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Automobile Characteristics Historical Data Base

Chilton Co, Radnor, Pa

Prepared for

Transportation Systems Center, Cambridge, Mass

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REPORT NO. DOT-TSC-OST-77-12

AUTOMOBILE CHARACTERISTICS
HISTORICAL DATA BASE

J.A. Milne, C. Cantwell, Eissler

Chilton Company
Radnor PA 19089

AUGUST 1977

FINAL REPORT

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16. Abstract

A collection of data concerning the physical, operating, and performance characteristics of automobiles for the model years 1955, 1960, 1965, 1968, and 1970 to 1974. Data is to be added to the data base already established by DOT/TSC, for the 1975 model year automobiles.

Information was primarily collected from published sources with extrapolation and correlations being made when raw data was not available.

Vehicles are reported by model year and are grouped by manufacturer using production volume and fuel economy-dependent attributes - ie: engine displacement, weight, and transmission type as criteria to select representative vehicles. Models which are essentially duplicated by more than one division of a manufacturer - ie: Ford Maverick and Mercury Comet, are represented by a model in only one of the divisions. Characteristics are documented for more than 1000 automobiles representative of total United States sales of all Domestic and Imported automobiles for the model years indicated.

17. Key Words

Automobile Characteristics Data Base, Automobile Fuel Economy Attributes, Automobile Inertia Weights, Auto Production Volume

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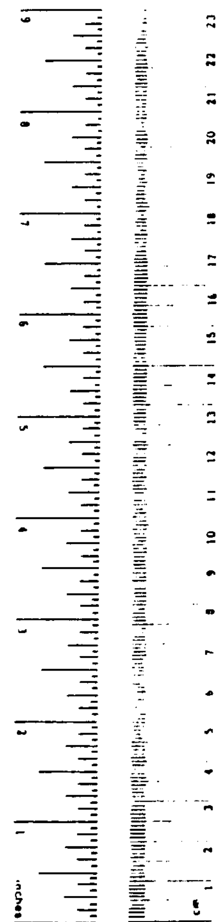
METRIC CONVERSION FACTORS

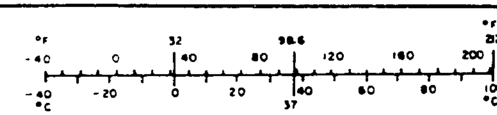
Approximate Conversions to Metric Measures

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



Approximate Conversions from Metric Measures

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



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LIST OF ABBREVIATIONS

Abbreviation	Definition
A/C	Air Conditioning
AIR	Air Injection Reactor
AMA	Automobile Manufacturers Association
AMC	American Motors Corporation
A3	3 Speed Automatic Transmission
CID	Cubic Inch Displacement of an Engine
CO	Carbon Monoxide
Compos.	Composite
Cu. In.	Cubic Inch
Cyl.	Cylinder
Disp.	Displacement
Dom/Imp	Domestic or Imported
DOT/TSC	Department of Transporation/Transportation Systems Center
Econ	Economy
ECS	Emission Control System
e.g.	For example
Emis.	Emissions
Eng.	Engine
EPA	Environmental Protection Agency
ft.	Foot
FTP	Federal Test Procedures
GM	General Motors
HP	Horsepower
ID	Identification
i.e.	That is
In.	Inch
IW	Inertia Weight (class)
L-6	Six Cylinder with the Pistons in Line
Lbs.	Pounds
MPG	Miles Per Gallon
MPH	Miles Per Hour
MVMA	Motor Vehicle Manufacturers Association
M3	3 Speed Manual Transmission
M4	4 Speed Manual Transmission
N.A.	Not Available
OX	Oxide
Perf.	Performance
Pop. Sci.	Popular Science Magazine
Rec. #	Record Number
R.F.	Roominess Factor
RPM	Revolutions Per Minute
SAE	Society of Automotive Engineers
STD	Standard Body Configuration (4-door Sedan)
SW	Station Wagon
Tot.	Total
Trans.	Transmission
U.S.	United States

LIST OF ABBREVIATIONS (continued)

Vol.	Volume
VW	Volkswagen
V-8	Eight cylinder engine with the pistons arranged in a V configuration
WB	Wheelbase

1. INTRODUCTION

The information presented and discussed in this report is the result of an extensive search for and analysis of representative automotive data describing the predominate national automotive vehicle population for selected years back to 1955. This information constitutes an historical data base which may be used as a baseline and a record of the many changes which have occurred in automobiles during the time period covered by the study (1955-1974).

