 | 0.383 | 0.388 | 0.385 |
| WORK, | kW-hr | 8.67 | 8.67 | 8.67 | 8.39 | 8.37 | 8.37 | 8.52 |
| POWER, | kW | 26.75 | 26.75 | 26.75 | 25.88 | 25.82 | 25.83 | 26.29 |

NINE MODE

| | | Test 8-3 | Test 8-5 | Average |
|---|---|---|---|---|
| HC, | g/kW-hr | 1.754 | 1.295 | 1.525 |
| CO, | g/kW-hr | 35.758 | 24.336 | 20.047 |
| $CO_2$, | g/kW-hr | -- | -- | -- |
| NOX, | g/kW-hr | 4.969 | 5.705 | 5.337 |
| SFC, | kg/kW-hr | 0.428 | 0.407 | 0.418 |

ENGINE DESCRIPTION

Engine: 1978 IHC 404 CID S/N 404-053483
Rated Power: 189 hp at 3600 rpm
Rated Torque: 323ft-lbs at 2200 rpm
550 rpm

TRANSIENT CYCLE AVERAGE VALUES

| | | | | | g/kg Fuel | g/km[a] |
|---|---|---|---|---|---|---|
| HC, | g/kW-hr | (g/hp-hr) | 5.14 | (3.83) | HC 13.35 | 4.21 |
| CO, | g/kW-hr | (g/hp-hr) | 77.64 | (57.90) | CO 201.66 | 63.54 |
| NOX, | g/kW-hr | (g/hp-hr) | 6.70 | (5.00) | NOX 17.40 | 5.48 |
| SFC, | kg/kW-hr | (lb/hp-hr) | 0.385 | (0.633) | FUEL CONS. -- | 315. |
| WORK, | kW-hr | (hp-hr) | 8.52 | (11.43) | | |

[a] Using a composite value of 10.41 km for the Transient Cycle.

TABLE F-4 (Cont'd). ENGINE 8 SUMMARY OF RESULTS
1978 IHC 404

TRANSIENT CYCLE STATISTICS

| | Cold Cycle | | | Hot Cycle | | |
|---|---|---|---|---|---|---|
| TEST 8-4 | Speed | Torque | Power | Speed | Torque | Power |
| Standard Error | 74. | 13.% | 9.% | 36. | 9.% | 7.% |
| Slope | .981 | .784 | .923 | .992 | .882 | .952 |
| Corr. Coef. | .9933 | .8255 | .9532 | .9985 | .9254 | .9701 |
| Intercept | 40. | 32.0 | 3.5 | 17. | 18.0 | 2.7 |
| Points Used | 1144. | 1139. | 1139. | 1144. | 1144. | 1144. |
| kW-hr Dev.[b] | ---------- | -0.1 | ---------- | ---------- | -0.1 | ---------- |
| TEST 8-5 | | | | | | |
| Standard Error | 41 | 13.% | 9.% | 41. | 7.% | 7.% |
| Slope | .989 | .759 | .897 | .991 | .883 | .923 |
| Corr. Coef. | .9980 | .8150 | .9410 | .9980 | .9485 | .9630 |
| Intercept | 21. | 29.5 | 2.9 | 21. | 11.1 | 2.1 |
| Points Used | 1144 | 1140 | 1140 | 1144 | 1144 | 1144 |
| kW-hr Dev.[b] | ---------- | -3.4 | ---------- | ---------- | -3.8 | ---------- |

TRANSIENT CYCLE MODAL RESULTS[c]

| | Cold Cycle | | | | Hot Cycle | | | |
|---|---|---|---|---|---|---|---|---|
| TEST 8-4 | NYNF | LANF | LAF | NYNF | NYNF | LANF | LAF | NYNF |
| HC, gram | 60.46 | 58.56 | 20.27 | 3.88 | 7.02 | 9.01 | 5.50 | 4.45 |
| CO, gram | 284.25 | 360.69 | 392.78 | 70.89 | 137.32 | 158.17 | 236.59 | 71.49 |
| $CO_2$, gram | 1097.4 | 1996.7 | 5316.1 | 959.7 | 1026.5 | 2004.2 | 5276.4 | 978.6 |
| NOX, gram | 2.31 | 7.69 | 39.92 | 3.59 | 3.30 | 9.51 | 44.45 | 3.80 |
| FUEL, kg | 0.547 | 0.867 | 1.900 | 0.342 | 0.399 | 0.719 | 1.786 | 0.348 |
| KW-HR | 0.77 | 1.72 | 5.43 | 0.75 | 0.81 | 1.69 | 5.42 | 0.75 |
| TEST 8-5 | | | | | | | | |
| HC, gram | 38.85 | 46.89 | 27.54 | 4.36 | 9.18 | 10.01 | 6.60 | 5.33 |
| CO, gram | 226.22 | 317.74 | 393.21 | 68.37 | 113.89 | 136.65 | 258.87 | 78.72 |
| $CO_2$, gram | 1069.2 | 2003.1 | 5220.6 | 956.2 | 022.2 | 1968.3 | 5281.6 | 970.0 |
| NOX, gram | 1.93 | 7.29 | 33.57 | 3.40 | 2.73 | 8.83 | 40.78 | 3.20 |
| FUEL, kg | 0.488 | 0.836 | 1.868 | 0.340 | 0.356 | 0.698 | 1.800 | 0.350 |
| KW-HR | 0.69 | 1.68 | 5.28 | 0.74 | 0.72 | 1.64 | 5.28 | 0.73 |

Test kW-hr minus Reference kW-hr divided by the Reference kW-hr times 100%.
Barometric Pressure: Test 8.4 = 748 mm Hg Test 8.5 = 742 mm Hg.

TABLE F-4 (Cont'd). ENGINE 8 SUMMARY OF RESULTS
1978 IHC 404

ENGINE DESCRIPTION

Engine: 1978 International Harvester 404 CID S/N 404-05483

| | Mfg. Spec. | Measured |
|---|---|---|
| Max. Engine Torque, Ft-Lb @ RPM | 323 @ 2200 | 300 @ 2200 |
| Max. Engine Power, HP @ RPM | 189 @ 3600 | 171 @ 3600 |
| Idle RPM | 525 - 575 | 550 |

POWER MAPPING (TQ in ft-lb) @ Temp. - 68 °F Baro. - 29.13" Hg

| RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ |
|---|---|---|---|---|---|---|---|---|---|
| - | | 1100 | 272 | 2100 | 300 | 3100 | 279 | 4100 | |
| - | | 1200 | 276 | 2200 | 300 | 3200 | 274 | 4200 | |
| - | | 1300 | 280 | 2300 | 300 | 3300 | 268 | 4300 | |
| 400 | 208 | 1400 | 284 | 2400 | 300 | 3400 | 263 | 4400 | |
| 500 | 251 | 1500 | 288 | 2500 | 298 | 3500 | 256 | 4500 | |
| 600 | 260 | 1600 | 291 | 2600 | 296 | 3600 | 250 | 4600 | |
| 700 | 262 | 1700 | 294 | 2700 | 294 | 3700 | 243 | 4700 | |
| 800 | 258 | 1800 | 296 | 2800 | 291 | 3800 | 236 | 4800 | |
| 900 | 262 | 1900 | 298 | 2900 | 288 | 3900 | 229 | 4900 | |
| 1000 | 270 | 2000 | 299 | 3000 | 284 | 4000 | 221 | 5000 | |

TABLE F-5. ENGINE 10 SUMMARY OF RESULTS
1979 GMC 292

TRANSIENT CYCLE

| | | TEST 10-1 | | | TEST 10-2 | | | |
|---|---|---|---|---|---|---|---|---|
| | | Cold | Hot | Composite | Cold | Hot | Composite | Average |
| HC, | g/kW-hr | 11.63 | 11.30 | 11.35 | 16.85 | 13.25 | 13.76 | 12.56 |
| CO, | g/kW-hr | 130.96 | 121.36 | 122.73 | 133.32 | 120.03 | 121.93 | 122.33 |
| $CO_2$, | g/kW-hr | 980. | 994. | 922. | 988. | 970. | 973. | 983. |
| NOX, | g/kW-hr | 19.20 | 18.86 | 18.91 | 15.90 | 16.72 | 16.60 | 17.76 |
| SFC, | kg/kW-hr | 0.385 | 0.385 | 0.385 | 0.394 | 0.379 | 0.381 | 0.383 |
| WORK, | kW-hr | 6.13 | 6.21 | 6.20 | 6.27 | 6.30 | 6.30 | 6.25 |
| POWER, | kW | 18.91 | 19.16 | 19.12 | 19.34 | 19.44 | 19.43 | 19.28 |

NINE MODE

| | | Test 10-4 | Test 10-5 | Average |
|---|---|---|---|---|
| HC, | g/kW-hr | 5.059 | 5.788 | 5.424 |
| CO, | g/kW-hr | 62.601 | 72.006 | 67.304 |
| $CO_2$, | g/kW-hr | -- | -- | -- |
| NOX, | g/kW-hr | 16.699 | 18.760 | 17.730 |
| SFC, | kg/kW-hr | 0.421 | 0.426 | 0.424 |

TRANSIENT CYCLE AVERAGE VALUES

| | | | | | g/kg Fuel | g/km[a] |
|---|---|---|---|---|---|---|
| HC, | g/kW-hr (g/hp-hr) | 12.56 | (9.37) | HC | 32.79 | 7.54 |
| CO, | g/kW-hr (g/hp-hr) | 122.33 | (91.22) | CO | 164.05 | 73.45 |
| NOX, | g/kW-hr (g/hp-hr) | 17.76 | (13.24) | NOX | 46.37 | 10.66 |
| SFC, | kg/kW-hr (lb/hp-hr) | 0.383 | (0.630) | FUEL CONS. | -- | 230. |
| WORK, | kW-hr (hp-hr) | 6.25 | (8.38) | | | |

[a] Using a composite value of 10.41 km for the Transient Cycle.

TABLE F-5 (Cont'd). ENGINE 10 SUMMARY OF RESULTS
1978 GMC 292

TRANSIENT CYCLE STATISTICS

| | Cold Cycle | | | Hot Cycle | | |
|---|---|---|---|---|---|---|
| TEST | Speed | Torque | Power | Speed | Torque | Power |
| Standard Error | 42. | 9.% | 6.% | 35. | 8.% | 6.% |
| Slope | 1.002 | .929 | .990 | 1.001 | .930 | .991 |
| Corr. Coef. | .9976 | .9262 | .9825 | .9983 | .9316 | .9835 |
| Intercept | 13. | 8.4 | .9 | 20. | 9.6 | 1.4 |
| Points Used | 1144 | 1114 | 1114 | 1144 | 1109 | 1109 |
| kW-hr Dev. [b] | ---------- | 1.9 | ---------- | ---------- | 3.1 | ---------- |
| TEST | | | | | | |
| Standard Error | 42. | 8.% | 6.% | 50. | 9.% | 7.% |
| Slope | .999 | .946 | 1.000 | .998 | .942 | 1.003 |
| Corr. Coef. | .9975 | .9379 | .9851 | .9965 | .9317 | .9803 |
| Intercept | 13. | 9.0 | 1.1 | 23. | 9.3 | 1.2 |
| Points Used | 1144 | 1128 | 1128 | 1144 | 1136 | 1136 |
| kW-hr Dev. [b] | ---------- | 4.2 | ---------- | ---------- | 4.7 | ---------- |

TRANSIENT CYCLE MODAL RESULTS [c]

| | Cold Cycle | | | | Hot Cycle | | | |
|---|---|---|---|---|---|---|---|---|
| Test | NYNF | LANF | LAF | NYNF | NYNF | LANF | LAF | NYNF |
| HC, gram | 43.85 | 12.37 | 7.99 | 7.06 | 45.93 | 9.76 | 7.49 | 6.95 |
| CO, gram | 296.80 | 143.61 | 309.18 | 52.86 | 262.73 | 123.83 | 309.86 | 56.81 |
| $CO_2$, gram | 619.4 | 1291.4 | 3446.0 | 646.3 | 639.7 | 1332.3 | 3564.1 | 634.8 |
| NOX, gram | 3.90 | 22.44 | 81.77 | 9.53 | 3.42 | 22.32 | 82.26 | 9.09 |
| FUEL, kg | 0.386 | 0.491 | 1.247 | 0.237 | 0.378 | 0.491 | 1.285 | 0.235 |
| KW-HR | 0.64 | 1.23 | 3.74 | 0.52 | 0.68 | 1.23 | 3.76 | 0.54 |
| TEST | | | | | | | | |
| HC, gram | 68.91 | 16.54 | 10.22 | 10.00 | 49.22 | 14.17 | 10.42 | 9.69 |
| CO, gram | 347.05 | 140.38 | 293.60 | 55.02 | 283.41 | 126.16 | 290.34 | 56.36 |
| $CO_2$ gram | 655.1 | 1326.3 | 3565.2 | 650.6 | 647.1 | 1298.0 | 3530.6 | 639.2 |
| NOX, gram | 3.51 | 18.14 | 70.36 | 7.69 | 2.88 | 19.26 | 75.23 | 7.98 |
| FUEL, kg | 0.447 | 0.504 | 1.280 | 0.242 | 0.394 | 0.486 | 1.267 | 0.239 |
| KW-HR | 0.71 | 1.24 | 3.78 | 0.54 | 0.72 | 1.24 | 3.80 | 0.54 |

[b]Test kW-hr minus Reference kW-hr divided by the Reference kW-hr times 100%.
[c]Barometric Pressure: Test 10-1 = 741 mm Hg Test 10-2 = 741 mm Hg.

TABLE F-5 (Cont'd). ENGINE 10 SUMMARY OF RESULTS
1978 GMC 292

ENGINE DESCRIPTION

Engine: 1979 General Motors 292 CID

| | Mfg. Specs. | Measured |
|---|---|---|
| Max. Engine Torque, Ft-Lb @ RPM | 215 @ 1600 | 220 @ 1400 |
| Max. Engine Power, HP @ RPM | 115 @ 3400 | 108 @ 3600 |
| Idle RPM | 700 | 700 |

POWER MAPPING (TQ in ft-lb) @ Temp. - 70 Baro. - 29.15

| RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ | RPM | TQ |
|---|---|---|---|---|---|---|---|---|---|
| - | | 1100 | 217 | 2100 | 208 | 3100 | 177 | 4100 | |
| - | | 1200 | 219 | 2200 | 205 | 3200 | 173 | 4200 | |
| - | | 1300 | 220 | 2300 | 202 | 3300 | 169 | 4300 | |
| 400 | | 1400 | 220 | 2400 | 199 | 3400 | 165 | 4400 | |
| 500 | 164 | 1500 | 220 | 2500 | 196 | 3500 | 161 | 4500 | |
| 600 | 189 | 1600 | 219 | 2600 | 193 | 3600 | 157 | 4600 | |
| 700 | 198 | 1700 | 217 | 2700 | 190 | 3700 | 152 | 4700 | |
| 800 | 205 | 1800 | 215 | 2800 | 187 | 3800 | 146 | 4800 | |
| 900 | 210 | 1900 | 213 | 2900 | 183 | 3900 | 140 | 4900 | |
| 1000 | 214 | 2000 | 211 | 3000 | 180 | 4000 | 0 | 5000 | |

# TABLE F-6A. TEST 1-8 EMISSIONS RESULTS

'COLD TRANSIENT

PROJECT NO. 11-5044-001

ENGINE NO.IH404
ENGINE MODEL 79
ENGINE 6.6 L(404 CID) V-8
CVS NO. 9

TEST NO. 1-8 RUN
DATE 9/11/78
TIME 10:11
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 735.58 MM HG(28.96 IN HG)
DRY BULB TEMP. 26.7 DEG C(80.0 DEG F)

RELATIVE HUMIDITY 84 PCT
ABSOLUTE HUMIDITY 19.1 GM/KG(133.9 GRAINS/LB)

NOX HUMIDITY C.F. 1.3825

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 55.0 (131.0) | 56.7 (134.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7169 | 8088 | 8317 | 7165 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 176.9 ( 6250) | 198.9 ( 7024) | 201.7 ( 7124) | 176.6 ( 6238) |
| HC SAMPLE METER/RANGE/PPM | 37.4/ 3/ 374 | 19.7/ 3/ 197 | 83.3/ 2/ 83 | 43.0/ 2/ 43 |
| HC BCKGRD METER/RANGE/PPM | .7/ 3/ 7 | 1.3/ 3/ 13 | 10.9/ 2/ 11 | 9.1/ 2/ 9 |
| CO SAMPLE METER/RANGE/PPM | 62.0/ 3/ 1826 | 46.1/ 3/ 1358 | 54.1/ 3/ 1593 | 19.1/ 3/ 569 |
| CO BCKGRD METER/RANGE/PPM | .1/ 3/ 3 | .1/ 3/ 3 | .7/ 3/ 21 | .7/ 3/ 21 |
| CO2 SAMPLE METER/RANGE/PCT | 25.3/ 3/ .41 | 38.2/ 3/ .64 | 84.5/ 3/ 1.56 | 22.4/ 3/ .36 |
| CO2 BCKGRD METER/RANGE/PCT | 2.7/ 3/ .04 | 2.4/ 3/ .04 | 2.1/ 3/ .03 | 2.3/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 8.6/ 2/ 9 | 17.9/ 2/ 18 | 88.3/ 2/ 88 | 10.6/ 2/ 11 |
| NOX BCKGRD METER/RANGE/PPM | .1/ 2/ 0 | .1/ 2/ 0 | .6/ 2/ 1 | 1.1/ 2/ 1 |
| DILUTION FACTOR | 21.34 | 16.87 | 7.80 | 31.65 |
| HC CONCENTRATION PPM | 362 | 185 | 74 | 34 |
| CO CONCENTRATION PPM | 1759 | 1301 | 1484 | 529 |
| CO2 CONCENTRATION PCT | .38 | .61 | 1.53 | .33 |
| NOX CONCENTRATION PPM | 8.5 | 17.8 | 87.8 | 9.5 |
| HC MASS GRAMS | 32.49 | 21.19 | 8.58 | 3.48 |
| CO MASS GRAMS | 362.42 | 301.38 | 348.54 | 108.81 |
| CO2 MASS GRAMS | 1215.3 | 2221.0 | 5656.7 | 1067.9 |
| NOX MASS GRAMS | 3.98 | 9.37 | 46.82 | 4.45 |
| FUEL KG (LB) | .600 ( 1.32) | .871 ( 1.92) | 1.964 ( 4.33) | .394 ( .87) |
| KW HR (HP HR) | .91 ( 1.22) | 1.77 ( 2.37) | 5.35 ( 7.18) | .79 ( 1.06) |
| BSHC G/KW HR (G/HP HR) | 41.26 ( 30.77) | 12.00 ( 8.95) | 1.60 ( 1.20) | 4.39 ( 3.27) |
| BSCO G/KW HR (G/HP HR) | 398.88 ( 297.44) | 170.58 ( 127.20) | 65.14 ( 48.57) | 137.05 ( 102.20) |
| BSCO2 G/KW HR (G/HP HR) | 1337.52 ( 997.39) | 1257.14 ( 937.45) | 1057.20 ( 788.35) | 1345.13 (1003.07) |
| BSNOX G/KW HR (G/HP HR) | 4.38 ( 3.27) | 5.30 ( 3.95) | 8.75 ( 6.53) | 5.61 ( 4.18) |
| BSFC KG/KW HR (LB/HP HR) | .661 ( 1.086) | .493 ( .810) | .367 ( .604) | .496 ( .816) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.82 ( 11.83) |
| BSHC G/KW HR (G/HP HR) | 8.02 ( 5.98) |
| BSCO G/KW HR (G/HP HR) | 127.12 ( 94.79) |
| BSCO2 G/KW HR (G/HP HR) | 1152 ( 859) |
| BSNOX G/KW HR (G/HP HR) | 7.33 ( 5.46) |
| BSFC KG/KW HR (LB/HP HR) | .434 ( .714) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE F-6A (CONT'D). TEST 1-8 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO. IH404
ENGINE MODEL 79
ENGINE 6.6 L(404 CID) V-8
CVS NO. 9

TEST NO. 1-8 RUN
DATE 9/11/78
TIME 10:52
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 235.58 MM HG(28.96 IN HG)
DRY BULB TEMP. 27.2 DEG C(81.0 DEG F)

RELATIVE HUMIDITY 78 PCT
ABSOLUTE HUMIDITY 18.4 GM/KG(129.1 GRAINS/LB)

NOX HUMIDITY C.F. 1.3408

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 55.0 (131.0) | 56.7 (134.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7167 | 8087 | 8314 | 7164 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 176.9 ( 6248) | 198.8 ( 7023) | 201.6 ( 7121) | 176.6 ( 6237) |
| HC SAMPLE METER/RANGE/PPM | 85.5/ 2/ 85 | 83.1/ 2/ 83 | 76.9/ 2/ 77 | 50.0/ 2/ 50 |
| HC BCKGRD METER/RANGE/PPM | 9.9/ 2/ 10 | 10.4/ 2/ 10 | 8.7/ 2/ 9 | 7.6/ 2/ 8 |
| CO SAMPLE METER/RANGE/PPM | 19.4/ 3/ 577 | 30.3/ 3/ 895 | 55.0/ 3/ 1620 | 18.9/ 3/ 563 |
| CO BCKGRD METER/RANGE/PPM | .9/ 3/ 28 | .9/ 3/ 28 | .8/ 3/ 24 | .9/ 3/ 28 |
| CO2 SAMPLE METER/RANGE/PCT | 22.2/ 3/ .36 | 36.1/ 3/ .61 | 84.0/ 3/ 1.55 | 22.6/ 3/ .37 |
| CO2 BCKGRD METER/RANGE/PCT | 2.1/ 3/ .03 | 2.2/ 3/ .03 | 2.2/ 3/ .03 | 2.0/ 3/ .03 |
| NOX SAMPLE METER/RANGE/PPM | 10.9/ 2/ 11 | 20.3/ 2/ 20 | 90.0/ 2/ 90 | 11.3/ 2/ 11 |
| NOX BCKGRD METER/RANGE/PPM | .6/ 2/ 1 | .6/ 2/ 1 | .8/ 2/ 1 | .8/ 2/ 1 |
| DILUTION FACTOR | 31.52 | 19.12 | 7.84 | 31.38 |
| HC CONCENTRATION PPM | 76 | 73 | 69 | 43 |
| CO CONCENTRATION PPM | 533 | 837 | 1510 | 519 |
| CO2 CONCENTRATION PCT | .33 | .57 | 1.52 | .34 |
| NOX CONCENTRATION PPM | 10.3 | 19.7 | 89.3 | 10.5 |
| HC MASS GRAMS | 7.75 | 8.40 | 8.06 | 4.34 |
| CO MASS GRAMS | 109.75 | 193.80 | 354.41 | 106.63 |
| CO2 MASS GRAMS | 1068.1 | 2091.7 | 5608.8 | 1093.3 |
| NOX MASS GRAMS | 4.68 | 10.06 | 46.18 | 4.77 |
| FUEL KG (LB) | .399 ( .88) | .764 ( 1.68) | 1.952 ( 4.30) | .402 ( .89) |
| KW HR (HP HR) | .79 ( 1.06) | 1.71 ( 2.29) | 5.30 ( 7.11) | .79 ( 1.06) |
| BSHC G/KW HR (G/HP HR) | 9.81 ( 7.32) | 4.92 ( 3.67) | 1.52 ( 1.13) | 5.47 ( 4.08) |
| BSCO G/KW HR (G/HP HR) | 139.04 ( 103.68) | 113.53 ( 84.66) | 66.81 ( 49.82) | 134.32 ( 100.16) |
| BSCO2 G/KW HR (G/HP HR) | 1353.18 (1009.07) | 1225.30 ( 913.71) | 1057.31 ( 788.44) | 1377.20 (1026.98) |
| BSNOX G/KW HR (G/HP HR) | 5.93 ( 4.42) | 5.90 ( 4.40) | 8.70 ( 6.49) | 6.01 ( 4.48) |
| BSFC KG/KW HR (LB/HP HR) | .505 ( .831) | .447 ( .736) | .368 ( .605) | .506 ( .832) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.60 ( 11.53) |
| BSHC G/KW HR (G/HP HR) | 3.32 ( 2.48) |
| BSCO G/KW HR (G/HP HR) | 88.96 ( 66.34) |
| BSCO2 G/KW HR (G/HP HR) | 1147 ( 856) |
| BSNOX G/KW HR (G/HP HR) | 7.64 ( 5.70) |
| BSFC KG/KW HR (LB/HP HR) | .409 ( .673) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE F-6B. TEST 1-9 EMISSIONS RESULTS