1.1 BACKGROUND

Noting that many changes have occurred since 1960 as a result of market forces and implementation of legislation relating to emission and safety requirements, the Department of Transportation/Transportation Systems Center (DOT/TSC) recognized the need to establish a baseline preceeding most of those changes and to track the changes up to the present time. The necessary data required to fill these needs concern physical dimensions of the vehicles, engine size and characteristics, operational characteristics (fuel economy, acceleration and emissions), price and production volume. The work described in this report was performed as part of DOT/TSC's Automotive Energy Efficiency Program.

The data base will be used in studies and analyses prepared by the Department of Transportation in support of energy policy decisions. Also, the historical data will be used for the development of baseline characteristics of vehicles, for evaluation of historical patterns and as a basis for future projections.

Prior to this work the DOT/TSC had developed a data base for the 1975 model year automobiles.

1.2 SCOPE

The objective of this project was to collect and collate data on the physical, operating and performance characteristics of automotive vehicles for the model years 1955, 1960 1965, 19 8, 1970 - 1974. This data base was loade into the DOT/TSC DEC 10 computer system.

Work was divided into two main areas. The first area included vehicle selection, attribute definition and correlation. The second area included data collection, collating and formating.

The information was gathered from trade publications trade associations, specialized testing reports, reports from Federal and State Government agencies, such as the Environmental Protection Agency (EPA), and from direct contact with manufacturers and importers of passenger vehicles.

1.3 LIMITATIONS

Published sources of information for many of the attributes being studied weren't available for the earlier model years. In addition some of the earlier information was not developed using the same techniques as is currently being used and is therefore less sophisticated. Because of this, limited early data was expanded for use in the study by making technical judgements where necessary.

Most important to the study were attributes relating to fuel economy. Since representative cars for all domestic and import models are currently tested by the EPA for compliance with the emission requirements and, in the process checked for fuel economy, information for these attributes was collected from the 1975 EPA test. For the years 1973 and 1974, emission and fuel economy information was available, from EPA sources, that could be readily correlated with the 1975 data. Since current EPA emission test procedures were initiated in 1973, no emission attributes were available for 1972 or earlier and by direction of DOT/TSC were not included in the data bank.

Fuel economy information however, for vehicles prior to 1973 was collected from the most consistent sources available and correlated to match 1975 EPA cycles as closely as possible using technical judgements.

Techniques for measuring interior dimensions changed between 1955 and 1975 requiring a correlation of early data to current standards.

Horsepower data prior to 1972 was presented as gross horsepower and was correlated for 1971 and earlier years to net horsepower as specified since 1972. All correlation methodology is detailed within this report for those attributes involved.

Classification of car classes changed after 1960 as cars grew larger. Intermediate cars as a class are not shown for 1955 and 1960. Because of the smaller wheelbases of standard size cars during these years the upper limit wheelbase designation for compact cars was increased slightly for 1955 and 1960 and the lower limit wheelbase designation for full size cars was reduced to cover the range assigned to intermediate class cars for 1965 and later years.

2. AUTOMOBILE CHARACTERISTICS DATA BASE METHODOLOGY

2.1 VEHICLE SELECTION

The inclusion of every domestic and imported vehicle configuration produced for sale in the United States into the data base is beyond the scope of this project. The requirements for the data base allows a selected vehicle sampling to represent a specific model year fleet. All domestic and imported vehicles that fit the requirements are included in the data base for model years 1955, 1960, 1965, 1968, and 1970 through 1974.

For the following discussion a vehicle "make" refers to the manufacturer and a vehicle "model" refers to a car line of a manufacturer or division of a manufacturer. For example, Volkswagen, Datsun, Porsche are makes, and GMC Nova, VW Rabbit and Dodge Dart are models.

Vehicles for the data base were selected by following an established set of criteria.

1. All models of domestic vehicles are represented.
2. All makes of import vehicles with U.S. annual sales of 90,000 units are represented.
3. Criteria for selection of vehicles in 1. and 2. are production volume, and fuel economy dependent attributes, i.e. engine displacement Inertia weight is the most significant physical factor

4. For model years 1973 and 1974, if a particular configuration as defined in 3. is produced in a quantity of 3 percent or less of all that models' production these vehicles are not included in the data. For example, if 3 percent or less of the AMC intermediate cars had a manual transmission, then this configuration is not shown and that production volume is represented by AMC intermediate cars with automatic transmissions.