COLD TRANSIENT

PROJECT NO. 11-5044-001

ENGINE NO.IH404
ENGINE MODEL 79
ENGINE 6.6 L(404 CID) V-8
CVS NO. 9

TEST NO. 1-9 RUN
DATE 9/12/78
TIME 02:00
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 734.06 MM HG(28.90 IN HG)
DRY BULB TEMP. 27.2 DEG C(81.0 DEG F)

RELATIVE HUMIDITY 81 PCT
ABSOLUTE HUMIDITY 14.3 GM/KG(134.8 GRAINS/LB)

NOX HUMIDITY C.F. 1.3911

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 55.0 (131.0) | 55.6 (132.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7169 | 8088 | 8316 | 7164 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 176.5 ( 6236) | 198.4 ( 7009) | 201.8 ( 7129) | 176.2 ( 6223) |
| HC SAMPLE METER/RANGE/PPM | 36.4/ 3/ 364 | 19.4/ 3/ 194 | 86.1/ 2/ 86 | 48.0/ 2/ 48 |
| HC BCKGRD METER/RANGE/PPM | .8/ 3/ 8 | 1.4/ 3/ 14 | 11.9/ 2/ 12 | 9.5/ 2/ 10 |
| CO SAMPLE METER/RANGE/PPM | 59.9/ 3/ 1764 | 44.2/ 3/ 1302 | 59.8/ 3/ 1761 | 20.0/ 3/ 595 |
| CO BCKGRD METER/RANGE/PPM | .2/ 3/ 6 | .1/ 3/ 3 | .9/ 3/ 28 | .8/ 3/ 24 |
| CO2 SAMPLE METER/RANGE/PCT | 25.2/ 3/ .91 | 38.9/ 3/ .66 | 84.7/ 3/ 1.56 | 23.4/ 3/ .38 |
| CO2 BCKGRD METER/RANGE/PCT | 3.2/ 3/ .05 | .1/ 3/ .00 | 3.1/ 3/ .05 | 3.2/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 8.1/ 2/ 8 | 19.0/ 2/ 19 | 83.3/ 2/ 83 | 9.9/ 2/ 10 |
| NOX BCKGRD METER/RANGE/PPM | .2/ 2/ 0 | .3/ 2/ 0 | .7/ 2/ 1 | .7/ 2/ 1 |
| DILUTION FACTOR | 21.63 | 16.72 | 7.71 | 30.20 |
| HC CONCENTRATION PPM | 356 | 181 | 76 | 39 |
| CO CONCENTRATION PPM | 1698 | 1248 | 1638 | 552 |
| CO2 CONCENTRATION PCT | .37 | .66 | 1.52 | .33 |
| NOX CONCENTRATION PPM | 7.9 | 18.7 | 82.7 | 9.2 |
| HC MASS GRAMS | 36.2 | 20.70 | 8.82 | 3.94 |
| CO MASS GRAMS | 349.06 | 288.47 | 385.06 | 113.23 |
| CO2 MASS GRAMS | 1183.0 | 2382.6 | 5627.8 | 1077.8 |
| NOX MASS GRAMS | 3.72 | 9.88 | 44.41 | 4.32 |
| FUEL KG (LB) | .582 ( 1.28) | .915 ( 2.02) | 1.974 ( 4.35) | .400 ( .88) |
| KW HR (HP HR) | .90 ( 1.21) | 1.75 ( 2.35) | 5.30 ( 7.11) | .78 ( 1.05) |
| BSHC G/KW HR (G/HP HR) | 40.35 ( 30.09) | 11.81 ( 8.80) | 1.66 ( 1.24) | 5.03 ( 3.75) |
| BSCO G/KW HR (G/HP HR) | 388.09 ( 289.40) | 164.56 ( 122.71) | 72.65 ( 54.18) | 144.29 ( 107.60) |
| BSCO2 G/KW HR (G/HP HR) | 1315.30 ( 980.82) | 1359.17 (1013.53) | 1061.80 ( 791.78) | 1373.52 (1024.24) |
| BSNOX G/KW HR (G/HP HR) | 4.13 ( 3.08) | 5.64 ( 4.20) | 8.38 ( 6.25) | 5.51 ( 4.11) |
| BSFC KG/KW HR (LB/HP HR) | .647 ( 1.064) | .522 ( .858) | .372 ( .612) | .509 ( .838) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.74 ( 11.72) |
| BSHC G/KW HR (G/HP HR) | 7.48 ( 5.95) |
| BSCO G/KW HR (G/HP HR) | 130.00 ( 96.99) |
| BSCO2 G/KW HR (G/HP HR) | 1176 ( 877) |
| BSNOX G/KW HR (G/HP HR) | 7.13 ( 5.32) |
| BSFC KG/KW HR (LB/HP HR) | .993 ( .728) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE F-6B (CONT'D). TEST 1-9 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.IH404
ENGINE MODEL 79
ENGINE 6.6 L(404 CID) V-8
CVS NO. 9

TEST NO. 1-9 RUN
DATE 9/12/78
TIME 02:41 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 2

BAROMETER 734.06 MM HG(28.90 IN HG)
DRY BULB TEMP. 28.3 DEG C(83.0 DEG F)

RELATIVE HUMIDITY 75 PCT
ABSOLUTE HUMIDITY 18.8 GM/KG(131.7 GRAINS/LB) — NOX HUMIDITY C.F. 1.3636

BAG RESULTS

| BAG NUMBER | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 55.0 (131.0) | 57.2 (135.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7168 | 8087 | 8316 | 7163 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 176.5 ( 6235) | 198.4 ( 7008) | 200.9 ( 7096) | 176.2 ( 6222) |
| HC SAMPLE METER/RANGE/PPM | 76.3/ 2/ 76 | 82.7/ 2/ 83 | 76.4/ 2/ 76 | 48.8/ 2/ 49 |
| HC BCKGRD METER/RANGE/PPM | 9.1/ 2/ 9 | 8.1/ 2/ 8 | 7.1/ 2/ 7 | 7.9/ 2/ 8 |
| CO SAMPLE METER/RANGE/PPM | 20.1/ 3/ 598 | 30.4/ 3/ 898 | 55.3/ 3/ 1628 | 20.6/ 3/ 612 |
| CO BCKGRD METER/RANGE/PPM | .7/ 3/ 21 | .8/ 3/ 24 | .9/ 3/ 28 | .8/ 3/ 24 |
| CO2 SAMPLE METER/RANGE/PCT | 23.3/ 3/ .38 | 37.3/ 3/ .63 | 84.0/ 3/ 1.55 | 23.9/ 3/ .39 |
| CO2 BCKGRD METER/RANGE/PCT | 3.5/ 3/ .05 | 3.5/ 3/ .05 | 3.3/ 3/ .05 | 3.4/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 10.6/ 2/ 11 | 20.1/ 2/ 20 | 89.5/ 2/ 89 | 10.2/ 2/ 10 |
| NOX BCKGRD METER/RANGE/PPM | .6/ 2/ 1 | .6/ 2/ 1 | .6/ 2/ 1 | .8/ 2/ 1 |
| DILUTION FACTOR | 30.10 | 18.54 | 7.84 | 29.50 |
| HC CONCENTRATION PPM | 68 | 75 | 70 | 41 |
| CO CONCENTRATION PPM | 559 | 843 | 1517 | 570 |
| CO2 CONCENTRATION PCT | .33 | .58 | 1.50 | .34 |
| NOX CONCENTRATION PPM | 10.0 | 14.5 | 89.0 | 9.4 |
| HC MASS GRAMS | 6.87 | 8.59 | 8.13 | 4.18 |
| CO MASS GRAMS | 114.87 | 194.82 | 354.94 | 116.94 |
| CO2 MASS GRAMS | 1059.7 | 2097.2 | 5534.5 | 1096.0 |
| NOX MASS GRAMS | 4.61 | 10.11 | 46.63 | 4.33 |
| FUEL KG (LB) | .398 ( .88) | .766 ( 1.69) | 1.929 ( 4.25) | .408 ( .90) |
| KW HR (HP HR) | .77 ( 1.03) | 1.70 ( 2.28) | 5.30 ( 7.11) | .78 ( 1.05) |
| BSHC G/KW HR (G/HP HR) | 8.91 ( 6.65) | 5.06 ( 3.77) | 1.53 ( 1.14) | 5.36 ( 4.00) |
| BSCO G/KW HR (G/HP HR) | 149.01 ( 111.11) | 114.74 ( 85.56) | 66.91 ( 49.89) | 149.90 ( 111.78) |
| BSCO2 G/KW HR (G/HP HR) | 1374.55 (1025.00) | 1235.15 ( 921.05) | 1043.30 ( 777.99) | 1404.95 (1047.67) |
| BSNOX G/KW HR (G/HP HR) | 5.98 ( 4.46) | 5.95 ( 4.44) | 8.79 ( 6.55) | 5.55 ( 4.14) |
| BSFC KG/KW HR (LB/HP HR) | .516 ( .848) | .451 ( .742) | .364 ( .598) | .523 ( .859) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.55 ( 11.47) |
| BSHC G/KW HR (G/HP HR) | 3.25 ( 2.42) |
| BSCO G/KW HR (G/HP HR) | 91.37 ( 68.14) |
| BSCO2 G/KW HR (G/HP HR) | 1144 ( 853) |
| BSNOX G/KW HR (G/HP HR) | 7.68 ( 5.73) |
| BSFC KG/KW HR (LB/HP HR) | .409 ( .673) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE F-7A. TEST 6-3 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.IH404
ENGINE MODEL 79 IH 404
ENGINE 6.6 L(404 CID) V-8
CVS NO. 9

TEST NO. 6-3 RUN
DATE 1/ 4/79
TIME 09:40
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 753.11 MM HG(29.65 IN HG)
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)

RELATIVE HUMIDITY 20 PCT
ABSOLUTE HUMIDITY 4.0 GM/KG( 27.8 GRAINS/LB)

NOX HUMIDITY C.F. .8184

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7169 | 8089 | 8317 | 7191 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 273.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 185.3 ( 6544) | 208.7 ( 7371) | 212.9 ( 7521) | 185.7 ( 6558) |
| HC SAMPLE METER/RANGE/PPM | 25.7/ 3/ 257 | 24.2/ 3/ 242 | 12.6/ 3/ 126 | 85.3/ 2/ 85 |
| HC BCKGRD METER/RANGE/PPM | 1.7/ 3/ 17 | 1.5/ 3/ 15 | 1.5/ 3/ 15 | 12.8/ 2/ 13 |
| CO SAMPLE METER/RANGE/PPM | 39.4/ 3/ 1161 | 45.3/ 3/ 1334 | 73.6/ 3/ 2165 | 17.1/ 3/ 510 |
| CO BCKGRD METER/RANGE/PPM | .7/ 3/ 21 | .6/ 3/ 18 | .8/ 3/ 24 | .6/ 3/ 18 |
| CO2 SAMPLE METER/RANGE/PCT | 24.4/ 3/ .40 | 35.3/ 3/ .59 | 79.5/ 3/ 1.45 | 21.4/ 3/ .35 |
| CO2 BCKGRD METER/RANGE/PCT | 3.4/ 3/ .05 | 3.3/ 3/ .05 | 3.3/ 3/ .05 | 3.5/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 10.2/ 2/ 10 | 33.7/ 2/ 34 | 47.5/ 3/ 142 | 20.0/ 2/ 20 |
| NOX BCKGRD METER/RANGE/PPM | .5/ 2/ 1 | .5/ 2/ 1 | .1/ 3/ 0 | .5/ 2/ 1 |
| DILUTION FACTOR | 24.86 | 17.94 | 8.01 | 33.02 |
| HC CONCENTRATION PPM | 241 | 228 | 113 | 73 |
| CO CONCENTRATION PPM | 1124 | 1293 | 2069 | 486 |
| CO2 CONCENTRATION PCT | .35 | .54 | 1.41 | .29 |
| NOX CONCENTRATION PPM | 9.7 | 33.2 | 142.2 | 19.5 |
| HC MASS GRAMS | 25.72 | 27.42 | 13.86 | 7.81 |
| CO MASS GRAMS | 242.57 | 314.24 | 513.06 | 104.99 |
| CO2 MASS GRAMS | 1183.1 | 2079.0 | 5485.2 | 1002.8 |
| NOX MASS GRAMS | 2.82 | 10.86 | 47.42 | 5.67 |
| FUEL KG (LB) | .519 ( 1.14) | .838 ( 1.85) | 1.997 ( 4.40) | .376 ( .83) |
| KW HR (HP HR) | .82 ( 1.09) | 1.78 ( 2.39) | 5.77 ( 7.74) | .75 ( 1.00) |
| BSHC G/KW HR (G/HP HR) | 31.51 ( 23.50) | 15.41 ( 11.49) | 2.40 ( 1.79) | 10.45 ( 7.79) |
| BSCO G/KW HR (G/HP HR) | 297.18 ( 221.61) | 176.53 ( 131.64) | 88.93 ( 66.32) | 140.53 ( 104.79) |
| BSCO2 G/KW HR (G/HP HR) | 1449.47 (1080.87) | 1167.94 ( 870.93) | 950.78 ( 709.00) | 1342.34 (1000.99) |
| BSNOX G/KW HR (G/HP HR) | 3.45 ( 2.58) | 6.10 ( 4.55) | 8.22 ( 6.13) | 7.59 ( 5.66) |
| BSFC KG/KW HR (LB/HP HR) | .636 ( 1.045) | .471 ( .774) | .346 ( .569) | .503 ( .827) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 9.11 ( 12.22) |
| BSHC G/KW HR (G/HP HR) | 8.21 ( 6.12) |
| BSCO G/KW HR (G/HP HR) | 128.93 ( 96.14) |
| BSCO2 G/KW HR (G/HP HR) | 1070 ( 798) |
| BSNOX G/KW HR (G/HP HR) | 7.33 ( 5.46) |
| BSFC KG/KW HR (LB/HP HR) | .409 ( .673) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE F-7A (CONT'D). TEST 6-3 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.IH404
ENGINE MODEL 79 IH 404
ENGINE 6.6 L(404 CID) V-8
CVS NO. 9

TEST NO. 6-3 RUN
DATE 1/ 4/79
TIME 09:40 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 2

BAROMETER 753.11 MM HG(29.65 IN HG)
DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)

RELATIVE HUMIDITY 23 PCT
ABSOLUTE HUMIDITY 9.7 GM/KG( 33.0 GRAINS/LB) — NOX HUMIDITY C.F. .8353

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H20(IN. H20) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H20(IN. H20) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7166 | 8086 | 8315 | 7164 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 185.2 ( 6541) | 208.6 ( 7368) | 212.9 ( 7519) | 185.0 ( 6533) |
| HC SAMPLE METER/RANGE/PPM | 12.4/ 3/ 124 | 14.3/ 3/ 143 | 87.2/ 2/ 87 | 82.5/ 2/ 83 |
| HC BCKGRD METER/RANGE/PPM | 1.2/ 3/ 12 | 1.4/ 3/ 14 | 9.9/ 2/ 10 | 10.1/ 2/ 10 |
| CO SAMPLE METER/RANGE/PPM | 23.1/ 3/ 685 | 31.7/ 3/ 936 | 58.3/ 3/ 1717 | 17.4/ 3/ 519 |
| CO BCKGRD METER/RANGE/PPM | 1.0/ 3/ 31 | .8/ 3/ 24 | .7/ 3/ 21 | 1.4/ 3/ 43 |
| CO2 SAMPLE METER/RANGE/PCT | 20.9/ 3/ .34 | 34.3/ 3/ .57 | 80.0/ 3/ 1.46 | 21.8/ 3/ .35 |
| CO2 BCKGRD METER/RANGE/PCT | 3.4/ 3/ .05 | 3.5/ 3/ .05 | 3.6/ 3/ .06 | 3.6/ 3/ .06 |
| NOX SAMPLE METER/RANGE/PPM | 15.3/ 2/ 15 | 36.3/ 2/ 36 | 51.0/ 3/ 153 | 19.6/ 2/ 20 |
| NOX BCKGRD METER/RANGE/PPM | .5/ 2/ 1 | .5/ 2/ 1 | .4/ 3/ 1 | .6/ 2/ 1 |
| DILUTION FACTOR | 32.03 | 19.71 | 8.19 | 32.43 |
| HC CONCENTRATION PPM | 112 | 130 | 79 | 73 |
| CO CONCENTRATION PPM | 646 | 896 | 1637 | 470 |
| CO2 CONCENTRATION PCT | .29 | .52 | 1.41 | .30 |
| NOX CONCENTRATION PPM | 14.8 | 35.8 | 151.9 | 19.0 |
| HC MASS GRAMS | 12.00 | 15.61 | 9.69 | 7.76 |
| CO MASS GRAMS | 139.41 | 217.62 | 405.83 | 101.29 |
| CO2 MASS GRAMS | 976.5 | 1997.2 | 5509.1 | 1017.3 |
| NOX MASS GRAMS | 4.38 | 11.94 | 51.68 | 5.62 |
| FUEL KG (LB) | .389 ( .86) | .753 ( 1.66) | 1.947 ( 4.29) | .379 ( .83) |
| KW HR (HP HR) | .72 ( .96) | 1.72 ( 2.31) | 5.78 ( 7.76) | .73 ( .98) |
| BSHC G/KW HR (G/HP HR) | 16.68 ( 12.44) | 9.05 ( 6.75) | 1.67 ( 1.24) | 10.58 ( 7.89) |
| BSCO G/KW HR (G/HP HR) | 193.78 ( 144.50) | 126.18 ( 94.09) | 70.18 ( 52.33) | 138.14 ( 103.01) |
| BSCO2 G/KW HR (G/HP HR) | 1357.36 (1012.18) | 1157.98 ( 863.51) | 952.64 ( 710.38) | 1387.42 (1034.60) |
| BSNOX G/KW HR (G/HP HR) | 6.09 ( 4.54) | 6.92 ( 5.16) | 8.94 ( 6.66) | 7.67 ( 5.72) |
| BSFC KG/KW HR (LB/HP HR) | .541 ( .889) | .437 ( .718) | .337 ( .554) | .516 ( .849) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.96 ( 12.02) |
| BSHC G/KW HR (G/HP HR) | 5.02 ( 3.75) |
| BSCO G/KW HR (G/HP HR) | 96.44 ( 71.92) |
| BSCO2 G/KW HR (G/HP HR) | 1060 ( 791) |
| BSNOX G/KW HR (G/HP HR) | 8.22 ( 6.13) |
| BSFC KG/KW HR (LB/HP HR) | .387 ( .636) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE F-7B. TEST 6-4 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.IH404
ENGINE MODEL 79 IH 404
ENGINE 6.6 L(404 CID) V-8
CVS NO. 9

TEST NO. 6-4 RUN
DATE 1/ 5/79
TIME 09:40 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 2

BAROMETER 749.30 MM HG(29.50 IN HG)
DRY BULB TEMP. 28.3 DEG C(83.0 DEG F)

RELATIVE HUMIDITY 27 PCT
ABSOLUTE HUMIDITY 6.5 GM/KG( 45.8 GRAINS/LB) — NOX HUMIDITY C.F. .8794

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7169 | 8091 | 8316 | 7164 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 184.3 ( 6509) | 207.6 ( 7333) | 211.8 ( 7480) | 184.0 ( 6498) |
| HC SAMPLE METER/RANGE/PPM | 21.7/ 3/ 217 | 32.5/ 3/ 325 | 17.6/ 3/ 176 | 9.9/ 3/ 99 |
| HC BCKGRD METER/RANGE/PPM | .8/ 3/ 8 | 1.1/ 3/ 11 | 1.4/ 3/ 14 | 1.3/ 3/ 13 |
| CO SAMPLE METER/RANGE/PPM | 37.9/ 3/ 1117 | 59.8/ 3/ 1761 | 79.0/ 3/ 2320 | 17.1/ 3/ 510 |
| CO BCKGRD METER/RANGE/PPM | .5/ 3/ 15 | .7/ 3/ 21 | 1.1/ 3/ 34 | 1.1/ 3/ 34 |
| CO2 SAMPLE METER/RANGE/PCT | 24.2/ 3/ .40 | 36.6/ 3/ .62 | 80.1/ 3/ 1.46 | 20.7/ 3/ .34 |
| CO2 BCKGRD METER/RANGE/PCT | 3.2/ 3/ .05 | 3.1/ 3/ .05 | 3.0/ 3/ .05 | 2.9/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 9.4/ 2/ 9 | 32.1/ 2/ 32 | 41.8/ 3/ 125 | 18.8/ 2/ 19 |
| NOX BCKGRD METER/RANGE/PPM | .5/ 2/ 1 | .5/ 2/ 1 | .3/ 3/ 1 | .7/ 2/ 1 |
| DILUTION FACTOR | 25.43 | 16.34 | 7.86 | 33.91 |
| HC CONCENTRATION PPM | 209 | 315 | 164 | 86 |
| CO CONCENTRATION PPM | 1085 | 1705 | 2206 | 470 |
| CO2 CONCENTRATION PCT | .35 | .57 | 1.42 | .29 |
| NOX CONCENTRATION PPM | 8.9 | 31.6 | 124.6 | 18.1 |
| HC MASS GRAMS | 22.25 | 37.68 | 20.00 | 9.17 |
| CO MASS GRAMS | 232.73 | 412.18 | 543.90 | 100.68 |
| CO2 MASS GRAMS | 1175.0 | 2169.9 | 5521.0 | 983.6 |
| NOX MASS GRAMS | 2.76 | 11.05 | 44.39 | 5.61 |
| FUEL KG (LB) | .508 ( 1.12) | .926 ( 2.04) | 2.030 ( 4.48) | .369 ( .81) |
| KW HR (HP HR) | .73 ( .98) | 1.79 ( 2.41) | 5.57 ( 7.47) | .71 ( .95) |
| BSHC G/KW HR (G/HP HR) | 30.34 ( 22.63) | 21.01 ( 15.66) | 3.59 ( 2.68) | 12.91 ( 9.62) |
| BSCO G/KW HR (G/HP HR) | 317.40 ( 236.68) | 229.76 ( 171.33) | 97.63 ( 72.80) | 141.76 ( 105.71) |
| BSCO2 G/KW HR (G/HP HR) | 1602.48 (1194.97) | 1209.59 ( 901.99) | 991.06 ( 739.03) | 1385.03 (1032.81) |
| BSNOX G/KW HR (G/HP HR) | 3.77 ( 2.81) | 6.16 ( 4.59) | 7.97 ( 5.94) | 7.90 ( 5.89) |
| BSFC KG/KW HR (LB/HP HR) | .693 ( 1.139) | .516 ( .849) | .364 ( .599) | .520 ( .854) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.81 ( 11.81) |
| BSHC G/KW HR (G/HP HR) | 10.12 ( 7.54) |
| BSCO G/KW HR (G/HP HR) | 146.40 (109.17) |
| BSCO2 G/KW HR (G/HP HR) | 1118 ( 834) |
| BSNOX G/KW HR (G/HP HR) | 7.24 ( 5.40) |
| BSFC KG/KW HR (LB/HP HR) | .435 ( .715) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE F-7B (CONT'D). TEST 6-4 EMISSIONS RESULTS

HOT TRANSIENT

PROJECT NO. 11-5044-001

ENGINE NO.IH404
ENGINE MODEL 79 IH 404
ENGINE 6.6 L(404 CID) V-8
CVS NO. 9

TEST NO. 6-4 RUN
DATE 1/ 5/79
TIME 09:40
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 749.30 MM HG(29.50 IN HG)
DRY BULB TEMP. 26.7 DEG C(80.0 DEG F)

RELATIVE HUMIDITY 30 PCT
ABSOLUTE HUMIDITY 6.5 GM/KG( 45.6 GRAINS/LB)

NOX HUMIDITY C.F. .8785

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7164 | 8084 | 8312 | 7160 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 184.1 ( 6504) | 207.4 ( 7327) | 211.7 ( 7476) | 183.9 ( 6494) |
| HC SAMPLE METER/RANGE/PPM | 14.1/ 3/ 141 | 15.0/ 3/ 150 | 10.3/ 3/ 103 | 84.6/ 2/ 85 |
| HC BCKGRD METER/RANGE/PPM | 1.2/ 3/ 12 | 1.1/ 3/ 11 | .9/ 3/ 9 | 7.2/ 2/ 7 |
| CO SAMPLE METER/RANGE/PPM | 24.3/ 3/ 720 | 31.5/ 3/ 930 | 55.3/ 3/ 1628 | 17.8/ 3/ 530 |
| CO BCKGRD METER/RANGE/PPM | .9/ 3/ 28 | 1.0/ 3/ 31 | 1.3/ 3/ 40 | 1.2/ 3/ 37 |
| CO2 SAMPLE METER/RANGE/PCT | 20.2/ 3/ .33 | 34.1/ 3/ .57 | 79.0/ 3/ 1.44 | 21.7/ 3/ .35 |
| CO2 BCKGRD METER/RANGE/PCT | 2.9/ 3/ .04 | 2.9/ 3/ .04 | 2.8/ 3/ .04 | 2.8/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 13.7/ 2/ 14 | 37.6/ 2/ 38 | 51.7/ 3/ 155 | 20.2/ 2/ 20 |
| NOX BCKGRD METER/RANGE/PPM | .6/ 2/ 1 | .5/ 2/ 1 | .2/ 3/ 1 | .5/ 2/ 1 |
| DILUTION FACTOR | 32.57 | 19.81 | 8.34 | 32.46 |
| HC CONCENTRATION PPM | 129 | 140 | 95 | 78 |
| CO CONCENTRATION PPM | 683 | 883 | 1533 | 487 |
| CO2 CONCENTRATION PCT | .28 | .53 | 1.40 | .31 |
| NOX CONCENTRATION PPM | 13.1 | 37.1 | 154.6 | 19.7 |
| HC MASS GRAMS | 13.74 | 16.70 | 11.61 | 8.23 |
| CO MASS GRAMS | 146.38 | 213.19 | 377.88 | 104.20 |
| CO2 MASS GRAMS | 955.9 | 2005.9 | 5436.5 | 1046.0 |
| NOX MASS GRAMS | 4.06 | 12.94 | 54.98 | 6.09 |
| FUEL KG (LB) | .388 ( .85) | .755 ( 1.66) | 1.913 ( 4.22) | .390 ( .86) |
| KW HR (HP HR) | .69 ( .93) | 1.66 ( 2.22) | 5.54 ( 7.43) | .71 ( .96) |
| BSHC G/KW HR (G/HP HR) | 19.86 ( 14.81) | 10.09 ( 7.52) | 2.09 ( 1.56) | 11.52 ( 8.59) |
| BSCO G/KW HR (G/HP HR) | 211.61 ( 157.79) | 128.77 ( 96.03) | 68.17 ( 50.84) | 145.78 ( 108.71) |
| BSCO2 G/KW HR (G/HP HR) | 1381.91 (1030.49) | 1211.60 ( 903.49) | 980.75 ( 731.35) | 1463.33 (1091.21) |
| BSNOX G/KW HR (G/HP HR) | 5.87 ( 4.38) | 7.82 ( 5.83) | 9.92 ( 7.40) | 8.52 ( 6.36) |
| BSFC KG/KW HR (LB/HP HR) | .560 ( .921) | .456 ( .749) | .345 ( .567) | .545 ( .896) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.61 ( 11.54) |
| BSHC G/KW HR (G/HP HR) | 5.84 ( 4.36) |
| BSCO G/KW HR (G/HP HR) | 97.81 ( 72.93) |
| BSCO2 G/KW HR (G/HP HR) | 1097 ( 818) |
| BSNOX G/KW HR (G/HP HR) | 9.07 ( 6.77) |
| BSFC KG/KW HR (LB/HP HR) | .900 ( .658) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE F-8A. TEST 7-2 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.CH454
ENGINE MODEL 79 CHEV 454
ENGINE 7.4 L(454 CID) V-8
CVS NO. 9

TEST NO. 7-2 RUN
DATE 1/31/79
TIME 08:46 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 2

BAROMETER 751.08 MM HG(29.57 IN HG)
DRY BULB TEMP. 27.8 DEG C(82.0 DEG F)

RELATIVE HUMIDITY 15 PCT
ABSOLUTE HUMIDITY 3.5 GM/KG( 24.8 GRAINS/LB) — NOX HUMIDITY C.F. .8091

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7143 | 8089 | 8314 | 7164 |
| TIME SECONDS | 271.1 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 184.1 ( 6501) | 208.1 ( 7350) | 212.4 ( 7501) | 184.4 ( 6514) |
| HC SAMPLE METER/RANGE/PPM | 25.0/ 3/ 250 | 19.0/ 3/ 190 | 8.0/ 3/ 80 | 4.2/ 3/ 42 |
| HC BCKGRD METER/RANGE/PPM | .3/ 3/ 3 | .6/ 3/ 6 | .6/ 3/ 6 | .7/ 3/ 7 |
| CO SAMPLE METER/RANGE/PPM | 28.2/ 3/ 834 | 31.0/ 3/ 916 | 41.6/ 3/ 1226 | 21.1/ 3/ 627 |
| CO BCKGRD METER/RANGE/PPM | .6/ 3/ 18 | 1.4/ 3/ 43 | 1.1/ 3/ 34 | 1.5/ 3/ 46 |
| CO2 SAMPLE METER/RANGE/PCT | 22.8/ 3/ .37 | 40.0/ 3/ .68 | 82.7/ 3/ 1.52 | 23.2/ 3/ .38 |
| CO2 BCKGRD METER/RANGE/PCT | 2.6/ 3/ .04 | 2.4/ 3/ .04 | 1.7/ 3/ .03 | 2.3/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 9.4/ 2/ 9 | 56.3/ 2/ 56 | 65.5/ 3/ 196 | 7.4/ 3/ 22 |
| NOX BCKGRD METER/RANGE/PPM | .1/ 2/ 0 | .1/ 2/ 0 | .3/ 3/ 1 | .4/ 3/ 1 |
| DILUTION FACTOR | 28.01 | 17.05 | 8.14 | 30.17 |
| HC CONCENTRATION PPM | 247 | 184 | 75 | 35 |
| CO CONCENTRATION PPM | 806 | 859 | 1154 | 575 |
| CO2 CONCENTRATION PCT | .33 | .64 | 1.50 | .34 |
| NOX CONCENTRATION PPM | 9.3 | 56.2 | 195.7 | 21.0 |
| HC MASS GRAMS | 26.23 | 22.13 | 9.16 | 3.75 |
| CO MASS GRAMS | 172.87 | 208.24 | 285.52 | 123.57 |
| CO2 MASS GRAMS | 1121.6 | 2449.1 | 5823.3 | 1162.0 |
| NOX MASS GRAMS | 2.65 | 18.10 | 64.33 | 6.01 |
| FUEL KG (LB) | .465 ( 1.03) | .897 ( 1.98) | 1.986 ( 4.38) | .431 ( .95) |
| KW HR (HP HR) | .50 ( .67) | 2.04 ( 2.73) | 6.60 ( 8.85) | .72 ( .97) |
| BSHC G/KW HR (G/HP HR) | 52.16 ( 38.90) | 10.85 ( 8.09) | 1.39 ( 1.03) | 5.19 ( 3.87) |
| BSCO G/KW HR (G/HP HR) | 343.73 ( 256.32) | 102.12 ( 76.15) | 43.28 ( 32.27) | 171.06 ( 127.56) |
| BSCO2 G/KW HR (G/HP HR) | 2230.21 (1663.06) | 1201.03 ( 895.61) | 882.65 ( 658.20) | 1608.52 (1199.47) |
| BSNOX G/KW HR (G/HP HR) | 5.27 ( 3.93) | 8.88 ( 6.62) | 9.75 ( 7.27) | 8.31 ( 6.20) |
| BSFC KG/KW HR (LB/HP HR) | .925 ( 1.521) | .440 ( .723) | .301 ( .495) | .597 ( .981) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 9.86 ( 13.23) |
| BSHC G/KW HR (G/HP HR) | 6.21 ( 4.63) |
| BSCO G/KW HR (G/HP HR) | 80.13 ( 59.75) |
| BSCO2 G/KW HR (G/HP HR) | 1070 ( 798) |
| BSNOX G/KW HR (G/HP HR) | 9.24 ( 6.89) |
| BSFC KG/KW HR (LB/HP HR) | .383 ( .630) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW . | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE F-8A (CONT'D). TEST 7-2 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.CH454
ENGINE MODEL 79 CHEV 454
ENGINE 7.4 L(454 CID) V-8
CVS NO. 9

TEST NO. 7-2 RUN
DATE 1/31/79
TIME 09:25
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 751.08 MM HG(29.57 IN HG)
DRY BULB TEMP. 26.1 DEG C(79.0 DEG F)

RELATIVE HUMIDITY 15 PCT
ABSOLUTE HUMIDITY 3.2 GM/KG( 22.3 GRAINS/LB)

NOX HUMIDITY C.F. .8015

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7167 | 8087 | 8319 | 7164 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 184.7 ( 6523) | 208.0 ( 7348) | 212.4 ( 7501) | 184.4 ( 6514) |
| HC SAMPLE METER/RANGE/PPM | 78.4/ 2/ 78 | 85.0/ 2/ 85 | 65.9/ 2/ 66 | 47.5/ 2/ 48 |
| HC BCKGRD METER/RANGE/PPM | 4.1/ 2/ 4 | 6.0/ 2/ 6 | 7.2/ 2/ 7 | 6.0/ 2/ 6 |
| CO SAMPLE METER/RANGE/PPM | 23.5/ 3/ 697 | 24.1/ 3/ 715 | 41.0/ 3/ 1208 | 20.0/ 3/ 595 |
| CO BCKGRD METER/RANGE/PPM | 1.1/ 3/ 34 | .4/ 3/ 12 | .6/ 3/ 18 | .4/ 3/ 12 |
| CO2 SAMPLE METER/RANGE/PCT | 26.0/ 3/ .43 | 39.9/ 3/ .68 | 88.4/ 3/ 1.65 | 25.6/ 3/ .42 |
| CO2 BCKGRD METER/RANGE/PCT | 2.0/ 3/ .03 | 2.3/ 3/ .04 | 1.6/ 3/ .02 | 1.7/ 3/ .03 |
| NOX SAMPLE METER/RANGE/PPM | 8.4/ 3/ 25 | 18.1/ 3/ 54 | 64.9/ 3/ 195 | 7.3/ 3/ 22 |
| NOX BCKGRD METER/RANGE/PPM | .1/ 3/ 0 | .1/ 3/ 0 | .2/ 3/ 1 | .3/ 3/ 1 |
| DILUTION FACTOR | 26.63 | 17.77 | 7.57 | 27.74 |
| HC CONCENTRATION PPM | 74 | 79 | 60 | 42 |
| CO CONCENTRATION PPM | 656 | 690 | 1148 | 575 |
| CO2 CONCENTRATION PCT | .40 | .64 | 1.63 | .39 |
| NOX CONCENTRATION PPM | 24.9 | 54.0 | 194.2 | 21.0 |
| HC MASS GRAMS | 7.93 | 9.52 | 7.31 | 4.44 |
| CO MASS GRAMS | 141.04 | 167.23 | 283.93 | 123.59 |
| CO2 MASS GRAMS | 1343.6 | 2446.7 | 6323.3 | 1333.0 |
| NOX MASS GRAMS | 7.05 | 17.23 | 63.23 | 5.95 |
| FUEL KG (LB) | .501 ( 1.11) | .864 ( 1.90) | 2.141 ( 4.72) | .486 ( 1.07) |
| KW HR (HP HR) | .89 ( 1.19) | 2.05 ( 2.75) | 6.62 ( 8.88) | .89 ( 1.20) |
| BSHC G/KW HR (G/HP HR) | 8.94 ( 6.67) | 4.65 ( 3.47) | 1.10 ( .82) | 4.98 ( 3.71) |
| BSCO G/KW HR (G/HP HR) | 159.01 ( 118.57) | 81.65 ( 60.88) | 42.89 ( 31.98) | 138.62 ( 103.37) |
| BSCO2 G/KW HR (G/HP HR) | 1514.76 (1129.56) | 1194.50 ( 890.74) | 955.13 ( 712.24) | 1495.18 (1114.95) |
| BSNOX G/KW HR (G/HP HR) | 7.95 ( 5.93) | 8.41 ( 6.27) | 9.55 ( 7.12) | 6.67 ( 4.97) |
| BSFC KG/KW HR (LB/HP HR) | .565 ( .929) | .422 ( .693) | .323 ( .532) | .545 ( .896) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 10.45 ( 14.01) |
| BSHC G/KW HR (G/HP HR) | 2.79 ( 2.08) |
| BSCO G/KW HR (G/HP HR) | 68.52 ( 51.09) |
| BSCO2 G/KW HR (G/HP HR) | 1096 ( 817) |
| BSNOX G/KW HR (G/HP HR) | 8.95 ( 6.67) |
| BSFC KG/KW HR (LB/HP HR) | .382 ( .628) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE F-8B. TEST 7-3 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.CH454
ENGINE MODEL 79 CHEV 454
ENGINE 7.4 L(454 CID) V-8
CVS NO. 9

TEST NO. 7-3 RUN
DATE 2/ 1/79
TIME 08:45 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 2

BAROMETER 748.54 MM HG(29.47 IN HG)
DRY BULB TEMP. 27.2 DEG C(81.0 DEG F)

RELATIVE HUMIDITY 15 PCT
ABSOLUTE HUMIDITY 3.4 GM/KG( 23.8 GRAINS/LB) — NOX HUMIDITY C.F. .8059

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7168 | 8089 | 8319 | 7165 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 184.1 ( 6501) | 207.3 ( 7323) | 211.6 ( 7474) | 183.8 ( 6492) |
| HC SAMPLE METER/RANGE/PPM | 41.4/ 3/ 414 | 18.5/ 3/ 185 | 7.6/ 3/ 76 | 45.8/ 2/ 46 |
| HC BCKGRD METER/RANGE/PPM | .6/ 3/ 6 | 1.1/ 3/ 11 | .9/ 3/ 9 | 5.3/ 2/ 5 |
| CO SAMPLE METER/RANGE/PPM | 32.3/ 3/ 954 | 30.0/ 3/ 887 | 37.9/ 3/ 1117 | 19.2/ 3/ 571 |
| CO BCKGRD METER/RANGE/PPM | .8/ 3/ 24 | .5/ 3/ 15 | .5/ 3/ 15 | .9/ 3/ 28 |
| CO2 SAMPLE METER/RANGE/PCT | 24.1/ 3/ .39 | 41.2/ 3/ .70 | 85.9/ 3/ 1.59 | 26.9/ 3/ .44 |
| CO2 BCKGRD METER/RANGE/PCT | 3.5/ 3/ .05 | 2.6/ 3/ .04 | 3.4/ 3/ .05 | 2.8/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 13.1/ 2/ 13 | 53.8/ 2/ 54 | 64.7/ 3/ 194 | 19.2/ 2/ 19 |
| NOX BCKGRD METER/RANGE/PPM | .6/ 2/ 1 | .5/ 2/ 1 | .2/ 3/ 1 | .4/ 2/ 0 |
| DILUTION FACTOR | 25.32 | 16.65 | 7.86 | 26.62 |
| HC CONCENTRATION PPM | 408 | 175 | 68 | 41 |
| CO CONCENTRATION PPM | 919 | 856 | 1064 | 537 |
| CO2 CONCENTRATION PCT | .34 | .66 | 1.55 | .40 |
| NOX CONCENTRATION PPM | 12.5 | 53.3 | 193.6 | 18.8 |
| HC MASS GRAMS | 43.34 | 20.89 | 8.32 | 4.31 |
| CO MASS GRAMS | 196.87 | 206.71 | 262.31 | 115.05 |
| CO2 MASS GRAMS | 1152.7 | 2513.0 | 5987.8 | 1350.2 |
| NOX MASS GRAMS | 3.55 | 17.05 | 63.15 | 5.33 |
| FUEL KG (LB) | .504 ( 1.11) | .916 ( 2.02) | 2.026 ( 4.47) | .487 ( 1.07) |
| KW HR (HP HR) | .62 ( .83) | 2.08 ( 2.79) | 6.68 ( 8.96) | .91 ( 1.23) |
| BSHC G/KW HR (G/HP HR) | 70.21 ( 52.36) | 10.04 ( 7.49) | 1.24 ( .93) | 4.72 ( 3.52) |
| BSCO G/KW HR (G/HP HR) | 318.96 ( 237.85) | 99.37 ( 74.10) | 39.24 ( 29.26) | 125.82 ( 93.82) |
| BSCO2 G/KW HR (G/HP HR) | 1867.56 (1392.64) | 1208.03 ( 900.83) | 895.79 ( 667.99) | 1476.63 (1101.12) |
| BSNOX G/KW HR (G/HP HR) | 5.76 ( 4.29) | 8.19 ( 6.11) | 9.45 ( 7.05) | 5.83 ( 4.35) |
| BSFC KG/KW HR (LB/HP HR) | .817 ( 1.343) | .440 ( .723) | .303 ( .498) | .533 ( .875) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 10.30 ( 13.81) |
| BSHC G/KW HR (G/HP HR) | 7.46 ( 5.57) |
| BSCO G/KW HR (G/HP HR) | 75.85 ( 56.56) |
| BSCO2 G/KW HR (G/HP HR) | 1069 ( 797) |
| BSNOX G/KW HR (G/HP HR) | 8.65 ( 6.45) |
| BSFC KG/KW HR (LB/HP HR) | .382 ( .628) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE F-8B (CONT'D). TEST 7-3 EMISSIONS RESULTS

HOT TRANSIENT

PROJECT NO. 11-5044-001

ENGINE NO.CH454
ENGINE MODEL 79 CHEV 454
ENGINE 7.4 L(454 CID) V-8
CVS NO. 9

TEST NO. 7-3 RUN
DATE 2/ 1/79
TIME 09:24
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 748.54 MM HG(29.47 IN HG)
DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)

RELATIVE HUMIDITY 15 PCT
ABSOLUTE HUMIDITY 3.1 GM/KG( 21.5 GRAINS/LB)

NOX HUMIDITY C.F. .7991

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7168 | 8089 | 8320 | 7166 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 184.1 ( 6501) | 207.3 ( 7323) | 211.6 ( 7475) | 183.8 ( 6493) |
| HC SAMPLE METER/RANGE/PPM | 83.1/ 2/ 83 | 80.4/ 2/ 80 | 64.2/ 2/ 64 | 48.4/ 2/ 48 |
| HC BCKGRD METER/RANGE/PPM | 6.0/ 2/ 6 | 7.0/ 2/ 7 | 6.8/ 2/ 7 | 7.3/ 2/ 7 |
| CO SAMPLE METER/RANGE/PPM | 24.5/ 3/ 726 | 25.2/ 3/ 747 | 36.7/ 3/ 1082 | 20.4/ 3/ 607 |
| CO BCKGRD METER/RANGE/PPM | .6/ 3/ 18 | .4/ 3/ 12 | 1.0/ 3/ 31 | 1.2/ 3/ 37 |
| CO2 SAMPLE METER/RANGE/PCT | 24.9/ 3/ .41 | 39.8/ 3/ .67 | 84.8/ 3/ 1.57 | 27.5/ 3/ .45 |
| CO2 BCKGRD METER/RANGE/PCT | 3.0/ 3/ .05 | 3.1/ 3/ .05 | 3.3/ 3/ .05 | 3.5/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 20.6/ 2/ 21 | 46.0/ 2/ 46 | 66.4/ 3/ 149 | 18.9/ 2/ 19 |
| NOX BCKGRD METER/RANGE/PPM | .5/ 2/ 1 | .6/ 2/ 1 | .3/ 3/ 1 | .5/ 2/ 1 |
| DILUTION FACTOR | 27.49 | 17.75 | 7.99 | 25.89 |
| HC CONCENTRATION PPM | 77 | 74 | 58 | 41 |
| CO CONCENTRATION PPM | 699 | 722 | 1018 | 563 |
| CO2 CONCENTRATION PCT | .36 | .63 | 1.52 | .40 |
| NOX CONCENTRATION PPM | 20.1 | 45.4 | 198.4 | 18.4 |
| HC MASS GRAMS | 8.21 | 8.83 | 7.11 | 4.39 |
| CO MASS GRAMS | 149.91 | 174.30 | 250.84 | 120.58 |
| CO2 MASS GRAMS | 1224.1 | 2387.3 | 5898.5 | 1350.9 |
| NOX MASS GRAMS | 5.66 | 14.40 | 64.19 | 5.18 |
| FUEL KG (LB) | .468 ( 1.03) | .848 ( 1.87) | 1.991 ( 4.39) | .490 ( 1.08) |
| KW HR (HP HR) | .92 ( 1.23) | 2.11 ( 2.83) | 6.71 ( 9.00) | .92 ( 1.23) |
| BSHC G/KW HR (G/HP HR) | 8.93 ( 6.66) | 4.18 ( 3.12) | 1.06 ( .79) | 4.77 ( 3.56) |
| BSCO G/KW HR (G/HP HR) | 163.13 ( 121.65) | 82.52 ( 61.53) | 37.37 ( 27.87) | 131.21 ( 97.85) |
| BSCO2 G/KW HR (G/HP HR) | 1332.06 ( 993.32) | 1130.22 ( 842.81) | 878.83 ( 655.35) | 1470.03 (1096.20) |
| BSNOX G/KW HR (G/HP HR) | 6.16 ( 4.59) | 6.82 ( 5.08) | 9.56 ( 7.13) | 5.63 ( 4.20) |
| BSFC KG/KW HR (LB/HP HR) | .510 ( .838) | .401 ( .660) | .297 ( .488) | .533 ( .877) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 10.66 ( 14.30) |
| BSHC G/KW HR (G/HP HR) | 2.68 ( 2.00) |
| BSCO G/KW HR (G/HP HR) | 65.24 ( 48.65) |
| BSCO2 G/KW HR (G/HP HR) | 1019 ( 760) |
| BSNOX G/KW HR (G/HP HR) | 8.39 ( 6.25) |
| BSFC KG/KW HR (LB/HP HR) | .356 ( .585) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE F-9A. TEST 8-4 EMISSIONS RESULTS

COLD TRANSIENT

PROJECT NO. 11-5044-001

ENGINE NO.IH404
ENGINE MODEL 79 IH 404
ENGINE 6.6 L(404 CID) V-8
CVS NO. 9

TEST NO. 8-4 RUN
DATE 2/16/79
TIME 09:54
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 747.52 MM HG(29.43 IN HG)
DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)

RELATIVE HUMIDITY 18 PCT
ABSOLUTE HUMIDITY 3.5 GM/KG( 24.5 GRAINS/LB)

NOX HUMIDITY C.F. .8082

BAG RESULTS

| BAG NUMBER | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7167 | 8086 | 8314 | 7163 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 183.8 ( 6491) | 207.0 ( 7310) | 211.2 ( 7459) | 183.5 ( 6481) |
| HC SAMPLE METER/RANGE/PPM | 58.0/ 3/ 580 | 50.0/ 3/ 500 | 25.0/ 3/ 250 | 46.6/ 2/ 47 |
| HC BCKGRD METER/RANGE/PPM | 1.0/ 3/ 10 | 1.0/ 3/ 10 | 1.1/ 3/ 11 | 10.2/ 2/ 10 |
| CO SAMPLE METER/RANGE/PPM | 46.0/ 3/ 1355 | 51.8/ 3/ 1525 | 56.2/ 3/ 1655 | 12.4/ 3/ 372 |
| CO BCKGRD METER/RANGE/PPM | .3/ 3/ 9 | .1/ 3/ 3 | .1/ 3/ 3 | 1.2/ 3/ 37 |
| CO2 SAMPLE METER/RANGE/PCT | 23.0/ 3/ .37 | 34.5/ 3/ .58 | 78.2/ 3/ 1.42 | 21.3/ 3/ .35 |
| CO2 BCKGRD METER/RANGE/PCT | 3.3/ 3/ .05 | 3.5/ 3/ .05 | 3.6/ 3/ .06 | 4.0/ 3/ .06 |
| NOX SAMPLE METER/RANGE/PPM | 8.6/ 2/ 9 | 24.8/ 2/ 25 | 41.2/ 3/ 124 | 14.2/ 2/ 14 |
| NOX BCKGRD METER/RANGE/PPM | .5/ 2/ 1 | .8/ 2/ 1 | 1.5/ 2/ 2 | 1.6/ 2/ 2 |
| DILUTION FACTOR | 23.67 | 17.24 | 8.33 | 34.66 |
| HC CONCENTRATION PPM | 570 | 491 | 240 | 37 |
| CO CONCENTRATION PPM | 1328 | 1497 | 1597 | 332 |
| CO2 CONCENTRATION PCT | .33 | .53 | 1.37 | .29 |
| NOX CONCENTRATION PPM | 8.1 | 24.0 | 122.3 | 12.6 |
| HC MASS GRAMS | 60.46 | 58.56 | 29.27 | 3.88 |
| CO MASS GRAMS | 284.25 | 360.69 | 392.78 | 70.89 |
| CO2 MASS GRAMS | 1097.4 | 1996.7 | 5316.1 | 959.7 |
| NOX MASS GRAMS | 2.31 | 7.69 | 39.92 | 3.59 |
| FUEL KG (LB) | .547 ( 1.21) | .867 ( 1.91) | 1.900 ( 4.19) | .342 ( .75) |
| KW HR (HP HR) | .77 ( 1.04) | 1.72 ( 2.30) | 5.43 ( 7.28) | .75 ( 1.01) |
| BSHC G/KW HR (G/HP HR) | 78.31 ( 58.40) | 34.11 ( 25.44) | 5.39 ( 4.02) | 5.15 ( 3.84) |
| BSCO G/KW HR (G/HP HR) | 368.17 ( 274.55) | 210.11 ( 156.68) | 72.38 ( 53.97) | 94.03 ( 70.12) |
| BSCO2 G/KW HR (G/HP HR) | 1421.39 (1059.93) | 1163.13 ( 867.35) | 979.58 ( 730.47) | 1273.05 ( 949.31) |
| BSNOX G/KW HR (G/HP HR) | 2.99 ( 2.23) | 4.48 ( 3.34) | 7.36 ( 5.49) | 4.76 ( 3.55) |
| BSFC KG/KW HR (LB/HP HR) | .709 ( 1.165) | .505 ( .830) | .350 ( .575) | .453 ( .745) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.67 ( 11.63) |
| BSHC G/KW HR (G/HP HR) | 17.55 ( 13.09) |
| BSCO G/KW HR (G/HP HR) | 127.87 ( 95.36) |
| BSCO2 G/KW HR (G/HP HR) | 1081 ( 806) |
| BSNOX G/KW HR (G/HP HR) | 6.17 ( 4.60) |
| BSFC KG/KW HR (LB/HP HR) | .422 ( .693) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE F-9A (CONT'D). TEST 8-4 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.IH404
ENGINE MODEL 79 IH 404
ENGINE 6.6 L(404 CID) V-8
CVS NO. 9