5. For 1972 model year and earlier, representative vehicles were selected by grouping models by engine displacement and body type into inertia weight class sub-groups and selecting the predominate transmission used by each sub-group. If a selection is split evenly on transmission application and the model production volume is high, then both automatic and standard transmissions are represented.

6. If one or more divisions of an automobile manufacturer produce essentially the same model - e.g., Ford Maverick and Mercury Comet - only the models of one division are included in the data base. The division model chosen is the one with the higher production volume (Maverick). Models are the same when they have the same body types, engines, and transmission.

7. The most popular model of an import with U.S. sales between 10,000 and 90,000 units, represents that make.

8. All models with diesel or rotary engines are represented in the data base.

9. Any other import makes with U.S. sales of less than 10,000 units per year are excluded.

Models or foreign makes produced in large volume, i.e. 50,000 units, were included in the data base while low volume, i.e. 900 units, configurations were not included. The 3 percent rule (4. above) will exclude a configuration of much larger production volume for a General Motors model than for any American Motors model.

Vehicle configurations of a particular model available for the data base are a function of the engine type and sizes, body types, transmission types and weight classes offered by the manufacturer for any particular model - i.e. Nova, Maverick, Fury, Matador. For a given model the year of configurations can vary from one to many. Table 2-1a shows the configurations for one model, the Dodge Dart Plymouth Valiant for 1974. Fourteen configurations are possible but can be reduced to seven configurations (Table 2-1b) combining Valiant and Dart since they meet the criteria of 6. above. Once the configurations are established the production quantities were found or estimated from the

TABLE 2-1 VEHICLE SELECTION METHODOLOGY

a. Initial Configurations of 1974 Valiant and Dart Models

Model	Body Type (STD or SW)	Engine Size (C I D)	Transmission (Type and # of gears)	Inertia Weight Class	Production 1974
Valiant	STD	198	M3	3500	2641
Valiant	STD	198	A3	3500	19551
Valiant	STD	225	M3	3500	33474
Valiant	STD	225	A3	3500	247818
Valiant	STD	318	A3	3500	116407
Valiant	STD	360	M4	4000	377
Valiant	STD	360	A3	4000	3592
			Valiant	Total -	423860
Dart	STD	198	M3	3500	1797
Dart	STD	198	A3	3500	12997
Dart	STD	225	M3	3500	20065
Dart	STD	225	A3	3500	150240
Dart	STD	318	A3	3500	96596
Dart	STD	360	M4	4000	245
Dart	STD	360	A3	4000	3706
			Dart	Total -	285646
			Valiant & Dart	Total -	709506

b. Combination of Valiant and Dart Models

Model	Body Type	Engine Size	Transmission	Inertia Weight Class	Production
Val/Dart	STD	198	M3	3500	4438
Val/Dart	STD	198	A3	3500	32548
Val/Dart	STD	225	M3	3500	53539
Val/Dart	STD	225	A3	3500	398058
Val/Dart	STD	318	A3	3500	213003
Val/Dart	STD	360	M4	4000	622
Val/Dart	STD	360	A3	4000	7298

c. Final Configuration Selection

Model	Body Type	Engine Size	Transmission	Inertia Weight Class	Production
Val/Dart	STD	198	A3	3500	36986
Val/Dart	STD	225	M3	3500	53539
Val/Dart	STD	225	A3	3500	398058
Val/Dart	STD	318	A3	4000*	220923
			Total	Production -	709506

* See Page 12

literature (see Table 2 - 2). Three tables are referenced in Wards Automotive Yearbook for this information, one showing production by series and engine type (Table 2 - 2a), one showing percent of factory-installed optional equipment (Table 2 -2b) and the other showing engine production for Chrysler Corporation by displacement (Table 2 -2c). When numbers disagreed between these tables (note totals from Tables 2 - 2a and 2 - 2b), the numbers from the table that seemed most consistant were arbitrarily used. The published information did not detail the production quantity for each configuration but this could be determined by process of elimination. Of the Valiant and Dart models, only the Valiant Duster 360 and Dart Sport 360 series used the 360 CID engine in 1974. Therefore the total of 7,920 (Table 2 - 2a) accounted for the Valiant/Dart 360 CID production. The production volume for Valiant and Dart V-8 engines is listed in the Wards series and engine table (Table 2 - 2c). Since only two V-8s are used in the Valiant/Dart (318 and 360 CID) the 318 CID equipped car production can be found by subtracting the 360 CID Valiant/Dart production from the total V-8 production. Also, since the 198 CID engine is available only in the Valiant/Dart models, the total 198 CID production for Chrysler (36,986) applies. Subtracting the 198 CID engine production and the Valiant/Dart V-8 engine production from the total Valiant/Dart production reveals the 225 CID engine production for Valiant/Dart.