TEST NO. 8-4 RUN
DATE 2/16/79
TIME 10:34
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 747.52 MM HG(29.43 IN HG)
DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)

RELATIVE HUMIDITY 18 PCT
ABSOLUTE HUMIDITY 3.5 GM/KG( 24.4 GRAINS/LB) NOX HUMIDITY C.F. .8077

BAG RESULTS

| BAG NUMBER | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7165 | 8086 | 8314 | 7163 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 183.7 ( 6489) | 207.0 ( 7310) | 211.2 ( 7459) | 183.5 ( 6481) |
| HC SAMPLE METER/RANGE/PPM | 7.5/ 3/ 75 | 8.5/ 3/ 85 | 5.4/ 3/ 54 | 47.0/ 2/ 47 |
| HC BCKGRD METER/RANGE/PPM | .9/ 3/ 9 | 1.0/ 3/ 10 | 1.0/ 3/ 10 | 5.1/ 2/ 5 |
| CO SAMPLE METER/RANGE/PPM | 22.3/ 3/ 662 | 23.8/ 3/ 706 | 36.1/ 3/ 1065 | 12.9/ 3/ 387 |
| CO BCKGRD METER/RANGE/PPM | .4/ 3/ 12 | 1.3/ 3/ 40 | 2.5/ 3/ 76 | 1.6/ 3/ 49 |
| CO2 SAMPLE METER/RANGE/PCT | 21.9/ 3/ .36 | 34.8/ 3/ .58 | 78.9/ 3/ 1.44 | 21.1/ 3/ .34 |
| CO2 BCKGRD METER/RANGE/PCT | 3.4/ 3/ .05 | 3.7/ 3/ .06 | 5.4/ 3/ .08 | 3.4/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 12.1/ 2/ 12 | 30.2/ 2/ 30 | 45.5/ 3/ 136 | 13.9/ 2/ 14 |
| NOX BCKGRD METER/RANGE/PPM | .5/ 2/ 1 | .5/ 2/ 1 | .1/ 3/ 0 | .5/ 2/ 1 |
| DILUTION FACTOR | 31.28 | 20.28 | 8.67 | 34.83 |
| HC CONCENTRATION PPM | 66 | 75 | 45 | 42 |
| CO CONCENTRATION PPM | 642 | 656 | 962 | 335 |
| CO2 CONCENTRATION PCT | .31 | .53 | 1.36 | .29 |
| NOX CONCENTRATION PPM | 11.6 | 29.7 | 136.2 | 13.4 |
| HC MASS GRAMS | 7.02 | 9.01 | 5.50 | 4.45 |
| CO MASS GRAMS | 137.32 | 158.17 | 236.59 | 71.49 |
| CO2 MASS GRAMS | 1026.5 | 2004.2 | 5276.4 | 978.6 |
| NOX MASS GRAMS | 3.30 | 9.51 | 44.45 | 3.80 |
| FUEL KG (LB) | .399 ( .88) | .719 ( 1.59) | 1.786 ( 3.94) | .348 ( .77) |
| KW HR (HP HR) | .81 ( 1.08) | 1.69 ( 2.27) | 5.42 ( 7.27) | .75 ( 1.00) |
| BSHC G/KW HR (G/HP HR) | 8.69 ( 6.48) | 5.32 ( 3.97) | 1.01 ( .76) | 5.94 ( 4.43) |
| BSCO G/KW HR (G/HP HR) | 169.87 ( 126.67) | 93.37 ( 69.63) | 43.63 ( 32.54) | 95.41 ( 71.15) |
| BSCO2 G/KW HR (G/HP HR) | 1269.88 ( 946.95) | 1183.15 ( 882.28) | 973.07 ( 725.62) | 1306.00 ( 973.88) |
| BSNOX G/KW HR (G/HP HR) | 4.08 ( 3.04) | 5.61 ( 4.18) | 8.20 ( 6.11) | 5.08 ( 3.78) |
| BSFC KG/KW HR (LB/HP HR) | .493 ( .811) | .425 ( .698) | .329 ( .541) | .465 ( .764) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.67 ( 11.63) |
| BSHC G/KW HR (G/HP HR) | 3.00 ( 2.23) |
| BSCO G/KW HR (G/HP HR) | 69.58 ( 51.89) |
| BSCO2 G/KW HR (G/HP HR) | 1071 ( 798) |
| BSNOX G/KW HR (G/HP HR) | 7.04 ( 5.25) |
| BSFC KG/KW HR (LB/HP HR) | .375 ( .616) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE F-9B. TEST 8-5 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.IH404
ENGINE MODEL 79 IH 404
ENGINE 6.6 L(404 CID) V-8
CVS NO. 9

TEST NO. 8-5 RUN
DATE 2/21/79
TIME 08:53 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 2

BAROMETER 741.93 MM HG(29.21 IN HG)
DRY BULB TEMP. 27.2 DEG C(81.0 DEG F)

RELATIVE HUMIDITY 26 PCT
ABSOLUTE HUMIDITY 5.9 GM/KG( 41.2 GRAINS/LB) — NOX HUMIDITY C.F. .8630

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7167 | 8087 | 8315 | 7164 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 182.3 ( 6439) | 205.4 ( 7253) | 209.5 ( 7401) | 182.1 ( 6431) |
| HC SAMPLE METER/RANGE/PPM | 38.0/ 3/ 380 | 41.0/ 3/ 410 | 24.2/ 3/ 242 | 53.3/ 2/ 53 |
| HC BCKGRD METER/RANGE/PPM | 1.1/ 3/ 11 | 1.5/ 3/ 15 | 1.6/ 3/ 16 | 12.1/ 2/ 12 |
| CO SAMPLE METER/RANGE/PPM | 37.0/ 3/ 1091 | 46.1/ 3/ 1358 | 57.0/ 3/ 1678 | 11.7/ 3/ 351 |
| CO BCKGRD METER/RANGE/PPM | .3/ 3/ 9 | .1/ 3/ 3 | .3/ 3/ 9 | .8/ 3/ 24 |
| CO2 SAMPLE METER/RANGE/PCT | 22.5/ 3/ .37 | 34.1/ 3/ .57 | 76.7/ 3/ 1.39 | 19.7/ 3/ .32 |
| CO2 BCKGRD METER/RANGE/PCT | 3.1/ 3/ .05 | 2.6/ 3/ .04 | 2.3/ 3/ .04 | 2.1/ 3/ .03 |
| NOX SAMPLE METER/RANGE/PPM | 6.7/ 2/ 7 | 21.7/ 2/ 22 | 97.3/ 2/ 97 | 11.7/ 2/ 12 |
| NOX BCKGRD METER/RANGE/PPM | .3/ 2/ 0 | .2/ 2/ 0 | .3/ 2/ 0 | .4/ 2/ 0 |
| DILUTION FACTOR | 26.21 | 18.00 | 8.49 | 37.44 |
| HC CONCENTRATION PPM | 369 | 396 | 228 | 42 |
| CO CONCENTRATION PPM | 1066 | 1329 | 1612 | 322 |
| CO2 CONCENTRATION PCT | .32 | .53 | 1.36 | .29 |
| NOX CONCENTRATION PPM | 6.4 | 21.5 | 97.0 | 11.3 |
| HC MASS GRAMS | 38.85 | 46.89 | 27.54 | 4.36 |
| CO MASS GRAMS | 226.22 | 317.74 | 393.21 | 68.37 |
| CO2 MASS GRAMS | 1069.2 | 2003.1 | 5220.6 | 956.2 |
| NOX MASS GRAMS | 1.93 | 7.29 | 33.57 | 3.40 |
| FUEL KG (LB) | .488 ( 1.08) | .836 ( 1.84) | 1.868 ( 4.12) | .340 ( .75) |
| KW HR (HP HR) | .69 ( .93) | 1.68 ( 2.26) | 5.28 ( 7.08) | .74 ( .99) |
| BSHC G/KW HR (G/HP HR) | 56.28 ( 41.96) | 27.83 ( 20.75) | 5.22 ( 3.89) | 5.93 ( 4.42) |
| BSCO G/KW HR (G/HP HR) | 327.71 ( 244.38) | 188.58 ( 140.63) | 74.51 ( 55.56) | 92.93 ( 69.30) |
| BSCO2 G/KW HR (G/HP HR) | 1548.90 (1155.02) | 1188.89 ( 886.56) | 989.30 ( 737.72) | 1299.69 ( 969.18) |
| BSNOX G/KW HR (G/HP HR) | 2.80 ( 2.08) | 4.33 ( 3.23) | 6.36 ( 4.74) | 4.62 ( 3.45) |
| BSFC KG/KW HR (LB/HP HR) | .707 ( 1.162) | .496 ( .815) | .354 ( .582) | .462 ( .759) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.39 ( 11.25) |
| BSHC G/KW HR (G/HP HR) | 14.02 ( 10.46) |
| BSCO G/KW HR (G/HP HR) | 119.88 ( 89.39) |
| BSCO2 G/KW HR (G/HP HR) | 1103 ( 822) |
| BSNOX G/KW HR (G/HP HR) | 5.51 ( 4.11) |
| BSFC KG/KW HR (LB/HP HR) | .421 ( .692) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE F-9B (CONT'D). TEST 8-5 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.IH404
ENGINE MODEL 79 IH 404
ENGINE 6.6 L(404 CID) V-8
CVS NO. 9

TEST NO. 8-5 RUN
DATE 2/21/79
TIME 09:35 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 2

BAROMETER 741.93 MM HG(29.21 IN HG)
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)

RELATIVE HUMIDITY 27 PCT
ABSOLUTE HUMIDITY 5.4 GM/KG( 37.8 GRAINS/LB) — NOX HUMIDITY C.F. .8513

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7163 | 8083 | 8313 | 7161 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 182.2 ( 6436) | 205.3 ( 7250) | 209.5 ( 7399) | 182.0 ( 6428) |
| HC SAMPLE METER/RANGE/PPM | 9.8/ 3/ 98 | 9.5/ 3/ 95 | 6.7/ 3/ 67 | 62.4/ 2/ 62 |
| HC BCKGRD METER/RANGE/PPM | 1.1/ 3/ 11 | 1.1/ 3/ 11 | 1.4/ 3/ 14 | 12.0/ 2/ 12 |
| CO SAMPLE METER/RANGE/PPM | 18.8/ 3/ 560 | 20.0/ 3/ 595 | 38.0/ 3/ 1120 | 14.1/ 3/ 422 |
| CO BCKGRD METER/RANGE/PPM | .5/ 3/ 15 | .4/ 3/ 12 | .7/ 3/ 21 | 1.5/ 3/ 46 |
| CO2 SAMPLE METER/RANGE/PCT | 19.7/ 3/ .32 | 33.7/ 3/ .56 | 77.8/ 3/ 1.41 | 20.3/ 3/ .33 |
| CO2 BCKGRD METER/RANGE/PCT | 2.8/ 3/ .04 | 2.7/ 3/ .04 | 2.8/ 3/ .04 | 2.5/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 9.5/ 2/ 10 | 26.8/ 2/ 27 | 40.0/ 3/ 120 | 11.2/ 2/ 11 |
| NOX BCKGRD METER/RANGE/PPM | .3/ 2/ 0 | .4/ 2/ 0 | .5/ 2/ 1 | .4/ 2/ 0 |
| DILUTION FACTOR | 35.00 | 21.24 | 8.76 | 35.64 |
| HC CONCENTRATION PPM | 87 | 85 | 55 | 51 |
| CO CONCENTRATION PPM | 537 | 572 | 1061 | 371 |
| CO2 CONCENTRATION PCT | .28 | .52 | 1.38 | .29 |
| NOX CONCENTRATION PPM | 9.2 | 26.4 | 119.6 | 10.8 |
| HC MASS GRAMS | 9.18 | 10.01 | 6.60 | 5.33 |
| CO MASS GRAMS | 113.89 | 136.65 | 258.87 | 78.72 |
| CO2 MASS GRAMS | 922.2 | 1968.3 | 5281.6 | 970.0 |
| NOX MASS GRAMS | 2.73 | 8.83 | 40.78 | 3.20 |
| FUEL KG (LB) | .356 ( .79) | .698 ( 1.54) | 1.800 ( 3.97) | .350 ( .77) |
| KW HR (HP HR) | .72 ( .96) | 1.64 ( 2.20) | 5.28 ( 7.08) | .73 ( .98) |
| BSHC G/KW HR (G/HP HR) | 12.79 ( 9.54) | 6.09 ( 4.54) | 1.25 ( .93) | 7.28 ( 5.43) |
| BSCO G/KW HR (G/HP HR) | 158.73 ( 118.36) | 83.12 ( 61.98) | 49.06 ( 36.58) | 107.67 ( 80.29) |
| BSCO2 G/KW HR (G/HP HR) | 1285.17 ( 958.35) | 1197.28 ( 892.81) | 1000.85 ( 746.34) | 1326.71 ( 989.33) |
| BSNOX G/KW HR (G/HP HR) | 3.81 ( 2.84) | 5.37 ( 4.01) | 7.73 ( 5.76) | 4.38 ( 3.27) |
| BSFC KG/KW HR (LB/HP HR) | .497 ( .816) | .425 ( .698) | .341 ( .561) | .479 ( .787) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 8.37 ( 11.22) |
| BSHC G/KW HR (G/HP HR) | 3.72 ( 2.77) |
| BSCO G/KW HR (G/HP HR) | 70.27 ( 52.40) |
| BSCO2 G/KW HR (G/HP HR) | 1092 ( 815) |
| BSNOX G/KW HR (G/HP HR) | 6.64 ( 4.95) |
| BSFC KG/KW HR (LB/HP HR) | .383 ( .629) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE F-10A. TEST 10-1 EMISSIONS RESULTS

COLD TRANSIENT

PROJECT NO. 11-5044-001

ENGINE NO.GM292
ENGINE MODEL -0 GM 292
ENGINE 4.8 L(292 CID) V-8
CVS NO. 9

TEST NO. 10-1 RUN
DATE 4/20/79
TIME 11:14
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 741.43 MM HG(29.19 IN HG)
DRY BULB TEMP. 27.8 DEG C(82.0 DEG F)

RELATIVE HUMIDITY 60 PCT
ABSOLUTE HUMIDITY 14.5 GM/KG(101.4 GRAINS/LB)

NOX HUMIDITY C.F. 1.1415

BAG RESULTS

| BAG NUMBER | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7164 | 8084 | 8316 | 7161 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 182.1 ( 6432) | 205.1 ( 7245) | 209.4 ( 7396) | 181.9 ( 6423) |
| HC SAMPLE METER/RANGE/PPM | 43.2/ 3/ 432 | 11.9/ 3/ 119 | 7.9/ 3/ 79 | 8.1/ 3/ 81 |
| HC BCKGRD METER/RANGE/PPM | 1.5/ 3/ 15 | 1.5/ 3/ 15 | 1.4/ 3/ 14 | 1.4/ 3/ 14 |
| CO SAMPLE METER/RANGE/PPM | 49.7/ 3/ 1464 | 21.6/ 3/ 642 | 46.0/ 3/ 1355 | 10.0/ 3/ 301 |
| CO BCKGRD METER/RANGE/PPM | 1.0/ 3/ 31 | .8/ 3/ 24 | 1.3/ 3/ 40 | 1.5/ 3/ 46 |
| CO2 SAMPLE METER/RANGE/PCT | 14.3/ 3/ .23 | 23.7/ 3/ .39 | 54.4/ 3/ .95 | 15.1/ 3/ .24 |
| CO2 BCKGRD METER/RANGE/PCT | 2.8/ 3/ .04 | 2.9/ 3/ .04 | 3.4/ 3/ .05 | 3.1/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 10.0/ 2/ 10 | 50.2/ 2/ 50 | 59.7/ 3/ 179 | 24.4/ 2/ 24 |
| NOX BCKGRD METER/RANGE/PPM | .2/ 2/ 0 | .1/ 2/ 0 | .1/ 3/ 0 | .4/ 2/ 0 |
| DILUTION FACTOR | 32.42 | 24.07 | 12.35 | 48.20 |
| HC CONCENTRATION PPM | 417 | 105 | 66 | 67 |
| CO CONCENTRATION PPM | 1400 | 601 | 1268 | 250 |
| CO2 CONCENTRATION PCT | .19 | .34 | .90 | .19 |
| NOX CONCENTRATION PPM | 9.8 | 50.1 | 178.8 | 24.0 |
| HC MASS GRAMS | 43.85 | 12.37 | 7.99 | 7.06 |
| CO MASS GRAMS | 296.80 | 143.61 | 309.18 | 52.86 |
| CO2 MASS GRAMS | 619.4 | 1291.4 | 3446.0 | 646.3 |
| NOX MASS GRAMS | 3.90 | 22.44 | 81.77 | 9.53 |
| FUEL KG (LB) | .386 ( .85) | .491 ( 1.08) | 1.247 ( 2.75) | .237 ( .52) |
| KW HR (HP HR) | .64 ( .86) | 1.23 ( 1.64) | 3.74 ( 5.01) | .52 ( .70) |
| BSHC G/KW HR (G/HP HR) | 68.77 ( 51.28) | 10.08 ( 7.52) | 2.14 ( 1.59) | 13.46 ( 10.04) |
| BSCO G/KW HR (G/HP HR) | 465.47 ( 347.10) | 117.12 ( 87.33) | 82.69 ( 61.66) | 100.79 ( 75.16) |
| BSCO2 G/KW HR (G/HP HR) | 971.42 ( 724.39) | 1053.15 ( 785.33) | 921.61 ( 687.25) | 1232.26 ( 918.90) |
| BSNOX G/KW HR (G/HP HR) | 6.12 ( 4.56) | 18.30 ( 13.65) | 21.87 ( 16.31) | 18.18 ( 13.56) |
| BSFC KG/KW HR (LB/HP HR) | .606 ( .996) | .400 ( .658) | .334 ( .548) | .452 ( .743) |

TOTAL TEST RESULTS 4 BAGS

| | | |
|---|---|---|
| TOTAL KW HR (HP HR) | 6.13 | ( 8.22) |
| BSHC G/KW HR (G/HP HR) | 11.63 | ( 8.67) |
| BSCO G/KW HR (G/HP HR) | 130.96 | ( 97.66) |
| BSCO2 G/KW HR (G/HP HR) | 980 | ( 731) |
| BSNOX G/KW HR (LB/HP HR) | 19.20 | ( 14.32) |
| BSFC KG/KW HR (LB/HP HR) | .385 | ( .634) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW SCM(SCF) | 0.000 | ( 0.00) |
| MULTIPLIER FOR G/TEST | 0.000 | |
| MULTIPLIER FOR G/KW HR (G/HP HR) | 0.0000 | (0.0000) |
| MULTIPLIER FOR G/KG FUEL (G/LB FUEL) | 0.0000 | (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW SCM(SCF) | 0.00 | ( 0.0) |

# TABLE F-10A (CONT'D). TEST 10-1 EMISSIONS RESULTS

HOT TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.GM292
ENGINE MODEL -0 GM 292
ENGINE 4.8 L(292 CID) V-8
CVS NO. 9

TEST NO. 10-1 RUN
DATE 4/20/79
TIME
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 741.43 MM HG(29.19 IN HG)
DRY BULB TEMP. 30.6 DEG C(87.0 DEG F)

RELATIVE HUMIDITY 46 PCT
ABSOLUTE HUMIDITY 12.9 GM/KG( 90.6 GRAINS/LB)

NOX HUMIDITY C.F. 1.0790

BAG RESULTS

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| BAG NUMBER | | | | |
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7163 | 8084 | 8318 | 7163 |
| TIME SECONDS | 272.0 | 307.0 | 315.9 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 182.1 ( 6431) | 205.1 ( 7245) | 209.5 ( 7398) | 181.9 ( 6425) |
| HC SAMPLE METER/RANGE/PPM | 44.8/ 3/ 448 | 9.6/ 3/ 96 | 7.3/ 3/ 73 | 7.7/ 3/ 77 |
| HC BCKGRD METER/RANGE/PPM | 1.1/ 3/ 11 | 1.4/ 3/ 14 | 1.2/ 3/ 12 | 1.1/ 3/ 11 |
| CO SAMPLE METER/RANGE/PPM | 43.6/ 3/ 1284 | 18.3/ 3/ 545 | 45.5/ 3/ 1340 | 10.7/ 3/ 322 |
| CO BCKGRD METER/RANGE/PPM | .7/ 3/ 21 | .5/ 3/ 15 | .9/ 3/ 28 | 1.6/ 3/ 49 |
| CO2 SAMPLE METER/RANGE/PCT | 14.4/ 3/ .23 | 23.9/ 3/ .39 | 55.4/ 3/ .47 | 14.8/ 3/ .24 |
| CO2 BCKGRD METER/RANGE/PCT | 2.5/ 3/ .04 | 2.4/ 3/ .04 | 2.6/ 3/ .04 | 3.0/ 3/ .05 |
| NOX SAMPLE METER/RANGE/PPM | 9.3/ 2/ 9 | 53.0/ 2/ 53 | 63.7/ 3/ 191 | 24.6/ 2/ 25 |
| NOX BCKGRD METER/RANGE/PPM | .2/ 2/ 0 | .3/ 2/ 0 | .3/ 3/ 1 | .4/ 2/ 0 |
| DILUTION FACTOR | 33.53 | 29.58 | 12.15 | 48.77 |
| HC CONCENTRATION PPM | 437 | 82 | 62 | 66 |
| CO CONCENTRATION PPM | 1239 | 518 | 1270 | 268 |
| CO2 CONCENTRATION PCT | .19 | .35 | .93 | .19 |
| NOX CONCENTRATION PPM | 9.1 | 52.7 | 190.3 | 24.2 |
| HC MASS GRAMS | 45.93 | 9.76 | 7.49 | 6.95 |
| CO MASS GRAMS | 262.73 | 123.83 | 309.86 | 56.81 |
| CO2 MASS GRAMS | 639.7 | 1332.3 | 3564.1 | 634.8 |
| NOX MASS GRAMS | 3.42 | 22.32 | 82.26 | 9.09 |
| FUEL KG (LB) | .378 ( .83) | .491 ( 1.08) | 1.285 ( 2.83) | .235 ( .52) |
| KW HR (HP HR) | .68 ( .91) | 1.23 ( 1.65) | 3.76 ( 5.04) | .54 ( .72) |
| BSHC G/KW HR (G/HP HR) | 67.63 ( 50.43) | 7.91 ( 5.90) | 1.99 ( 1.49) | 12.97 ( 9.67) |
| BSCO G/KW HR (G/HP HR) | 386.86 ( 288.48) | 100.37 ( 74.85) | 82.45 ( 61.49) | 106.04 ( 79.08) |
| BSCO2 G/KW HR (G/HP HR) | 941.91 ( 702.38) | 1079.88 ( 805.26) | 948.42 ( 707.24) | 1184.91 ( 883.58) |
| BSNOX G/KW HR (G/HP HR) | 5.04 ( 3.76) | 18.09 ( 13.49) | 21.89 ( 16.32) | 16.96 ( 12.65) |
| BSFC KG/KW HR (LB/HP HR) | .556 ( .914) | .398 ( .654) | .342 ( .562) | .439 ( .722) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 6.21 ( 8.32) |
| BSHC G/KW HR (G/HP HR) | 11.30 ( 8.43) |
| BSCO G/KW HR (G/HP HR) | 121.36 ( 90.50) |
| BSCO2 G/KW HR (G/HP HR) | 994 ( 741) |
| BSNOX G/KW HR (G/HP HR) | 18.86 ( 14.07) |
| BSFC KG/KW HR (LB/HP HR) | .385 ( .633) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE F-10B. TEST 10-2 EMISSIONS RESULTS

COLD TRANSIENT — PROJECT NO. 11-5044-001

ENGINE NO.GM292
ENGINE MODEL -8 GM 292
ENGINE 4.8 L(292 CID) V-8
CVS NO. 9

TEST NO. 10-2 RUN
DATE 4/23/79
TIME 09:12 — GASOLINE EM-267-F
DYNO NO. 2 — BAG CART NO. 2

BAROMETER 741.43 MM HG(29.19 IN HG)
DRY BULB TEMP. 27.8 DEG C(82.0 DEG F)

RELATIVE HUMIDITY 42 PCT
ABSOLUTE HUMIDITY 10.0 GM/KG( 69.9 GRAINS/LB) — NOX HUMIDITY C.F. .9768

BAG RESULTS

| BAG NUMBER | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7167 | 8086 | 8318 | 7163 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 182.2 ( 6435) | 205.2 ( 7247) | 209.5 ( 7398) | 181.9 ( 6425) |
| HC SAMPLE METER/RANGE/PPM | 67.6/ 3/ 676 | 16.1/ 3/ 161 | 10.2/ 3/ 102 | 11.0/ 3/ 110 |
| HC BCKGRD METER/RANGE/PPM | 2.1/ 3/ 21 | 2.2/ 3/ 22 | 1.9/ 3/ 19 | 1.5/ 3/ 15 |
| CO SAMPLE METER/RANGE/PPM | 57.4/ 3/ 1690 | 20.9/ 3/ 621 | 43.3/ 3/ 1276 | 10.8/ 3/ 325 |
| CO BCKGRD METER/RANGE/PPM | .8/ 3/ 24 | .7/ 3/ 21 | 1.1/ 3/ 34 | 2.0/ 3/ 61 |
| CO2 SAMPLE METER/RANGE/PCT | 16.0/ 3/ .26 | 25.0/ 3/ .41 | 56.3/ 3/ .98 | 15.4/ 3/ .25 |
| CO2 BCKGRD METER/RANGE/PCT | 4.0/ 3/ .06 | 3.8/ 3/ .06 | 3.8/ 3/ .06 | 3.9/ 3/ .06 |
| NOX SAMPLE METER/RANGE/PPM | 10.6/ 2/ 11 | 47.7/ 2/ 48 | 60.2/ 3/ 181 | 23.5/ 2/ 23 |
| NOX BCKGRD METER/RANGE/PPM | .3/ 2/ 0 | .4/ 2/ 0 | .3/ 3/ 1 | .9/ 2/ 1 |
| DILUTION FACTOR | 27.40 | 27.57 | 12.00 | 45.16 |
| HC CONCENTRATION PPM | 656 | 140 | 85 | 95 |
| CO CONCENTRATION PPM | 1636 | 588 | 1204 | 260 |
| CO2 CONCENTRATION PCT | .20 | .35 | .93 | .20 |
| NOX CONCENTRATION PPM | 10.3 | 47.3 | 179.8 | 22.6 |
| HC MASS GRAMS | 68.91 | 16.54 | 10.22 | 10.00 |
| CO MASS GRAMS | 347.05 | 140.38 | 293.60 | 55.02 |
| CO2 MASS GRAMS | 655.1 | 1326.3 | 3565.2 | 650.6 |
| NOX MASS GRAMS | 3.51 | 18.14 | 70.36 | 7.69 |
| FUEL KG (LB) | .447 ( .99) | .504 ( 1.11) | 1.280 ( 2.82) | .242 ( .53) |
| KW HR (HP HR) | .71 ( .96) | 1.24 ( 1.66) | 3.78 ( 5.06) | .54 ( .73) |
| BSHC G/KW HR (G/HP HR) | 96.63 ( 72.06) | 13.37 ( 9.97) | 2.71 ( 2.02) | 18.41 ( 13.73) |
| BSCO G/KW HR (G/HP HR) | 486.68 ( 362.91) | 113.44 ( 84.59) | 77.74 ( 57.97) | 101.26 ( 75.51) |
| BSCO2 G/KW HR (G/HP HR) | 918.60 ( 685.00) | 1071.68 ( 799.15) | 943.97 ( 703.92) | 1197.55 ( 893.01) |
| BSNOX G/KW HR (G/HP HR) | 4.92 ( 3.67) | 14.66 ( 10.93) | 18.63 ( 13.89) | 14.15 ( 10.55) |
| BSFC KG/KW HR (LB/HP HR) | .627 ( 1.031) | .407 ( .670) | .339 ( .557) | .446 ( .733) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 6.27 ( 8.41) |
| BSHC G/KW HR (G/HP HR) | 16.85 ( 12.57) |
| BSCO G/KW HR (G/HP HR) | 133.32 ( 99.42) |
| BSCO2 G/KW HR (G/HP HR) | 988 ( 737) |
| BSNOX G/KW HR (G/HP HR) | 15.90 ( 11.86) |
| BSFC KG/KW HR (LB/HP HR) | .394 ( .648) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE F-10B (CONT'D). TEST 10-2 EMISSIONS RESULTS

HOT TRANSIENT

PROJECT NO. 11-5044-001

ENGINE NO.GM292
ENGINE MODEL -0 GM 292
ENGINE 4.8 L(292 CID) V-8
CVS NO. 9

TEST NO. 10-2 RUN
DATE 4/23/79
TIME 09:52
DYNO NO. 2

GASOLINE EM-267-F
BAG CART NO. 2

BAROMETER 741.43 MM HG(29.19 IN HG)
DRY BULB TEMP. 28.3 DEG C(83.0 DEG F)

RELATIVE HUMIDITY 40 PCT
ABSOLUTE HUMIDITY 9.8 GM/KG( 68.8 GRAINS/LB)

NOX HUMIDITY C.F. .9716

BAG RESULTS

| BAG NUMBER | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| DESCRIPTION | NYNF | LANF | LAF | NYNF |
| BLOWER DIF P MM. H2O(IN. H2O) | 696.0 (27.4) | 711.2 (28.0) | 762.0 (30.0) | 708.7 (27.9) |
| BLOWER INLET P MM. H2O(IN. H2O) | 457.2 (18.0) | 472.4 (18.6) | 541.0 (21.3) | 464.8 (18.3) |
| BLOWER INLET TEMP. DEG. C(DEG. F) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) | 54.4 (130.0) |
| BLOWER REVOLUTIONS | 7163 | 8085 | 8317 | 7161 |
| TIME SECONDS | 272.0 | 307.0 | 316.0 | 272.0 |
| TOTAL FLOW STD. CU. METRES(SCF) | 182.1 ( 6431) | 205.2 ( 7246) | 209.4 ( 7397) | 181.9 ( 6423) |
| HC SAMPLE METER/RANGE/PPM | 48.8/ 3/ 488 | 14.0/ 3/ 140 | 10.1/ 3/ 101 | 10.9/ 3/ 109 |
| HC BCKGRD METER/RANGE/PPM | 2.0/ 3/ 20 | 2.1/ 3/ 21 | 1.6/ 3/ 16 | 1.7/ 3/ 17 |
| CO SAMPLE METER/RANGE/PPM | 47.0/ 3/ 1384 | 18.6/ 3/ 554 | 42.4/ 3/ 1249 | 9.7/ 3/ 292 |
| CO BCKGRD METER/RANGE/PPM | .8/ 3/ 24 | .5/ 3/ 15 | .7/ 3/ 21 | .7/ 3/ 21 |
| CO2 SAMPLE METER/RANGE/PCT | 14.8/ 3/ .29 | 23.8/ 3/ .39 | 55.1/ 3/ .96 | 14.7/ 3/ .23 |
| CO2 BCKGRD METER/RANGE/PCT | 2.8/ 3/ .04 | 2.9/ 3/ .04 | 2.8/ 3/ .04 | 2.8/ 3/ .04 |
| NOX SAMPLE METER/RANGE/PPM | 8.7/ 2/ 9 | 50.7/ 2/ 51 | 64.7/ 3/ 194 | 24.5/ 2/ 24 |
| NOX BCKGRD METER/RANGE/PPM | .2/ 2/ 0 | .2/ 2/ 0 | .3/ 3/ 1 | .9/ 2/ 1 |
| DILUTION FACTOR | 31.88 | 29.35 | 12.28 | 49.00 |
| HC CONCENTRATION PPM | 469 | 120 | 86 | 92 |
| CO CONCENTRATION PPM | 1337 | 528 | 1191 | 266 |
| CO2 CONCENTRATION PCT | .19 | .35 | .92 | .19 |
| NOX CONCENTRATION PPM | 8.5 | 50.5 | 193.3 | 23.6 |
| HC MASS GRAMS | 49.22 | 14.17 | 10.42 | 9.69 |
| CO MASS GRAMS | 283.41 | 126.16 | 290.34 | 56.36 |
| CO2 MASS GRAMS | 647.1 | 1248.0 | 3530.6 | 639.2 |
| NOX MASS GRAMS | 2.88 | 19.26 | 75.23 | 7.98 |
| FUEL KG (LB) | .394 ( .87) | .486 ( 1.07) | 1.267 ( 2.79) | .239 ( .53) |
| KW HR (HP HR) | .72 ( .96) | 1.24 ( 1.66) | 3.80 ( 5.10) | .54 ( .73) |
| BSHC G/KW HR (G/HP HR) | 68.65 ( 51.19) | 11.41 ( 8.51) | 2.74 ( 2.05) | 17.83 ( 13.29) |
| BSCO G/KW HR (G/HP HR) | 395.35 ( 294.81) | 101.63 ( 75.79) | 76.42 ( 56.98) | 103.74 ( 77.36) |
| BSCO2 G/KW HR (G/HP HR) | 902.63 ( 673.09) | 1045.67 ( 779.76) | 929.24 ( 692.94) | 1176.48 ( 877.30) |
| BSNOX G/KW HR (G/HP HR) | 4.02 ( 2.99) | 15.51 ( 11.57) | 19.80 ( 14.77) | 14.69 ( 10.96) |
| BSFC KG/KW HR (LB/HP HR) | .549 ( .903) | .391 ( .643) | .334 ( .548) | .440 ( .723) |

TOTAL TEST RESULTS 4 BAGS

| | |
|---|---|
| TOTAL KW HR (HP HR) | 6.30 ( 8.45) |
| BSHC G/KW HR (G/HP HR) | 13.25 ( 9.88) |
| BSCO G/KW HR (G/HP HR) | 120.03 ( 89.50) |
| BSCO2 G/KW HR (G/HP HR) | 970 ( 724) |
| BSNOX G/KW HR (G/HP HR) | 16.72 ( 12.47) |
| BSFC KG/KW HR (LB/HP HR) | .379 ( .622) |

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.000 ( 0.00) |
| MULTIPLIER FOR | G/TEST | 0.000 |
| MULTIPLIER FOR | G/KW HR (G/HP HR) | 0.0000 (0.0000) |
| MULTIPLIER FOR | G/KG FUEL (G/LB FUEL) | 0.0000 (0.0000) |

20 X 20 FILTERS

| | | |
|---|---|---|
| SAMPLE FLOW | SCM(SCF) | 0.00 ( 0.0) |

# TABLE F-11A. ENGINE 1 NINE-MODE EMISSIONS RESULTS

1977-78 IH MV404 --- PROJECT 11-5044-001

09-21-78 TEST 11 DUR HRS IH404 BAROMETER F 29.21 K= 1.098 HUM= 15.2 G/KG

| MODE | CONCENTRATION AS MEASURED HC-FID | CO | CO2 | NOX-CL | TOTAL CARBON | FUEL G/HR | CALCULATED G/HR HC | CO | NOX | WT. FACT. | -----MODAL G/KWHR----- HC-FID | CO | NOX-CL | KW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | 819 | .537 | 10.01 | 31 | 10.637 | 1996 | 17 | 203 | 2 | .232 | R | R | R | 0.0 |
| 2 25 PCT T | 312 | .541 | 12.14 | 119 | 12.717 | 12066 | 33 | 1038 | 41 | .077 | 1.149 | 35.860 | 1.422 | 21.6 |
| 3 55 PCT T | 808 | .920 | 12.25 | 467 | 13.261 | 16012 | 110 | 2244 | 205 | .147 | 1.826 | 37.294 | 3.415 | 44.9 |
| 4 25 PCT T | 297 | .191 | 11.90 | 178 | 12.124 | 12111 | 33 | 386 | 65 | .077 | 1.162 | 13.508 | 2.269 | 21.3 |
| 5 10 PCT T | 131 | .147 | 11.33 | 97 | 11.492 | 9117 | 12 | 236 | 28 | .057 | 1.047 | 21.347 | 2.539 | 8.2 |
| 6 25 PCT T | 261 | .191 | 11.79 | 183 | 12.010 | 12066 | 29 | 388 | 67 | .077 | 1.069 | 14.151 | 2.443 | 20.4 |
| 7 90 PCT T | 686 | 1.110 | 12.61 | 1492 | 13.798 | 22770 | 128 | 3700 | 897 | .113 | 1.298 | 37.518 | 9.098 | 73.5 |
| 8 25 PCT T | 219 | .216 | 11.92 | 197 | 12.161 | 11431 | 23 | 410 | 67 | .077 | .806 | 14.366 | 2.363 | 21.3 |
| 9 C.T. | 58 | .165 | 9.80 | 56 | 9.971 | 5126 | 3 | 171 | 10 | .143 | R | R | R | 0.0 |
| 1 25 PCT T | 248 | .219 | 11.90 | 185 | 12.147 | 11567 | 26 | 421 | 64 | .077 | .913 | 14.555 | 2.218 | 21.6 |
| 2 55 PCT T | 598 | .850 | 12.25 | 651 | 13.167 | 16193 | 83 | 2112 | 292 | .147 | 1.326 | 33.811 | 4.672 | 46.6 |
| 3 25 PCT T | 222 | .225 | 11.90 | 199 | 12.150 | 11340 | 23 | 425 | 68 | .077 | .791 | 14.479 | 2.308 | 21.9 |
| 4 10 PCT T | 89 | .233 | 11.21 | 148 | 11.453 | 8301 | 7 | 341 | 39 | .057 | .608 | 28.860 | 3.311 | 8.8 |
| 5 25 PCT T | 252 | .238 | 11.97 | 201 | 12.236 | 11431 | 26 | 448 | 68 | .077 | .911 | 15.492 | 2.364 | 21.6 |
| 6 90 PCT T | 664 | 1.420 | 12.73 | 1297 | 14.225 | 23541 | 125 | 4747 | 782 | .113 | 1.239 | 47.217 | 7.780 | 75.0 |
| 7 25 PCT T | 208 | .230 | 11.90 | 208 | 12.153 | 11249 | 22 | 429 | 70 | .077 | .735 | 14.641 | 2.393 | 21.9 |
| 8 C.T. | 61 | .162 | 9.72 | 56 | 9.888 | 5171 | 4 | 171 | 11 | .143 | R | R | R | 0.0 |
| 9 IDLE | 1090 | .412 | 10.07 | 32 | 10.602 | 1905 | 22 | 149 | 2 | .232 | R | R | R | 0.0 |

| MODE | ID | ----UNITS AS SPECIFIED IN THE 9-08-77 PROCEDURE---- HP | TQ | FC | BSFC | BSNOX | F/A | SFC KG/KW HR | RPM | CALC A/F | --------PERCENT OF TOTAL------- HC | CO | NOX | FUEL | POWER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | | 0.0 | 0 | 4.4 | R | R | .049 | R | 580 | 20.5 | 8.8 | 4.7 | .3 | 4.5 | 0.0 |
| 2 25 PCT T | | 28.9 | 76 | 26.6 | .919 | 1.4 | .058 | .559 | 2000 | 17.3 | 5.7 | 8.0 | 2.1 | 9.0 | 7.6 |
| 3 55 PCT T | | 60.2 | 158 | 35.3 | .587 | 3.4 | .060 | .357 | 2000 | 16.6 | 36.0 | 32.8 | 19.7 | 22.8 | 30.1 |
| 4 25 PCT T | | 28.6 | 75 | 26.7 | .935 | 2.3 | .055 | .569 | 2000 | 18.1 | 5.7 | 3.0 | 3.2 | 9.0 | 7.5 |
| 5 10 PCT T | | 11.0 | 29 | 20.1 | 1.820 | 2.5 | .052 | 1.107 | 2000 | 19.1 | 1.5 | 1.3 | 1.0 | 5.0 | 2.1 |
| 6 25 PCT T | | 27.4 | 72 | 26.6 | .970 | 2.4 | .055 | .590 | 2000 | 18.3 | 5.0 | 3.0 | 3.4 | 9.0 | 7.2 |
| 7 90 PCT T | | 98.6 | 259 | 50.2 | .509 | 9.1 | .063 | .310 | 2000 | 15.9 | 32.3 | 41.6 | 66.0 | 24.9 | 38.0 |
| 8 25 PCT T | | 28.6 | 75 | 25.2 | .882 | 2.4 | .055 | .537 | 2000 | 18.1 | 4.0 | 3.1 | 3.4 | 8.5 | 7.5 |
| 9 C.T. | | 0.0 | 0 | 11.3 | R | R | .046 | R | 2000 | 21.9 | 1.0 | 2.4 | 1.0 | 7.1 | 0.0 |
| 1 25 PCT T | | 28.9 | 76 | 25.5 | .881 | 2.2 | .055 | .536 | 2000 | 18.1 | 5.1 | 3.1 | 3.2 | 8.7 | 7.4 |
| 2 55 PCT T | | 62.5 | 164 | 35.7 | .572 | 4.7 | .060 | .348 | 2000 | 16.7 | 30.7 | 29.3 | 27.4 | 23.3 | 30.4 |
| 3 25 PCT T | | 29.3 | 77 | 25.0 | .853 | 2.3 | .055 | .519 | 2000 | 18.1 | 4.5 | 3.1 | 3.3 | 8.6 | 7.5 |
| 4 10 PCT T | | 11.8 | 31 | 18.3 | 1.550 | 3.3 | .052 | .943 | 2000 | 19.2 | 1.0 | 1.8 | 1.4 | 4.6 | 2.2 |
| 5 25 PCT T | | 28.9 | 76 | 25.2 | .871 | 2.4 | .056 | .530 | 2000 | 18.0 | 5.1 | 3.3 | 3.4 | 8.6 | 7.4 |
| 6 90 PCT T | | 100.5 | 264 | 51.9 | .516 | 7.8 | .065 | .314 | 2000 | 15.4 | 35.5 | 50.7 | 56.5 | 26.1 | 37.6 |
| 7 25 PCT T | | 29.3 | 77 | 24.8 | .846 | 2.4 | .055 | .514 | 2000 | 18.1 | 4.2 | 3.1 | 3.5 | 8.5 | 7.5 |
| 8 C.T. | | 0.0 | 0 | 11.4 | R | R | .045 | R | 2000 | 22.0 | 1.3 | 2.3 | 1.0 | 7.2 | 0.0 |
| 9 IDLE | | 0.0 | 0 | 4.2 | R | R | .049 | R | 590 | 20.5 | 12.6 | 3.3 | .3 | 4.3 | 0.0 |

| | | | | | |
|---|---|---|---|---|---|
| SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- | | | 2.0 | 46 | 7.0 |
| SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- | | | 1.8 | 47 | 6.9 |
| TWO CYCLE COMPOSITE - | HC- FID 0.35( 2.0) + 0.65( 1.8) = | 1.863 | G/KW HR | | ( 1.389 BS) |
| | CO- NDIR 0.35( 45.9) + 0.65( 47.0) = | 46.605 | G/KW HR | | (34.753 BS) |
| | NOX-CL 0.35( 7.0) + 0.65( 6.9) = | 6.972 | G/KW HR | | ( 5.199 BS) |
| | HC + NOX = | 8.835 | G/KW HR | | ( 6.588 BS) |
| | SFC = | .460 | KG/KW HR | | ( .756 BS) |

# TABLE F-11B. ENGINE 1 NINE-MODE EMISSIONS RESULTS

1977-78 IH MV404 --- PROJECT 11-5044-001 — BAROMETER 29.16

09-21-78 — TEST 13 — DUR HRS — IH404 — K= 1.082 — HUM= 14.4 G/KG

| MODE | CONCENTRATION AS MEASURED HC-FID | CO | CO2 | NOX-CL | TOTAL CARBON | FUEL G/HR | CALCULATED G/HR HC | CO | NOX | WT. FACT. | MODAL G/KWHR HC-FID | CO | NOX-CL | KW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | 820 | .436 | 10.11 | 34 | 10.637 | 1950 | 17 | 162 | 2 | .232 | R | R | R | 0.0 |
| 2 25 PCT T | 346 | .487 | 12.25 | 131 | 12.776 | 12020 | 37 | 926 | 44 | .077 | 1.265 | 32.005 | 1.530 | 21.6 |
| 3 55 PCT T | 846 | .620 | 12.37 | 603 | 13.085 | 16239 | 118 | 1554 | 269 | .147 | 1.928 | 25.350 | 4.384 | 45.7 |
| 4 25 PCT T | 280 | .198 | 11.90 | 180 | 12.129 | 11567 | 30 | 381 | 62 | .077 | 1.033 | 13.172 | 2.130 | 21.6 |
| 5 10 PCT T | 90 | .286 | 11.10 | 150 | 11.396 | 7711 | 7 | 391 | 36 | .057 | .613 | 35.422 | 3.301 | 8.2 |
| 6 25 PCT T | 257 | .197 | 12.02 | 182 | 12.245 | 11476 | 27 | 372 | 61 | .077 | .957 | 13.214 | 2.174 | 21.0 |
| 7 90 PCT T | 712 | 1.160 | 12.73 | 1537 | 13.971 | 22816 | 132 | 3827 | 902 | .113 | 1.330 | 38.650 | 9.106 | 73.8 |
| 8 25 PCT T | 210 | .225 | 12.02 | 204 | 12.269 | 11431 | 22 | 424 | 68 | .077 | .748 | 14.454 | 2.328 | 21.9 |
| 9 C.T. | 54 | .156 | 9.59 | 53 | 9.752 | 4990 | 3 | 162 | 10 | .143 | R | R | R | 0.0 |
| 1 25 PCT T | 257 | .231 | 12.02 | 196 | 12.280 | 11703 | 27 | 446 | 67 | .077 | .936 | 15.198 | 2.288 | 21.9 |
| 2 55 PCT T | 610 | .800 | 12.37 | 636 | 13.239 | 15876 | 82 | 1938 | 274 | .147 | 1.353 | 31.806 | 4.496 | 45.4 |
| 3 25 PCT T | 219 | .249 | 12.02 | 205 | 12.294 | 11476 | 23 | 470 | 69 | .077 | .792 | 16.249 | 2.375 | 21.6 |
| 4 10 PCT T | 115 | .159 | 11.56 | 110 | 11.731 | 9072 | 10 | 248 | 31 | .057 | .841 | 20.973 | 2.588 | 8.8 |
| 5 25 PCT T | 226 | .249 | 12.02 | 208 | 12.294 | 11431 | 24 | 468 | 69 | .077 | .814 | 16.165 | 2.400 | 21.6 |
| 6 90 PCT T | 610 | 1.360 | 12.85 | 1369 | 14.279 | 23133 | 112 | 4451 | 797 | .113 | 1.133 | 44.951 | 8.046 | 73.8 |
| 7 25 PCT T | 173 | .251 | 12.14 | 207 | 12.410 | 11385 | 18 | 465 | 68 | .077 | .623 | 16.286 | 2.388 | 21.3 |
| 8 C.T. | 49 | .157 | 9.82 | 56 | 9.983 | 5216 | 3 | 166 | 11 | .143 | R | R | R | 0.0 |
| 9 IDLE | 866 | .425 | 10.33 | 36 | 10.851 | 1860 | 16 | 147 | 2 | .232 | R | R | R | 0.0 |

| MODE | ID | ----UNITS AS SPECIFIED IN THE 9-08-77 PROCEDURE---- HP | TQ | FC | BSFC | BSNOX | F/A | SFC KG/KW HR | RPM | CALC A/F | --------PERCENT OF TOTAL------- HC | CO | NOX | FUEL | POWER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | IDLE | 0.0 | 0 | 4.3 | R | R | .049 | R | 570 | 20.5 | 8.4 | 4.1 | .3 | 4.5 | 0.0 |
| 2 | 25 PCT T | 28.9 | 76 | 26.5 | .916 | 1.5 | .058 | .557 | 2000 | 17.2 | 6.1 | 7.9 | 2.1 | 9.1 | 7.5 |
| 3 | 55 PCT T | 61.3 | 161 | 35.8 | .584 | 4.4 | .060 | .355 | 2000 | 16.8 | 37.9 | 25.2 | 24.2 | 23.5 | 30.3 |
| 4 | 25 PCT T | 28.9 | 76 | 25.5 | .881 | 2.1 | .055 | .536 | 2000 | 18.1 | 5.0 | 3.2 | 2.9 | 8.8 | 7.5 |
| 5 | 10 PCT T | 11.0 | 29 | 17.0 | 1.539 | 3.3 | .052 | .936 | 2000 | 19.2 | .8 | 2.5 | 1.3 | 4.3 | 2.1 |
| 6 | 25 PCT T | 28.2 | 74 | 25.3 | .898 | 2.2 | .056 | .546 | 2000 | 18.0 | 4.5 | 3.2 | 2.9 | 8.7 | 7.3 |
| 7 | 90 PCT T | 99.0 | 260 | 50.3 | .508 | 9.1 | .064 | .309 | 2000 | 15.7 | 32.5 | 47.7 | 62.3 | 25.4 | 37.7 |
| 8 | 25 PCT T | 29.3 | 77 | 25.2 | .859 | 2.3 | .056 | .523 | 2000 | 17.9 | 3.7 | 3.6 | 3.2 | 8.7 | 7.6 |
| 9 | C.T. | 0.0 | 0 | 11.0 | R | R | .045 | R | 2000 | 22.3 | .9 | 2.6 | .9 | 7.0 | 0.0 |
| 1 | 25 PCT T | 29.3 | 77 | 25.8 | .880 | 2.3 | .056 | .535 | 2000 | 17.9 | 5.8 | 3.4 | 3.3 | 8.8 | 7.6 |
| 2 | 55 PCT T | 60.9 | 160 | 35.0 | .574 | 4.5 | .060 | .349 | 2000 | 16.6 | 33.1 | 28.4 | 26.0 | 22.9 | 30.1 |
| 3 | 25 PCT T | 28.9 | 76 | 25.3 | .874 | 2.4 | .056 | .532 | 2000 | 17.9 | 4.8 | 3.6 | 3.4 | 8.7 | 7.5 |
| 4 | 10 PCT T | 11.8 | 31 | 20.0 | 1.694 | 2.6 | .053 | 1.031 | 2000 | 18.7 | 1.5 | 1.4 | 1.1 | 5.1 | 2.3 |
| 5 | 25 PCT T | 28.9 | 76 | 25.2 | .871 | 2.4 | .056 | .530 | 2000 | 17.9 | 4.9 | 3.6 | 3.4 | 8.6 | 7.5 |
| 6 | 90 PCT T | 99.0 | 260 | 51.0 | .515 | 8.0 | .065 | .313 | 2000 | 15.4 | 34.6 | 50.2 | 58.0 | 25.7 | 37.6 |
| 7 | 25 PCT T | 28.6 | 75 | 25.1 | .879 | 2.4 | .056 | .535 | 2000 | 17.7 | 3.7 | 3.6 | 3.4 | 8.6 | 7.4 |
| 8 | C.T. | 0.0 | 0 | 11.5 | R | R | .046 | R | 2000 | 21.8 | 1.1 | 2.4 | 1.0 | 7.3 | 0.0 |
| 9 | IDLE | 0.0 | 0 | 4.1 | R | R | .050 | R | 570 | 20.1 | 10.4 | 3.4 | .3 | 4.2 | 0.0 |

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 2.1 41 7.4

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 1.7 45 7.0

TWO CYCLE COMPOSITE -

| | | | | | | |
|---|---|---|---|---|---|---|
| HC- FID | 0.35( 2.1) + 0.65( 1.7) = | 1.798 | G/KW | HR | ( 1.341 | BS) |
| CO- NDIR | 0.35( 40.9) + 0.65( 45.2) = | 43.687 | G/KW | HR | (32.578 | BS) |
| NOX-CL | 0.35( 7.4) + 0.65( 7.0) = | 7.130 | G/KW | HR | ( 5.317 | BS) |
| HC + NOX = | | 8.928 | G/KW | HR | ( 6.657 | BS) |
| SFC = | | .459 | KG/KW | HR | ( .754 | BS) |

# TABLE F-12A. ENGINE 6 NINE-MODE EMISSIONS RESULTS

01 04 79 136 PM TEST 63 — 1977-78 IH404 -- PROJECT 11-5044-0 — IH404B — BAR=29.51 — K= .788 — HUM= 4.0 G/KG

| MODE | CONCENTRATION AS MEASURED HC-FID | CO | CO2 | NOX-CL | TOTAL CARBON | FUEL G/HR | CALCULATED G/HR HC | CO | NOX | WT. FACT. | MODAL G/KWHR HC-FID | CO | NOX-CL | KW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | 2280 | .290 | 9.69 | 20 | 10.230 | 907 | 22 | 52 | 0 | .232 | R | R | R | 0.0 |
| 2 25 PCT T | 2332 | .810 | 11.44 | 210 | 12.511 | 10433 | 217 | 1364 | 46 | .077 | 7.319 | 45.936 | 1.543 | 22.1 |
| 3 55 PCT T | 944 | 1.430 | 11.56 | 1099 | 13.096 | 16103 | 130 | 3552 | 354 | .147 | 2.013 | 54.864 | 5.462 | 48.3 |
| 4 25 PCT T | 160 | .580 | 11.67 | 370 | 12.268 | 10070 | 15 | 962 | 79 | .077 | .495 | 32.376 | 2.675 | 22.1 |
| 5 10 PCT T | 78 | .350 | 10.99 | 114 | 11.349 | 7212 | 6 | 449 | 19 | .057 | .516 | 42.138 | 1.778 | 8.0 |
| 6 25 PCT T | 126 | .490 | 11.56 | 410 | 12.064 | 10070 | 12 | 826 | 90 | .077 | .411 | 28.927 | 3.135 | 21.3 |
| 7 90 PCT T | 576 | 1.280 | 12.14 | 1594 | 13.485 | 23814 | 115 | 4566 | 737 | .113 | 1.072 | 42.670 | 6.883 | 79.8 |
| 8 25 PCT T | 136 | .290 | 11.21 | 630 | 11.515 | 9752 | 13 | 496 | 140 | .077 | .421 | 16.285 | 4.583 | 22.7 |
| 9 C.T. | 60 | .150 | 9.28 | 45 | 9.437 | 4309 | 3 | 138 | 5 | .143 | R | R | R | 0.0 |
| 1 25 PCT T | 170 | .280 | 11.21 | 515 | 11.509 | 9934 | 16 | 488 | 139 | .077 | .536 | 16.025 | 4.559 | 22.7 |
| 2 55 PCT T | 560 | .490 | 11.81 | 1700 | 12.363 | 15377 | 78 | 1231 | 553 | .147 | 1.183 | 18.687 | 8.398 | 49.1 |
| 3 25 PCT T | 150 | .290 | 11.33 | 640 | 11.637 | 9888 | 14 | 498 | 142 | .077 | .460 | 16.138 | 4.614 | 23.0 |
| 4 10 PCT T | 76 | .250 | 9.62 | 188 | 9.878 | 7121 | 6 | 364 | 35 | .057 | .526 | 31.867 | 3.104 | 8.5 |
| 5 25 PCT T | 160 | .300 | 11.21 | 630 | 11.528 | 9979 | 15 | 525 | 143 | .077 | .506 | 17.219 | 4.684 | 22.7 |
| 6 90 PCT T | 480 | 1.070 | 12.25 | 1700 | 13.374 | 23360 | 94 | 3775 | 777 | .113 | .886 | 35.406 | 7.287 | 79.5 |
| 7 25 PCT T | 112 | .310 | 11.44 | 665 | 11.762 | 9389 | 10 | 500 | 139 | .077 | .315 | 15.815 | 4.395 | 23.6 |
| 8 C.T. | 64 | .140 | 9.38 | 49 | 9.527 | 4309 | 3 | 128 | 6 | .143 | R | R | R | 0.0 |
| 9 IDLE | 1472 | .570 | 9.69 | 26 | 10.422 | 953 | 15 | 105 | 1 | .232 | R | R | R | 0.0 |

| MODE | ID | ----UNITS AS SPECIFIED IN THE 9-08-77 PROCEDURE---- HP | TQ | FC | BSFC | BSNOX | F/A | SFC KG/KW HR | RPM | CALC A/F | PERCENT OF TOTAL HC | CO | NOX | FUEL | POWER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | | 0.0 | 0 | 2.0 | R | R | .047 | R | 530 | 21.2 | 8.9 | .9 | .1 | 2.2 | 0.0 |
| 2 25 PCT T | | 29.7 | 78 | 23.0 | .774 | 1.5 | .057 | .471 | 2000 | 17.5 | 29.0 | 7.6 | 2.1 | 8.5 | 7.3 |
| 3 55 PCT T | | 64.7 | 170 | 35.5 | .548 | 5.5 | .060 | .334 | 2000 | 16.7 | 33.2 | 37.9 | 31.6 | 25.2 | 30.4 |
| 4 25 PCT T | | 29.7 | 78 | 22.2 | .747 | 2.7 | .056 | .455 | 2000 | 17.9 | 2.0 | 5.4 | 3.7 | 8.2 | 7.3 |
| 5 10 PCT T | | 10.7 | 28 | 15.9 | 1.491 | 1.8 | .052 | .907 | 2000 | 19.3 | .5 | 1.9 | .7 | 4.4 | 1.9 |
| 6 25 PCT T | | 28.6 | 75 | 22.2 | .777 | 3.1 | .055 | .473 | 2000 | 18.2 | 1.6 | 4.6 | 4.2 | 8.2 | 7.0 |
| 7 90 PCT T | | 107.0 | 281 | 52.5 | .491 | 6.9 | .062 | .298 | 2000 | 16.2 | 22.4 | 37.5 | 50.6 | 28.6 | 38.6 |
| 8 25 PCT T | | 30.5 | 80 | 21.5 | .706 | 4.6 | .053 | .429 | 2000 | 19.0 | 1.7 | 2.8 | 6.5 | 8.0 | 7.5 |
| 9 C.T. | | 0.0 | 0 | 9.5 | R | R | .043 | R | 2000 | 23.1 | .7 | 1.4 | .5 | 6.6 | 0.0 |
| 1 25 PCT T | | 30.5 | 80 | 21.9 | .719 | 4.6 | .052 | .437 | 2000 | 19.1 | 4.1 | 4.6 | 5.0 | 8.3 | 7.4 |
| 2 55 PCT T | | 65.9 | 173 | 33.9 | .515 | 8.4 | .056 | .313 | 2000 | 17.8 | 37.4 | 21.9 | 37.7 | 24.7 | 30.4 |
| 3 25 PCT T | | 30.8 | 81 | 21.8 | .707 | 4.6 | .053 | .430 | 2000 | 18.9 | 3.6 | 4.6 | 5.1 | 8.3 | 7.4 |
| 4 10 PCT T | | 11.4 | 30 | 15.7 | 1.374 | 3.1 | .045 | .836 | 2000 | 22.0 | 1.1 | 2.5 | .9 | 4.4 | 2.0 |
| 5 25 PCT T | | 30.5 | 80 | 22.0 | .722 | 4.7 | .053 | .439 | 2000 | 19.0 | 3.9 | 4.9 | 5.1 | 8.4 | 7.4 |
| 6 90 PCT T | | 106.6 | 280 | 51.5 | .483 | 7.3 | .061 | .294 | 2000 | 16.4 | 34.8 | 51.7 | 40.7 | 28.8 | 37.8 |
| 7 25 PCT T | | 31.6 | 83 | 20.7 | .655 | 4.4 | .054 | .398 | 2000 | 18.7 | 2.5 | 4.7 | 5.0 | 7.9 | 7.6 |
| 8 C.T. | | 0.0 | 0 | 9.5 | R | R | .044 | R | 2000 | 22.8 | 1.5 | 2.2 | .4 | 6.7 | 0.0 |
| 9 IDLE | | 0.0 | 0 | 2.1 | R | R | .048 | R | 575 | 20.8 | 11.2 | 3.0 | .1 | 2.4 | 0.0 |

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 2.5 59 7.0

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 1.3 35 9.1

TWO CYCLE COMPOSITE -

| | | | | | | |
|---|---|---|---|---|---|---|
| HC- FID | 0.35( 2.5) + 0.65( 1.3) = | 1.704 | G/KW | HR | ( 1.271 | BS) |
| CO- NDIR | 0.35( 58.9) + 0.65( 34.7) = | 43.194 | G/KW | HR | ( 32.210 | BS) |
| NOX-CL | 0.35( 7.0) + 0.65( 9.1) = | 8.354 | G/KW | HR | ( 6.229 | BS) |
| | HC + NOX = | 10.058 | G/KW | HR | ( 7.500 | BS) |
| | SFC = | .391 | KG/KW | HR | ( .643 | BS) |

# TABLE F-12B. ENGINE 6 NINE-MODE EMISSIONS RESULTS

01 04 79 359 PM TEST 64 — 1977-78 IH404 -- PROJECT 11-5044-0 — IH404C — BAR=27.61 K= .827 HUM= 5.0 G/KG

| MODE | CONCENTRATION AS MEASURED HC-FID | CO | CO2 | NOX-CL | TOTAL CARBON | FUEL G/HR | CALCULATED G/HR HC | CO | NOX | WT. FACT. | MODAL G/KWHR HC-FID | CO | NOX-CL | KW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | 2112 | .320 | 9.59 | 20 | 10.142 | 907 | 21 | 58 | 0 | .232 | R | R | R | 0.0 |
| 2 25 PCT T | 332 | .820 | 11.52 | 305 | 12.377 | 10659 | 32 | 1427 | 72 | .077 | 1.063 | 47.418 | 2.397 | 22.4 |
| 3 55 PCT T | 992 | 1.430 | 11.56 | 1122 | 13.101 | 16012 | 136 | 3530 | 376 | .147 | 2.078 | 53.899 | 5.747 | 48.8 |
| 4 25 PCT T | 152 | .550 | 11.67 | 360 | 12.237 | 10206 | 14 | 927 | 82 | .077 | .465 | 30.415 | 2.706 | 22.7 |
| 5 10 PCT T | 72 | .340 | 10.88 | 109 | 11.228 | 7303 | 5 | 447 | 19 | .057 | .455 | 39.101 | 1.704 | 8.5 |
| 6 25 PCT T | 120 | .470 | 11.44 | 405 | 11.923 | 10024 | 11 | 798 | 93 | .077 | .374 | 26.532 | 3.107 | 22.4 |
| 7 90 PCT T | 528 | 1.140 | 12.14 | 1653 | 13.339 | 23360 | 104 | 4033 | 795 | .113 | .977 | 37.820 | 7.453 | 79.5 |
| 8 25 PCT T | 118 | .290 | 11.33 | 620 | 11.633 | 9752 | 11 | 491 | 143 | .077 | .362 | 16.120 | 4.684 | 22.7 |
| 9 C.T. | 120 | .130 | 9.28 | 44 | 9.423 | 4264 | 6 | 119 | 5 | .143 | R | R | R | 0.0 |
| 1 25 PCT T | 156 | .290 | 11.10 | 610 | 11.407 | 9888 | 15 | 508 | 145 | .077 | .493 | 16.668 | 4.765 | 22.7 |
| 2 55 PCT T | 552 | .470 | 11.79 | 1676 | 12.322 | 15195 | 76 | 1171 | 567 | .147 | 1.170 | 17.980 | 8.714 | 48.6 |
| 3 25 PCT T | 140 | .290 | 11.33 | 640 | 11.636 | 9934 | 13 | 500 | 150 | .077 | .421 | 15.823 | 4.746 | 23.6 |
| 4 10 PCT T | 68 | .240 | 10.66 | 185 | 10.908 | 7212 | 5 | 321 | 34 | .057 | .408 | 26.305 | 2.756 | 9.1 |
| 5 25 PCT T | 152 | .290 | 11.21 | 630 | 11.517 | 9979 | 15 | 508 | 150 | .077 | .475 | 16.456 | 4.858 | 23.0 |
| 6 90 PCT T | 480 | .970 | 12.25 | 1676 | 13.274 | 22906 | 93 | 3381 | 794 | .113 | .878 | 31.825 | 7.473 | 79.2 |
| 7 25 PCT T | 104 | .280 | 11.33 | 650 | 11.622 | 9888 | 10 | 481 | 152 | .077 | .308 | 15.045 | 4.747 | 23.9 |
| 8 C.T. | 60 | .150 | 9.38 | 46 | 9.537 | 4309 | 3 | 137 | 6 | .143 | R | R | R | 0.0 |
| 9 IDLE | 1120 | .590 | 9.90 | 38 | 10.613 | 1134 | 13 | 127 | 1 | .232 | R | R | R | 0.0 |

| MODE | ID | ----UNITS AS SPECIFIED IN THE 9-08-77 PROCEDURE---- HP | TQ | FC | BSFC | BSNOX | F/A | SFC KG/KW HR | RPM | CALC A/F | --------PERCENT OF TOTAL------- HC | CO | NOX | FUEL | POWER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | | 0.0 | 0 | 2.0 | R | R | .047 | R | 485 | 21.4 | 11.2 | 1.0 | .1 | 2.2 | 0.0 |
| 2 25 PCT T | | 30.1 | 79 | 23.5 | .781 | 2.4 | .057 | .475 | 2000 | 17.7 | 5.7 | 8.4 | 3.1 | 8.8 | 7.3 |
| 3 55 PCT T | | 65.5 | 172 | 35.3 | .539 | 5.7 | .060 | .328 | 2000 | 16.7 | 46.5 | 39.6 | 31.2 | 25.1 | 30.4 |
| 4 25 PCT T | | 30.5 | 80 | 22.5 | .739 | 2.7 | .056 | .449 | 2000 | 17.9 | 2.5 | 5.4 | 3.6 | 8.4 | 7.4 |
| 5 10 PCT T | | 11.4 | 30 | 16.1 | 1.409 | 1.7 | .051 | .857 | 2000 | 19.5 | .7 | 1.9 | .6 | 4.4 | 2.1 |
| 6 25 PCT T | | 30.1 | 79 | 22.1 | .735 | 3.1 | .054 | .447 | 2000 | 18.4 | 2.0 | 4.7 | 4.1 | 8.2 | 7.3 |
| 7 90 PCT T | | 106.6 | 280 | 51.5 | .483 | 7.5 | .061 | .294 | 2000 | 16.4 | 27.4 | 34.8 | 50.7 | 28.2 | 38.1 |
| 8 25 PCT T | | 30.5 | 80 | 21.5 | .706 | 4.7 | .053 | .429 | 2000 | 18.9 | 2.0 | 2.9 | 6.2 | 8.0 | 7.4 |
| 9 C.T. | | 0.0 | 0 | 9.4 | R | R | .043 | R | 2000 | 23.1 | 2.0 | 1.3 | .4 | 6.5 | 0.0 |
| 1 25 PCT T | | 30.5 | 80 | 21.8 | .716 | 4.8 | .052 | .435 | 2000 | 19.2 | 3.9 | 5.0 | 5.0 | 8.3 | 7.4 |
| 2 55 PCT T | | 65.1 | 171 | 33.5 | .514 | 8.7 | .056 | .313 | 2000 | 17.8 | 37.9 | 22.2 | 37.6 | 24.4 | 30.0 |
| 3 25 PCT T | | 31.6 | 83 | 21.9 | .693 | 4.7 | .053 | .421 | 2000 | 18.9 | 3.5 | 5.0 | 5.2 | 8.3 | 7.6 |
| 4 10 PCT T | | 12.2 | 32 | 15.9 | 1.305 | 2.8 | .050 | .794 | 2000 | 20.1 | 1.0 | 2.4 | .9 | 4.5 | 2.2 |
| 5 25 PCT T | | 30.8 | 81 | 22.0 | .713 | 4.9 | .053 | .434 | 2000 | 19.0 | 3.8 | 5.0 | 5.2 | 8.4 | 7.4 |
| 6 90 PCT T | | 106.2 | 279 | 50.5 | .475 | 7.5 | .060 | .289 | 2000 | 16.5 | 35.6 | 49.3 | 40.4 | 28.2 | 37.6 |
| 7 25 PCT T | | 32.0 | 84 | 21.8 | .681 | 4.7 | .053 | .415 | 2000 | 18.9 | 2.6 | 4.8 | 5.3 | 8.3 | 7.7 |
| 8 C.T. | | 0.0 | 0 | 9.6 | R | R | .044 | R | 2000 | 22.8 | 1.4 | 8.8 | .4 | 6.7 | 0.0 |
| 9 IDLE | | 0.0 | 0 | 2.5 | R | R | .049 | R | 540 | 20.5 | 10.3 | 3.8 | .1 | 2.9 | 0.0 |

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 1.8 56 7.5

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 1.2 33 9.3

TWO CYCLE COMPOSITE -

HC- FID 0.35( 1.8) + 0.65( 1.2) = 1.446 G/KW HR ( 1.078 BS)

CO- NDIR 0.35( 55.5) + 0.65( 32.6) = 40.632 G/KW HR ( 30.299 BS)

NOX-CL 0.35( 7.5) + 0.65( 9.3) = 8.698 G/KW HR ( 6.486 BS)

HC + NOX = 10.144 G/KW HR ( 7.565 BS)

SFC = .389 KG/KW HR ( .640 BS)

## A. ENGINE 7 NINE-MODE EMISSIONS RESULTS

01 30 79 TEST 71 DUR HRS — 1978 CHEV 454 -- PROJECT 11-504 — BAR=29.21 K= .760 HUM= 3.2 G/KG

| MODE | CONCENTRATION AS MEASURED HC-FID | CO | CO2 | NOX-CL | TOTAL CARBON | FUEL G/HR | CALCULATED G/HR HC | CO | NOX | WT. FACT. | MODAL G/KWHR HC-FID | CO | NOX-CL | KW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | 1450 | 1.990 | 9.50 | 13 | 11.651 | 2948 | 41 | 1017 | 1 | .232 | R | R | R | 0.0 |
| 2 25 PCT T | 193 | .095 | 11.00 | 573 | 11.117 | 10569 | 20 | 183 | 137 | .077 | .660 | 5.921 | 4.457 | 23.0 |
| 3 55 PCT T | 299 | .101 | 11.70 | 1552 | 11.834 | 16465 | 46 | 283 | 545 | .147 | .635 | 3.867 | 7.454 | 54.5 |
| 4 25 PCT T | 143 | .098 | 11.10 | 625 | 11.214 | 10795 | 15 | 190 | 152 | .077 | .446 | 5.555 | 4.431 | 25.6 |
| 5 10 PCT T | 76 | .134 | 10.80 | 245 | 10.993 | 7847 | 6 | 195 | 44 | .057 | .429 | 13.817 | 3.147 | 10.5 |
| 6 25 PCT T | 132 | .098 | 11.10 | 652 | 11.213 | 10886 | 14 | 192 | 160 | .077 | .415 | 5.602 | 4.661 | 25.6 |
| 7 90 PCT T | 309 | 1.228 | 13.50 | 1407 | 14.763 | 25174 | 60 | 4230 | 605 | .113 | .490 | 34.496 | 4.938 | 91.4 |
| 8 25 PCT T | 108 | .103 | 11.30 | 701 | 11.415 | 10433 | 11 | 191 | 162 | .077 | .320 | 5.564 | 4.718 | 25.6 |
| 9 C.T. | 168 | .128 | 11.10 | 38 | 11.247 | 4763 | 8 | 110 | 4 | .143 | R | R | R | 0.0 |
| 1 25 PCT T | 123 | .102 | 11.10 | 690 | 11.215 | 10614 | 13 | 194 | 165 | .077 | .377 | 5.673 | 4.809 | 25.6 |
| 2 55 PCT T | 202 | .107 | 11.60 | 1507 | 11.730 | 16556 | 32 | 306 | 537 | .147 | .424 | 4.074 | 7.156 | 55.9 |
| 3 25 PCT T | 107 | .103 | 11.20 | 672 | 11.315 | 10569 | 11 | 195 | 158 | .077 | .328 | 5.751 | 4.674 | 25.3 |
| 4 10 PCT T | 58 | .154 | 11.00 | 228 | 11.161 | 7620 | 4 | 213 | 39 | .057 | .340 | 16.447 | 3.034 | 9.7 |
| 5 25 PCT T | 115 | .101 | 11.10 | 684 | 11.213 | 10523 | 12 | 191 | 162 | .077 | .358 | 5.691 | 4.834 | 25.0 |
| 6 90 PCT T | 255 | 1.125 | 13.50 | 1499 | 14.654 | 25265 | 50 | 3917 | 652 | .113 | .411 | 32.142 | 5.353 | 90.9 |
| 7 25 PCT T | 93 | .103 | 11.20 | 732 | 11.314 | 10659 | 10 | 197 | 174 | .077 | .284 | 5.736 | 5.079 | 25.6 |
| 8 C.T. | 66 | .128 | 11.10 | 40 | 11.236 | 4944 | 3 | 114 | 4 | .143 | R | R | R | 0.0 |
| 9 IDLE | 344 | .770 | 10.90 | 26 | 11.708 | 2722 | 9 | 362 | 2 | .232 | R | R | R | 0.0 |

| MODE | ID | ----UNITS AS SPECIFIED IN THE 9-08-77 PROCEDURE---- HP | TQ | FC | BSFC | BSNOX | F/A | SFC KG/KW HR | RPM | CALC A/F | --------PERCENT OF TOTAL------- HC | CO | NOX | FUEL | POWER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | | 0.0 | 0 | 6.5 | R | R | .054 | R | 670 | 18.5 | 32.3 | 28.1 | .1 | 6.6 | 0.0 |
| 2 25 PCT T | | 30.8 | 81 | 23.3 | .755 | 4.5 | .051 | .459 | 2000 | 19.7 | 5.4 | 1.7 | 5.3 | 7.9 | 6.7 |
| 3 55 PCT T | | 73.1 | 192 | 36.3 | .496 | 7.5 | .054 | .302 | 2000 | 18.6 | 23.4 | 4.9 | 40.3 | 23.4 | 30.1 |
| 4 25 PCT T | | 34.3 | 90 | 23.8 | .694 | 4.4 | .051 | .422 | 2000 | 19.6 | 4.0 | 1.7 | 5.9 | 8.0 | 7.4 |
| 5 10 PCT T | | 14.1 | 37 | 17.3 | 1.228 | 3.1 | .050 | .747 | 2000 | 20.0 | 1.2 | 1.3 | 1.3 | 4.3 | 2.2 |
| 6 25 PCT T | | 34.3 | 90 | 24.0 | .700 | 4.7 | .051 | .426 | 2000 | 19.6 | 3.8 | 1.8 | 6.2 | 8.1 | 7.4 |
| 7 90 PCT T | | 122.6 | 322 | 55.5 | .453 | 4.9 | .067 | .275 | 2000 | 14.9 | 23.2 | 56.9 | 34.4 | 27.4 | 38.8 |
| 8 25 PCT T | | 34.3 | 90 | 23.0 | .671 | 4.7 | .052 | .408 | 2000 | 19.2 | 2.9 | 1.7 | 6.3 | 7.8 | 7.4 |
| 9 C.T. | | 0.0 | 0 | 10.5 | R | R | .051 | R | 2000 | 19.5 | 3.9 | 1.9 | .3 | 6.6 | 0.0 |
| 1 25 PCT T | | 34.3 | 90 | 23.4 | .683 | 4.8 | .051 | .415 | 2000 | 19.6 | 6.0 | 2.3 | 6.1 | 7.9 | 7.3 |
| 2 55 PCT T | | 75.0 | 197 | 36.5 | .487 | 7.2 | .053 | .296 | 2000 | 18.7 | 28.1 | 6.8 | 38.2 | 23.6 | 30.6 |
| 3 25 PCT T | | 33.9 | 89 | 23.3 | .687 | 4.7 | .052 | .418 | 2000 | 19.4 | 5.1 | 2.3 | 5.9 | 7.9 | 7.2 |
| 4 10 PCT T | | 12.9 | 34 | 16.8 | 1.298 | 3.0 | .051 | .789 | 2000 | 19.6 | 1.5 | 1.8 | 1.1 | 4.2 | 2.0 |
| 5 25 PCT T | | 33.5 | 88 | 23.2 | .692 | 4.8 | .051 | .421 | 2000 | 19.6 | 5.5 | 2.2 | 6.0 | 7.8 | 7.2 |
| 6 90 PCT T | | 121.9 | 320 | 55.7 | .457 | 5.4 | .066 | .278 | 2000 | 15.1 | 34.0 | 67.1 | 35.7 | 27.7 | 38.2 |
| 7 25 PCT T | | 34.3 | 90 | 23.5 | .686 | 5.1 | .052 | .417 | 2000 | 19.4 | 4.6 | 2.3 | 6.5 | 8.0 | 7.3 |
| 8 C.T. | | 0.0 | 0 | 10.9 | R | R | .051 | R | 2000 | 19.5 | 2.8 | 2.5 | .3 | 6.8 | 0.0 |
| 9 IDLE | | 0.0 | 0 | 6.0 | R | R | .054 | R | 675 | 18.7 | 12.4 | 12.7 | .2 | 6.1 | 0.0 |

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 1.1 32 7.5
SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .6 25 7.7

TWO CYCLE COMPOSITE -

| | | | | | | |
|---|---|---|---|---|---|---|
| HC- FID | 0.35( 1.1) + 0.65( .6) = | .787 | G/KW HR | ( .587 | BS) |
| CO- NDIR | 0.35( 31.6) + 0.65( 24.6) = | 27.021 | G/KW HR | ( 20.150 | BS) |
| NOX-CL | 0.35( 7.5) + 0.65( 7.7) = | 7.617 | G/KW HR | ( 5.680 | BS) |
| | HC + NOX = | 8.403 | G/KW HR | ( 6.266 | BS) |
| | SFC = | .386 | KG/KW HR | ( .635 | BS) |

# TABLE F-13B. ENGINE 7 NINE-MODE EMISSIONS RESULTS

1978 CHEV 454 -- PROJECT 11-504 BAR=29.59

01 31 79 AM TEST 72 DUR HRS K= .753 HUM= 3.0 G/KG

| MODE | CONCENTRATION AS MEASURED HC-FID | CO | CO2 | NOX-CL | TOTAL CARBON | FUEL G/HR | CALCULATED G/HR HC | CO | NOX | WT. FACT. | MODAL G/KWHR HC-FID | CO | NOX-CL | KW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | 886 | 1.432 | 9.80 | 15 | 11.330 | 3538 | 31 | 903 | 1 | .232 | R | R | R | 0.0 |
| 2 25 PCT T | 180 | .098 | 10.99 | 578 | 11.108 | 11340 | 20 | 202 | 148 | .077 | .602 | 5.957 | 4.355 | 25.3 |
| 3 55 PCT T | 286 | .106 | 11.67 | 1636 | 11.808 | 17010 | 46 | 309 | 589 | .147 | .604 | 4.054 | 7.739 | 56.8 |
| 4 25 PCT T | 122 | .101 | 11.10 | 674 | 11.214 | 11249 | 14 | 204 | 169 | .077 | .388 | 5.818 | 4.827 | 26.1 |
| 5 10 PCT T | 79 | .155 | 10.81 | 246 | 10.974 | 8346 | 7 | 238 | 47 | .057 | .437 | 15.613 | 3.072 | 11.4 |
| 6 25 PCT T | 134 | .101 | 10.99 | 652 | 11.105 | 11340 | 15 | 208 | 167 | .077 | .438 | 5.988 | 4.805 | 25.8 |
| 7 90 PCT T | 251 | 1.089 | 13.59 | 1465 | 14.707 | 25809 | 50 | 3859 | 643 | .113 | .411 | 31.569 | 5.260 | 91.2 |
| 8 25 PCT T | 94 | .101 | 11.10 | 697 | 11.211 | 11249 | 10 | 204 | 175 | .077 | .293 | 5.696 | 4.887 | 26.7 |
| 9 C.T. | 100 | .134 | 10.99 | 38 | 11.135 | 5534 | 6 | 135 | 5 | .143 | R | R | R | 0.0 |
| 1 25 PCT T | 107 | .101 | 10.99 | 666 | 11.102 | 11294 | 12 | 207 | 169 | .077 | .352 | 6.032 | 4.944 | 25.6 |
| 2 55 PCT T | 211 | .114 | 11.67 | 1729 | 11.808 | 16919 | 34 | 331 | 620 | .147 | .443 | 4.348 | 8.136 | 56.8 |
| 3 25 PCT T | 105 | .101 | 11.10 | 718 | 11.212 | 11249 | 12 | 204 | 180 | .077 | .334 | 5.819 | 5.143 | 26.1 |
| 4 10 PCT T | 52 | .143 | 10.88 | 238 | 11.029 | 8346 | 4 | 218 | 45 | .057 | .286 | 14.331 | 2.957 | 11.4 |
| 5 25 PCT T | 113 | .101 | 11.10 | 704 | 11.213 | 11340 | 13 | 206 | 178 | .077 | .366 | 5.930 | 5.139 | 25.8 |
| 6 90 PCT T | 212 | 1.030 | 13.64 | 1435 | 14.694 | 25991 | 43 | 3679 | 635 | .113 | .349 | 30.004 | 5.177 | 91.4 |
| 7 25 PCT T | 90 | .101 | 11.10 | 742 | 11.211 | 11119 | 10 | 201 | 184 | .077 | .277 | 5.628 | 5.139 | 26.7 |
| 8 C.T. | 100 | .131 | 11.10 | 38 | 11.242 | 5670 | 6 | 134 | 5 | .143 | R | R | R | 0.0 |
| 9 IDLE | 351 | .811 | 10.99 | 27 | 11.841 | 3538 | 12 | 490 | 2 | .232 | R | R | R | 0.0 |

| MODE | ID | ----UNITS AS SPECIFIED IN THE 9-08-77 PROCEDURE---- HP | TQ | FC | BSFC | BSNOX | F/A | SFC KG/KW HR | RPM | CALC A/F | --------PERCENT OF TOTAL-------- HC | CO | NOX | FUEL | POWER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | IDLE | 0.0 | 0 | 7.8 | R | R | .052 | R | 700 | 19.1 | 28.1 | 26.6 | .1 | 7.5 | 0.0 |
| 2 | 25 PCT T | 33.9 | 89 | 25.0 | .738 | 4.4 | .051 | .449 | 2000 | 19.7 | 6.2 | 2.0 | 5.3 | 7.9 | 7.1 |
| 3 | 55 PCT T | 76.2 | 200 | 37.5 | .492 | 7.7 | .054 | .299 | 2000 | 18.6 | 26.7 | 5.8 | 40.6 | 22.8 | 30.6 |
| 4 | 25 PCT T | 35.0 | 92 | 24.8 | .708 | 4.8 | .051 | .431 | 2000 | 19.6 | 4.1 | 2.0 | 6.1 | 7.9 | 7.4 |
| 5 | 10 PCT T | 15.2 | 40 | 18.4 | 1.208 | 3.1 | .050 | .735 | 2000 | 20.0 | 1.5 | 1.7 | 1.2 | 4.3 | 2.4 |
| 6 | 25 PCT T | 34.7 | 91 | 25.0 | .721 | 4.8 | .051 | .439 | 2000 | 19.7 | 4.6 | 2.0 | 6.0 | 7.9 | 7.3 |
| 7 | 90 PCT T | 122.2 | 321 | 56.9 | .465 | 5.3 | .067 | .283 | 2000 | 15.0 | 22.4 | 55.4 | 34.0 | 26.6 | 37.7 |
| 8 | 25 PCT T | 35.8 | 94 | 24.8 | .693 | 4.9 | .051 | .421 | 2000 | 19.6 | 3.2 | 2.0 | 6.3 | 7.9 | 7.5 |
| 9 | C.T. | 0.0 | 0 | 12.2 | R | R | .051 | R | 2000 | 19.7 | 3.1 | 2.4 | .3 | 7.2 | 0.0 |
| 1 | 25 PCT T | 34.3 | 90 | 24.9 | .727 | 4.9 | .051 | .442 | 2000 | 19.7 | 5.4 | 2.4 | 5.9 | 7.9 | 7.2 |
| 2 | 55 PCT T | 76.2 | 200 | 37.3 | .490 | 8.1 | .054 | .298 | 2000 | 18.6 | 29.0 | 7.2 | 41.2 | 22.6 | 30.5 |
| 3 | 25 PCT T | 35.0 | 92 | 24.8 | .708 | 5.1 | .051 | .431 | 2000 | 19.6 | 5.3 | 2.3 | 6.3 | 7.9 | 7.4 |
| 4 | 10 PCT T | 15.2 | 40 | 18.4 | 1.208 | 3.0 | .050 | .735 | 2000 | 19.9 | 1.5 | 1.9 | 1.2 | 4.3 | 2.4 |
| 5 | 25 PCT T | 34.9 | 91 | 25.0 | .721 | 5.1 | .051 | .439 | 2000 | 19.6 | 5.7 | 2.4 | 6.2 | 7.9 | 7.3 |
| 6 | 90 PCT T | 122.6 | 322 | 57.3 | .467 | 5.2 | .067 | .284 | 2000 | 15.0 | 28.2 | 61.8 | 32.4 | 26.7 | 37.8 |
| 7 | 25 PCT T | 35.8 | 94 | 24.5 | .684 | 5.1 | .051 | .416 | 2000 | 19.6 | 4.5 | 2.3 | 6.4 | 7.8 | 7.5 |
| 8 | C.T. | 0.0 | 0 | 12.5 | R | R | .051 | R | 2000 | 19.5 | 4.7 | 2.8 | .3 | 7.4 | 0.0 |
| 9 | IDLE | 0.0 | 0 | 7.8 | R | R | .054 | R | 750 | 18.5 | 15.8 | 16.9 | .2 | 7.5 | 0.0 |

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .9 29 7.8

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .6 25 8.1

TWO CYCLE COMPOSITE -

HC- FID 0.35( .9) + 0.65( .6) = .731 G/KW HR ( .545 BS)

CO- NDIR 0.35( 28.8) + 0.65( 24.6) = 26.069 G/KW HR ( 19.440 BS)

NOX-CL 0.35( 7.8) + 0.65( 8.1) = 7.998 G/KW HR ( 5.964 BS)

HC + NOX = 8.729 G/KW HR ( 6.510 BS)

SFC = .402 KG/KW HR ( .661 BS)

TABLE F-14A. ENGINE 8 NINE-MODE EMISSIONS RESULTS

1978 IH404 -- PROJECT 11-504 BAR=29.03

02-15-79 3:26PM TEST 83 IH404 K= .917 HUM= 7.8 G/KG

| MODE | CONCENTRATION AS MEASURED HC-FID | CO | CO2 | NOX-CL | TOTAL CARBON | FUEL G/HR | CALCULATED G/HR HC | CO | NOX | WT. FACT. | -----MODAL G/KWHR----- HC-FID | CO | NOX-CL | KW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | 2432 | .489 | 9.38 | 24 | 10.136 | 1814 | 48 | 177 | 1 | .232 | R | R | R | 0.0 |
| 2 25 PCT T | 384 | .579 | 11.97 | 101 | 12.592 | 11068 | 38 | 1027 | 27 | .077 | 1.326 | 35.975 | .946 | 21.3 |
| 3 55 PCT T | 883 | .973 | 12.02 | 46 | 13.092 | 14969 | 114 | 2247 | 16 | .147 | 1.924 | 38.063 | .271 | 44.0 |
| 4 25 PCT T | 232 | .383 | 12.02 | 125 | 12.429 | 10841 | 23 | 674 | 33 | .077 | .795 | 23.603 | 1.162 | 21.3 |
| 5 10 PCT T | 86 | .302 | 10.88 | 146 | 11.192 | 7530 | 6 | 411 | 30 | .057 | .562 | 35.950 | 2.618 | 8.5 |
| 6 25 PCT T | 244 | .218 | 11.79 | 198 | 12.035 | 10569 | 24 | 387 | 53 | .077 | .839 | 13.540 | 1.854 | 21.3 |
| 7 90 PCT T | 581 | .935 | 12.68 | 1379 | 13.681 | 21047 | 101 | 2905 | 646 | .113 | 1.021 | 29.344 | 6.524 | 73.8 |
| 8 25 PCT T | 192 | .192 | 11.90 | 178 | 12.114 | 10569 | 19 | 339 | 47 | .077 | .656 | 11.872 | 1.656 | 21.3 |
| 9 C.T. | 40 | .140 | 9.42 | 46 | 9.564 | 4853 | 2 | 143 | 7 | .143 | R | R | R | 0.0 |
| 1 25 PCT T | 192 | .192 | 11.79 | 154 | 12.004 | 10795 | 19 | 349 | 42 | .077 | .676 | 12.219 | 1.477 | 21.3 |
| 2 55 PCT T | 488 | .465 | 12.25 | 645 | 12.770 | 14560 | 63 | 1071 | 224 | .147 | 1.053 | 18.021 | 3.770 | 44.3 |
| 3 25 PCT T | 168 | .187 | 11.79 | 179 | 11.996 | 10614 | 17 | 335 | 48 | .077 | .590 | 11.873 | 1.711 | 21.0 |
| 4 10 PCT T | 60 | .261 | 10.88 | 170 | 11.148 | 7575 | 5 | 358 | 35 | .057 | .340 | 26.879 | 2.639 | 9.9 |
| 5 25 PCT T | 185 | .205 | 11.90 | 173 | 12.126 | 10795 | 18 | 370 | 47 | .077 | .645 | 12.939 | 1.642 | 21.3 |
| 6 90 PCT T | 488 | 1.080 | 12.85 | 1292 | 13.985 | 21364 | 85 | 3333 | 601 | .113 | .860 | 33.924 | 6.117 | 73.3 |
| 7 25 PCT T | 148 | .209 | 11.90 | 184 | 12.125 | 10523 | 14 | 366 | 49 | .077 | .503 | 12.805 | 1.702 | 21.3 |
| 8 C.T. | 54 | .144 | 9.42 | 48 | 9.570 | 4899 | 3 | 149 | 7 | .143 | R | R | R | 0.0 |
| 9 IDLE | 2240 | .251 | 9.48 | 22 | 9.977 | 1497 | 37 | 76 | 1 | .232 | R | R | R | 0.0 |

| MODE | ID | ----UNITS AS SPECIFIED IN THE 9-08-77 PROCEDURE---- HP | TQ | FC | BSFC | BSNOX | F/A | SFC KG/KW HR | RPM | CALC A/F | --------PERCENT OF TOTAL------- HC | CO | NOX | FUEL | POWER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | | 0.0 | 0 | 4.0 | R | R | .047 | R | 630 | 21.4 | 23.2 | 4.4 | .3 | 4.5 | 0.0 |
| 2 25 PCT T | | 28.6 | 75 | 24.4 | .854 | .9 | .057 | .520 | 2000 | 17.4 | 6.1 | 8.5 | 2.3 | 9.0 | 7.5 |
| 3 55 PCT T | | 59.0 | 155 | 33.0 | .559 | .3 | .060 | .340 | 2000 | 16.7 | 34.9 | 35.5 | 2.6 | 23.3 | 29.6 |
| 4 25 PCT T | | 28.6 | 75 | 23.9 | .837 | 1.2 | .057 | .509 | 2000 | 17.7 | 3.7 | 5.6 | 2.8 | 8.8 | 7.5 |
| 5 10 PCT T | | 11.4 | 30 | 16.6 | 1.453 | 2.6 | .051 | .884 | 2000 | 19.6 | .8 | 2.5 | 1.9 | 4.5 | 2.2 |
| 6 25 PCT T | | 28.6 | 75 | 23.3 | .816 | 1.9 | .055 | .496 | 2000 | 18.3 | 3.9 | 3.2 | 4.5 | 8.6 | 7.5 |
| 7 90 PCT T | | 99.0 | 260 | 46.4 | .469 | 6.5 | .062 | .285 | 2000 | 16.1 | 23.9 | 35.3 | 80.5 | 25.2 | 38.2 |
| 8 25 PCT T | | 28.6 | 75 | 23.3 | .816 | 1.7 | .055 | .496 | 2000 | 18.2 | 3.0 | 2.8 | 4.0 | 8.6 | 7.5 |
| 9 C.T. | | 0.0 | 0 | 10.7 | R | R | .044 | R | 2000 | 22.8 | .7 | 2.2 | 1.1 | 7.4 | 0.0 |
| 1 25 PCT T | | 28.6 | 75 | 23.8 | .833 | 1.5 | .055 | .507 | 2000 | 18.3 | 4.5 | 3.8 | 2.7 | 8.9 | 7.5 |
| 2 55 PCT T | | 59.4 | 156 | 32.1 | .540 | 3.8 | .058 | .329 | 2000 | 17.2 | 27.6 | 22.4 | 27.8 | 23.0 | 29.7 |
| 3 25 PCT T | | 28.2 | 74 | 23.4 | .830 | 1.7 | .055 | .505 | 2000 | 18.3 | 3.8 | 3.7 | 3.1 | 8.8 | 7.4 |
| 4 10 PCT T | | 13.3 | 35 | 16.7 | 1.253 | 2.6 | .051 | .762 | 2000 | 19.6 | .8 | 2.9 | 1.7 | 4.6 | 2.6 |
| 5 25 PCT T | | 28.6 | 75 | 23.8 | .833 | 1.6 | .055 | .507 | 2000 | 18.1 | 4.3 | 4.0 | 3.0 | 8.9 | 7.5 |
| 6 90 PCT T | | 98.2 | 258 | 47.1 | .479 | 6.1 | .064 | .292 | 2000 | 15.7 | 28.7 | 53.6 | 57.3 | 25.9 | 37.8 |
| 7 25 PCT T | | 28.6 | 75 | 23.2 | .812 | 1.7 | .055 | .494 | 2000 | 18.1 | 3.3 | 4.0 | 3.2 | 8.7 | 7.5 |
| 8 C.T. | | 0.0 | 0 | 10.8 | R | R | .044 | R | 2000 | 22.7 | 1.3 | 3.0 | .9 | 7.5 | 0.0 |
| 9 IDLE | | 0.0 | 0 | 3.3 | R | R | .046 | R | 600 | 21.8 | 25.7 | 2.5 | .2 | 3.7 | 0.0 |

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 2.2 43 4.2

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 1.5 32 5.4

TWO CYCLE COMPOSITE -

HC- FID 0.35( 2.2) + 0.65( 1.5) = 1.754 G/KW HR ( 1.308 BS)

CO- NDIR 0.35( 42.6) + 0.65( 32.1) = 35.758 G/KW HR ( 26.665 BS)

NOX-CL 0.35( 4.2) + 0.65( 5.4) = 4.969 G/KW HR ( 3.705 BS)

HC + NOX = 6.723 G/KW HR ( 5.013 BS)

SFC = .428 KG/KW HR ( .703 BS)

# TABLE F-14B. ENGINE 8 NINE-MODE EMISSIONS RESULTS

1978 IH404 -- PROJECT 11-504 BAR=29.44

02-19-79 TEST 85 3-Minute Modes K= .747 HUM= 2.9 G/KG

| MODE | CONCENTRATION AS MEASURED HC-FID | CO | CO2 | NOX-CL | TOTAL CARBON | FUEL G/HR | CALCULATED G/HR HC | CO | NOX | WT. FACT. | MODAL G/KWHR HC-FID | CO | NOX-CL | KW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | 2240 | .282 | 9.59 | 30 | 10.118 | 1406 | 34 | 79 | 1 | .232 | R | R | R | 0.0 |
| 2 25 PCT T | 248 | .146 | 11.67 | 199 | 11.843 | 10659 | 25 | 265 | 44 | .077 | .884 | 9.394 | 1.576 | 21.0 |
| 3 55 PCT T | 424 | .269 | 12.25 | 910 | 12.567 | 14878 | 56 | 644 | 267 | .147 | .896 | 10.242 | 4.252 | 46.9 |
| 4 25 PCT T | 196 | .146 | 11.67 | 233 | 11.837 | 10387 | 19 | 258 | 51 | .077 | .638 | 8.579 | 1.685 | 22.4 |
| 5 10 PCT T | 76 | .250 | 10.77 | 195 | 11.028 | 7167 | 5 | 328 | 31 | .057 | .464 | 27.767 | 2.662 | 8.8 |
| 6 25 PCT T | 188 | .146 | 11.67 | 225 | 11.837 | 10478 | 19 | 260 | 49 | .077 | .625 | 8.765 | 1.663 | 22.1 |
| 7 90 PCT T | 344 | .910 | 13.10 | 1653 | 14.049 | 22453 | 62 | 2937 | 655 | .113 | .591 | 27.839 | 6.211 | 78.7 |
| 8 25 PCT T | 152 | .146 | 11.79 | 240 | 11.953 | 10523 | 15 | 259 | 52 | .077 | .503 | 8.718 | 1.764 | 22.1 |
| 9 C.T. | 39 | .117 | 9.28 | 51 | 9.401 | 4672 | 2 | 118 | 6 | .143 | R | R | R | 0.0 |
| 1 25 PCT T | 248 | .146 | 11.67 | 199 | 11.843 | 10659 | 25 | 265 | 44 | .077 | .884 | 9.394 | 1.576 | 21.0 |
| 2 55 PCT T | 424 | .269 | 12.25 | 910 | 12.567 | 14878 | 56 | 644 | 267 | .147 | .896 | 10.242 | 4.252 | 46.9 |
| 3 25 PCT T | 196 | .146 | 11.67 | 233 | 11.837 | 10387 | 19 | 258 | 51 | .077 | .638 | 8.579 | 1.685 | 22.4 |
| 4 10 PCT T | 76 | .250 | 10.77 | 195 | 11.028 | 7167 | 5 | 328 | 31 | .057 | .464 | 27.767 | 2.662 | 8.8 |
| 5 25 PCT T | 188 | .146 | 11.67 | 225 | 11.837 | 10478 | 19 | 260 | 49 | .077 | .625 | 8.765 | 1.663 | 22.1 |
| 6 90 PCT T | 344 | .910 | 13.10 | 1653 | 14.049 | 22453 | 62 | 2937 | 655 | .113 | .591 | 27.839 | 6.211 | 78.7 |
| 7 25 PCT T | 152 | .146 | 11.79 | 240 | 11.953 | 10523 | 15 | 259 | 52 | .077 | .503 | 8.718 | 1.764 | 22.1 |
| 8 C.T. | 39 | .117 | 9.28 | 51 | 9.401 | 4672 | 2 | 118 | 6 | .143 | R | R | R | 0.0 |
| 9 IDLE | 2240 | .282 | 9.59 | 30 | 10.118 | 1406 | 34 | 79 | 1 | .232 | R | R | R | 0.0 |

| MODE | ID | ----UNITS AS SPECIFIED IN THE 9-08-77 PROCEDURE---- HP | TQ | FC | BSFC | BSNOX | F/A | SFC KG/KW HR | RPM | CALC A/F | --------PERCENT OF TOTAL------- HC | CO | NOX | FUEL | POWER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | | 0.0 | 0 | 3.1 | R | R | .047 | R | 550 | 21.5 | 26.6 | 3.3 | .2 | 3.5 | 0.0 |
| 2 25 PCT T | | 28.2 | 74 | 23.5 | .834 | 1.6 | .054 | .507 | 2000 | 18.6 | 6.4 | 3.6 | 2.6 | 8.8 | 7.0 |
| 3 55 PCT T | | 62.8 | 165 | 32.8 | .522 | 4.3 | .057 | .318 | 2000 | 17.5 | 27.7 | 16.9 | 29.9 | 23.4 | 29.9 |
| 4 25 PCT T | | 30.1 | 79 | 22.9 | .761 | 1.7 | .054 | .463 | 2000 | 18.6 | 5.0 | 3.5 | 3.0 | 8.5 | 7.5 |
| 5 10 PCT T | | 11.8 | 31 | 15.8 | 1.338 | 2.7 | .050 | .814 | 2000 | 19.8 | 1.0 | 3.3 | 1.4 | 4.4 | 2.2 |
| 6 25 PCT T | | 29.7 | 78 | 23.1 | .778 | 1.7 | .054 | .473 | 2000 | 18.6 | 4.8 | 3.6 | 2.9 | 8.6 | 7.4 |
| 7 90 PCT T | | 105.5 | 277 | 49.5 | .469 | 6.2 | .064 | .285 | 2000 | 15.7 | 23.6 | 59.2 | 56.3 | 27.1 | 38.6 |
| 8 25 PCT T | | 29.7 | 78 | 23.2 | .781 | 1.8 | .054 | .475 | 2000 | 18.4 | 3.9 | 3.6 | 3.1 | 8.7 | 7.4 |
| 9 C.T. | | 0.0 | 0 | 10.3 | R | R | .043 | R | 2000 | 23.1 | 1.0 | 3.0 | .7 | 7.1 | 0.0 |
| 1 25 PCT T | | 28.2 | 74 | 23.5 | .834 | 1.6 | .054 | .507 | 2000 | 18.6 | 6.4 | 3.6 | 2.6 | 8.8 | 7.0 |
| 2 55 PCT T | | 62.8 | 165 | 32.8 | .522 | 4.3 | .057 | .318 | 2000 | 17.5 | 27.7 | 16.9 | 29.9 | 23.4 | 29.9 |
| 3 25 PCT T | | 30.1 | 79 | 22.9 | .761 | 1.7 | .054 | .463 | 2000 | 18.6 | 5.0 | 3.5 | 3.0 | 8.5 | 7.5 |
| 4 10 PCT T | | 11.8 | 31 | 15.8 | 1.338 | 2.7 | .050 | .814 | 2000 | 19.8 | 1.0 | 3.3 | 1.4 | 4.4 | 2.2 |
| 5 25 PCT T | | 29.7 | 78 | 23.1 | .778 | 1.7 | .054 | .473 | 2000 | 18.6 | 4.8 | 3.6 | 2.9 | 8.6 | 7.4 |
| 6 90 PCT T | | 105.5 | 277 | 49.5 | .469 | 6.2 | .064 | .285 | 2000 | 15.7 | 23.6 | 59.2 | 56.3 | 27.1 | 38.6 |
| 7 25 PCT T | | 29.7 | 78 | 23.2 | .781 | 1.8 | .054 | .475 | 2000 | 18.4 | 3.9 | 3.6 | 3.1 | 8.7 | 7.4 |
| 8 C.T. | | 0.0 | 0 | 10.3 | R | R | .043 | R | 2000 | 23.1 | 1.0 | 3.0 | .7 | 7.1 | 0.0 |
| 9 IDLE | | 0.0 | 0 | 3.1 | R | R | .047 | R | 550 | 21.5 | 26.6 | 3.3 | .2 | 3.5 | 0.0 |

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 1.3 24 5.7

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 1.3 24 5.7

TWO CYCLE COMPOSITE -

| | | | | | |
|---|---|---|---|---|---|
| HC- FID | 0.35( 1.3) + 0.65( 1.3) = | 1.295 | G/KW HR | ( .966 BS) |
| CO- NDIR | 0.35( 24.3) + 0.65( 24.3) = | 24.336 | G/KW HR | ( 18.147 BS) |
| NOX-CL | 0.35( 5.7) + 0.65( 5.7) = | 5.705 | G/KW HR | ( 4.254 BS) |
| | HC + NOX = | 7.000 | G/KW HR | ( 5.220 BS) |
| | SFC = | .407 | KG/KW HR | ( .668 BS) |

# TABLE F-15A. ENGINE 10 NINE-MODE EMISSIONS RESULTS

1979 GM292 PROJECT 11-5044-001

05 01 79 TEST 10-4 K= .959 HUM= 9.2 G/KG

| MODE | CONCENTRATION AS MEASURED HC-FID | CO | CO2 | NOX-CL | TOTAL CARBON | FUEL G/HR | CALCULATED G/HR HC | CO | NOX | WT. FACT. | MODAL G/KWHR HC-FID | CO | NOX-CL | KW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | 9856 | .102 | 7.10 | 76 | 8.260 | 1497 | 192 | 37 | 4 | .232 | R | R | R | 0.0 |
| 2 25 PCT T | 378 | 1.158 | 11.19 | 695 | 12.391 | 7167 | 24 | 1353 | 128 | .077 | 1.234 | 68.343 | 6.461 | 14.8 |
| 3 55 PCT T | 915 | 1.359 | 11.66 | 2351 | 13.122 | 10886 | 85 | 2277 | 621 | .147 | 1.931 | 51.554 | 14.054 | 32.9 |
| 4 25 PCT T | 186 | .973 | 11.54 | 763 | 12.534 | 7167 | 12 | 1124 | 139 | .077 | .613 | 57.861 | 7.150 | 14.5 |
| 5 10 PCT T | 147 | .595 | 10.51 | 190 | 11.121 | 4990 | 7 | 539 | 27 | .057 | 1.010 | 74.491 | 3.750 | 5.4 |
| 6 25 PCT T | 124 | .846 | 11.66 | 790 | 12.520 | 7167 | 8 | 978 | 144 | .077 | .402 | 49.385 | 7.269 | 14.8 |
| 7 90 PCT T | 611 | 1.236 | 12.40 | 3012 | 13.706 | 15604 | 79 | 2844 | 1091 | .113 | 1.081 | 39.096 | 15.006 | 54.2 |
| 8 25 PCT T | 44 | .554 | 12.27 | 774 | 12.829 | 7484 | 3 | 652 | 144 | .077 | .146 | 32.947 | 7.258 | 14.8 |
| 9 C.T. | 4480 | .152 | 8.17 | 87 | 8.808 | 3175 | 175 | 111 | 10 | .143 | R | R | R | 0.0 |
| 1 25 PCT T | 98 | .708 | 11.90 | 755 | 12.619 | 7167 | 6 | 812 | 136 | .077 | .322 | 41.833 | 7.027 | 14.5 |
| 2 55 PCT T | 652 | 1.181 | 11.90 | 2500 | 13.155 | 10886 | 61 | 1975 | 659 | .147 | 1.398 | 45.485 | 15.169 | 32.4 |
| 3 25 PCT T | 64 | .654 | 12.07 | 798 | 12.731 | 7212 | 4 | 748 | 144 | .077 | .210 | 38.523 | 7.409 | 14.5 |
| 4 10 PCT T | 108 | .568 | 10.51 | 212 | 11.090 | 4990 | 5 | 516 | 30 | .057 | .707 | 67.779 | 3.986 | 5.7 |
| 5 25 PCT T | 64 | .679 | 11.90 | 773 | 12.586 | 7031 | 4 | 766 | 137 | .077 | .206 | 39.456 | 7.077 | 14.5 |
| 6 90 PCT T | 562 | 1.478 | 12.07 | 2823 | 13.612 | 15876 | 74 | 3483 | 1048 | .113 | 1.027 | 48.394 | 14.561 | 53.7 |
| 7 25 PCT T | 32 | .485 | 12.35 | 783 | 12.839 | 7257 | 2 | 554 | 141 | .077 | .107 | 29.092 | 7.399 | 14.2 |
| 8 C.T. | 4544 | .156 | 8.20 | 76 | 8.849 | 3084 | 172 | 110 | 8 | .143 | R | R | R | 0.0 |
| 9 IDLE | 8960 | .079 | 7.06 | 55 | 8.100 | 998 | 118 | 20 | 2 | .232 | R | R | R | 0.0 |

| MODE | ID | UNITS AS SPECIFIED IN THE 9-08-77 PROCEDURE HP | TQ | FC | BSFC | BSNOX | F/A | SFC KG/KW HR | RPM | CALC A/F | PERCENT OF TOTAL HC | CO | NOX | FUEL | POWER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | IDLE | 0.0 | 0 | 3.3 | R | R | .039 | R | 700 | 25.8 | 46.8 | .8 | .4 | 5.2 | 0.0 |
| 2 | 25 PCT T | 19.8 | 52 | 15.8 | .798 | 6.5 | .057 | .485 | 2000 | 17.6 | 2.0 | 10.1 | 3.8 | 8.3 | 7.2 |
| 3 | 55 PCT T | 44.2 | 116 | 24.0 | .543 | 14.1 | .060 | .330 | 2000 | 16.6 | 13.2 | 32.6 | 34.9 | 24.0 | 30.6 |
| 4 | 25 PCT T | 19.4 | 51 | 15.8 | .814 | 7.2 | .057 | .495 | 2000 | 17.5 | 1.0 | 8.4 | 4.1 | 8.3 | 7.1 |
| 5 | 10 PCT T | 7.2 | 19 | 11.0 | 1.520 | 3.8 | .051 | .925 | 2000 | 19.6 | .4 | 3.0 | .6 | 4.3 | 1.9 |
| 6 | 25 PCT T | 19.8 | 52 | 15.8 | .798 | 7.3 | .057 | .485 | 2000 | 17.5 | .6 | 7.3 | 4.2 | 8.3 | 7.2 |
| 7 | 90 PCT T | 72.7 | 191 | 34.4 | .473 | 15.0 | .062 | .288 | 2000 | 16.0 | 9.4 | 31.3 | 47.2 | 26.4 | 38.8 |
| 8 | 25 PCT T | 19.8 | 52 | 16.5 | .833 | 7.3 | .058 | .507 | 2000 | 17.2 | .2 | 4.9 | 4.2 | 8.6 | 7.2 |
| 9 | C.T. | 0.0 | 0 | 7.0 | R | R | .041 | R | 2000 | 24.5 | 26.4 | 1.5 | .5 | 6.8 | 0.0 |
| 1 | 25 PCT T | 19.4 | 51 | 15.8 | .814 | 7.0 | .057 | .495 | 2000 | 17.4 | .7 | 6.5 | 4.0 | 8.4 | 7.2 |
| 2 | 55 PCT T | 43.4 | 114 | 24.0 | .553 | 15.2 | .060 | .336 | 2000 | 16.6 | 12.6 | 30.4 | 37.0 | 24.4 | 30.5 |
| 3 | 25 PCT T | 19.4 | 51 | 15.9 | .819 | 7.4 | .058 | .498 | 2000 | 17.3 | .4 | 6.0 | 4.2 | 8.5 | 7.2 |
| 4 | 10 PCT T | 7.6 | 20 | 11.0 | 1.444 | 4.0 | .051 | .879 | 2000 | 19.7 | .4 | 3.1 | .7 | 4.3 | 2.1 |
| 5 | 25 PCT T | 19.4 | 51 | 15.5 | .798 | 7.1 | .057 | .485 | 2000 | 17.4 | .4 | 6.2 | 4.0 | 8.3 | 7.2 |
| 6 | 90 PCT T | 72.0 | 189 | 35.0 | .486 | 14.6 | .062 | .296 | 2000 | 16.1 | 11.8 | 41.2 | 45.3 | 27.4 | 38.9 |
| 7 | 25 PCT T | 19.0 | 50 | 16.0 | .840 | 7.4 | .058 | .511 | 2000 | 17.2 | .2 | 4.5 | 4.1 | 8.5 | 7.0 |
| 8 | C.T. | 0.0 | 0 | 6.8 | R | R | .041 | R | 2000 | 24.4 | 34.6 | 1.6 | .8 | 6.7 | 0.0 |
| 9 | IDLE | 0.0 | 0 | 2.2 | R | R | .038 | R | 700 | 26.4 | 38.8 | .5 | .2 | 3.5 | 0.0 |

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 6.0 65 16.5

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 4.5 61 16.8

TWO CYCLE COMPOSITE -

| | | | | | | |
|---|---|---|---|---|---|---|
| HC- FID | 0.35( 6.0) + 0.65( 4.5) = | 5.059 | G/KW HR | ( 3.772 BS) |
| CO- NDIR | 0.35( 65.0) + 0.65( 61.3) = | 62.601 | G/KW HR | ( 46.681 BS) |
| NOX-CL | 0.35( 16.5) + 0.65( 16.8) = | 16.699 | G/KW HR | ( 12.453 BS) |
| | HC + NOX = | 21.758 | G/KW HR | ( 16.225 BS) |
| | SFC = | .421 | KG/KW HR | ( .693 BS) |

# TABLE F-15B. ENGINE 10 NINE-MODE EMISSIONS RESULTS

1979 GM292 PROJECT 11-5044-001

05 01 79 TEST 10-5 K= .969 HUM= 9.5 G/KG

| MODE | CONCENTRATION AS MEASURED HC-FID | CO | CO2 | NOx-CL | TOTAL CARBON | FUEL G/HR | CALCULATED G/HR HC | CO | NOX | WT. FACT. | MODAL G/KWHR HC-FID | CO | NOx-CL | KW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | 8064 | .089 | 7.02 | 98 | 7.973 | 1406 | 152 | 32 | 6 | .232 | R | R | R | 0.0 |
| 2 25 PCT T | 362 | 1.145 | 10.29 | 705 | 11.475 | 7031 | 25 | 1417 | 139 | .077 | 1.318 | 75.956 | 7.444 | 13.9 |
| 3 55 PCT T | 931 | 1.385 | 10.47 | 2311 | 11.959 | 10932 | 95 | 2558 | 679 | .147 | 2.219 | 59.978 | 15.927 | 31.8 |
| 4 25 PCT T | 194 | .998 | 10.42 | 800 | 11.439 | 7167 | 13 | 1263 | 161 | .077 | .708 | 66.314 | 8.465 | 14.2 |
| 5 10 PCT T | 164 | .605 | 9.65 | 208 | 10.273 | 4763 | 8 | 567 | 31 | .057 | 1.098 | 74.427 | 4.071 | 5.7 |
| 6 25 PCT T | 136 | .873 | 10.85 | 815 | 11.738 | 7167 | 9 | 1077 | 160 | .077 | .485 | 56.560 | 8.404 | 14.2 |
| 7 90 PCT T | 614 | 1.637 | 11.19 | 2975 | 12.896 | 16239 | 87 | 4164 | 1205 | .113 | 1.185 | 56.950 | 16.476 | 54.5 |
| 8 25 PCT T | 48 | .575 | 11.19 | 823 | 11.771 | 7575 | 3 | 748 | 170 | .077 | .181 | 39.285 | 8.945 | 14.2 |
| 9 C.T. | 4992 | .155 | 7.45 | 80 | 8.143 | 2903 | 192 | 112 | 9 | .143 | R | R | R | 0.0 |
| 1 25 PCT T | 112 | .762 | 10.40 | 794 | 11.175 | 7167 | 8 | 988 | 164 | .077 | .418 | 51.873 | 8.600 | 14.2 |
| 2 55 PCT T | 722 | 1.134 | 10.51 | 2591 | 11.724 | 10932 | 75 | 2135 | 777 | .147 | 1.693 | 48.343 | 17.587 | 32.9 |
| 3 25 PCT T | 72 | .709 | 10.73 | 815 | 11.447 | 7257 | 5 | 908 | 166 | .077 | .266 | 47.708 | 8.726 | 14.2 |
| 4 10 PCT T | 116 | .562 | 9.65 | 207 | 10.224 | 4672 | 6 | 518 | 30 | .057 | .806 | 71.657 | 4.204 | 5.4 |
| 5 25 PCT T | 70 | .699 | 10.96 | 826 | 11.667 | 7031 | 5 | 851 | 160 | .077 | .247 | 44.695 | 8.407 | 14.2 |
| 6 90 PCT T | 536 | 1.532 | 11.42 | 2823 | 13.012 | 16148 | 75 | 3839 | 1127 | .113 | 1.021 | 52.510 | 15.408 | 54.5 |
| 7 25 PCT T | 35 | .512 | 11.42 | 850 | 11.935 | 7303 | 2 | 632 | 167 | .077 | .123 | 32.552 | 8.611 | 14.5 |
| 8 C.T. | 4480 | .155 | 7.85 | 79 | 8.489 | 2858 | 163 | 105 | 9 | .143 | R | R | R | 0.0 |
| 9 IDLE | 10240 | .074 | 6.64 | 53 | 7.808 | 1406 | 197 | 27 | 3 | .232 | R | R | R | 0.0 |

| MODE | ID | ----UNITS AS SPECIFIED IN THE 9-08-77 PROCEDURE---- HP | TQ | FC | BSFC | BSNOX | F/A | SFC KG/KW HR | RPM | CALC A/F | --------PERCENT OF TOTAL------- HC | CO | NOX | FUEL | POWER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 IDLE | | 0.0 | 0 | 3.1 | R | R | .037 | R | 700 | 26.8 | 38.9 | .6 | .4 | 4.9 | 0.0 |
| 2 25 PCT T | | 18.7 | 49 | 15.5 | .831 | 7.4 | .053 | .505 | 2000 | 19.0 | 2.1 | 8.7 | 3.7 | 8.1 | 6.9 |
| 3 55 PCT T | | 42.7 | 112 | 24.1 | .565 | 15.9 | .055 | .344 | 2000 | 18.2 | 15.3 | 30.1 | 34.6 | 24.0 | 30.1 |
| 4 25 PCT T | | 19.0 | 50 | 15.8 | .830 | 8.5 | .053 | .505 | 2000 | 19.0 | 1.1 | 7.8 | 4.3 | 8.3 | 7.0 |
| 5 10 PCT T | | 7.6 | 20 | 10.5 | 1.379 | 4.1 | .047 | .839 | 2000 | 21.2 | .5 | 2.6 | .6 | 4.1 | 2.1 |
| 6 25 PCT T | | 19.0 | 50 | 15.8 | .830 | 8.4 | .054 | .505 | 2000 | 18.6 | .8 | 6.6 | 4.3 | 8.3 | 7.0 |
| 7 90 PCT T | | 73.1 | 192 | 35.8 | .490 | 16.5 | .059 | .298 | 2000 | 16.9 | 10.8 | 37.7 | 47.1 | 27.5 | 39.7 |
| 8 25 PCT T | | 19.0 | 50 | 16.7 | .877 | 8.9 | .054 | .534 | 2000 | 18.6 | .3 | 4.6 | 4.5 | 8.7 | 7.0 |
| 9 C.T. | | 0.0 | 0 | 6.4 | R | R | .038 | R | 2000 | 26.4 | 30.2 | 1.3 | .5 | 6.2 | 0.0 |
| 1 25 PCT T | | 19.0 | 50 | 15.8 | .830 | 8.6 | .051 | .505 | 2000 | 19.5 | .7 | 7.2 | 4.3 | 8.3 | 7.0 |
| 2 55 PCT T | | 44.2 | 116 | 24.1 | .546 | 17.6 | .054 | .332 | 2000 | 18.6 | 12.2 | 29.6 | 38.6 | 24.2 | 30.8 |
| 3 25 PCT T | | 19.0 | 50 | 16.0 | .840 | 8.7 | .052 | .511 | 2000 | 19.1 | .4 | 6.6 | 4.3 | 8.4 | 7.0 |
| 4 10 PCT T | | 7.2 | 19 | 10.3 | 1.424 | 4.2 | .047 | .866 | 2000 | 21.3 | .4 | 2.8 | .6 | 4.0 | 2.0 |
| 5 25 PCT T | | 19.0 | 50 | 15.5 | .814 | 8.4 | .053 | .495 | 2000 | 18.7 | .4 | 6.2 | 4.2 | 8.1 | 7.0 |
| 6 90 PCT T | | 73.1 | 192 | 35.6 | .487 | 15.4 | .060 | .296 | 2000 | 16.8 | 9.3 | 41.0 | 43.0 | 27.5 | 39.2 |
| 7 25 PCT T | | 19.4 | 51 | 16.1 | .829 | 8.6 | .054 | .504 | 2000 | 18.4 | .2 | 4.6 | 4.4 | 8.5 | 7.1 |
| 8 C.T. | | 0.0 | 0 | 6.3 | R | R | .039 | R | 2000 | 26.3 | 26.8 | 1.4 | .4 | 6.1 | 0.0 |
| 9 IDLE | | 0.0 | 0 | 3.1 | R | R | .037 | R | 700 | 27.3 | 50.6 | .6 | .2 | 4.9 | 0.0 |

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 5.9 81 18.6

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 5.8 67 18.8

TWO CYCLE COMPOSITE -

| | | | | | | |
|---|---|---|---|---|---|---|
| HC- FID | 0.35( 5.9) + 0.65( 5.8) = | 5.788 | G/KW HR | ( 4.316 BS) |
| CO- NDIR | 0.35( 80.5) + 0.65( 67.4) = | 72.006 | G/KW HR | ( 53.695 BS) |
| NOX-CL | 0.35( 18.6) + 0.65( 18.8) = | 18.760 | G/KW HR | ( 13.989 BS) |
| | HC + NOX = | 24.548 | G/KW HR | ( 18.305 BS) |
| | SFC = | .426 | KG/KW HR | ( .700 BS) |

## TECHNICAL REPORT DATA
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| | |
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16. ABSTRACT

This volume of the two-volume report describes the heavy-duty, gasoline engine baseline emissions evaluations conducted at Southwest Research Institute. Initially, a facility was developed which was capable of complying with the requirements in the 1984 dynamometer transient procedure. Seventeen gasoline engines were then tested over the transient and the nine-mode emissions test procedures. Included were 1969 model year engines for HC baseline, 1972-73 engines for $NO_x$ baseline, and 1978-79 engines for correlation purposes. Emissions measured were hydrocarbons, carbon monoxide, and oxides of nitrogen on all engines.

17. KEY WORDS AND DOCUMENT ANALYSIS

| a. DESCRIPTORS | b. IDENTIFIERS/OPEN ENDED TERMS | c. COSATI Field/Group |
|---|---|---|
| Exhaust Emissions<br>Spark Ignition Engines<br>Hydrocarbons<br>Carbon Monoxide<br>Nitrogen Oxides | Heavy-Duty Engines<br>Emissions Test Procedure<br>Transient Cycle Emission Tests | |

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