TABLE 2-2 SELECTED 1974 WARD'S PRODUCTION DATA

a. 1974 U.S. Production by Series and Engine Type

MAKE AND SERIES	L-6	V-8	Total
DART			
Dart.	19,912	2,293	22,205
Swinger Special	14,211	1,944	16,155
Swinger	56,126	33,116	89,242
Sport 360	0	3,951	3,951
Sport	40,293	3,225	63,518
Custom.	50,047	8,169	78,216
Special Edition	3,111	9,274	12,385
Total	183,700	101,972	285,672
VALIANT			
Valiant	85,463	26,866	112,329
Duster.	181,926	65,045	246,971
Scamp	32,126	13,693	45,819
Duster 360.	0	3,969	3,969
Brougham.	4,098	12,213	16,311
Total	303,613	121,786	425,399

b. Percent of Factory Installed Equipment - 1974

MAKE	AUTOMATIC TRANSMISSION	RATES BASED ON TOTAL OUTPUT OF:
Valiant	90.5%	423,860
Dart	93.8%	285,646

c. U.S. Car Production by Make, Cylinder Type, Displacement - 1974 Model year

Chrysler Corporation

Cu. In.	Cyl.	Units	% Tot.
198	L-6	36,986	2.9
225	L-6	467,264	36.9
318	V-8	449,506	35.5
360	V-8	93,334	7.4
400	V-8	155,036	12.2
440	V-8	65,031	5.1
Total . .		1,267,157	100.0

Source: Ward's Automotive Yearbook for 1975

The factory installed optional equipment chart (Table 2 - 2b) shows that 90.5 percent of the Valiants and 93.8 percent of the Darts were equipped with automatic transmissions. Applying appropriate percentages shows that 40,267 Valiants and 17,710 Darts were equipped with manual transmissions. A very small quantity of 4-speed manual transmission equipped cars were produced.

It is known that very few V-8 engine cars had 3-speed manual transmission installed. For simplification, the assumption was made that all of the manual transmissions were in the six cylinder cars. Dividing the total number of manual transmissions by the total Valiant/Dart six cylinder equipped cars gives a 12 percent installation rate. This rate applied to the 198 CID and 225 CID equipped Valiant/Dart production indicates 4,434 three-speed transmission equipped, 198 CID Valiant/Darts and 53,539 3-speed equipped, 225 CID Valiant/Darts.

Inertia weight classes were determined by referencing Curb Weight data from the applicable Motor Vehicle Manufacturers Association (MVMA) specfications for the model/engine configuration, and adding an amount for radio, power steering, and air conditioning (137 pounds as shown in Table 2-6) to establish corrected curb weight, and then adding 300 pounds to get inertia weight.

The inertia weight class was checked against the inertia weight class listed by the EPA for the EPA test configuration. If the EPA inertia weight class listing was higher, the EPA class was listed in the data base. In this case the determined inertia weight class was 3,500 pounds for all configurations. But, the EPA test inertia weight for the V-8 model was 4,000 pounds, so 4,000 pounds was the inertia weight entered in the data base for the 1974 Valiant/Dart 318 CID V-8 configurations. This adjustment was only a factor for 1973 and later years.

It was seen that the 360 CID production was less than 3 percent (21,285) of the model production. These 360 CID configuration cars were excluded, but their production quantities were combined with the 318 CID cars. By reviewing each of the configurations in order and comparing the production volumes of each to the 3 percent exclusion level, the number of representative configurations was reduced to four (Table 2 - 1c). These four configurations were included in the data base. The total production of all Valiant/Dart cars was accounted for in the four final included configurations with representative vehicles according to similar fuel economy attribute characteristics.

Models with station wagon body variations were represented either by a station wagon vehicle configuration, where production volume warranted, or by inclusion with a representative standard body in a common inertia weight class. Because of the importance of inertia weight class to fuel economy ratings, vehicles of different inertia weight classes were not combined except in situations where only a small production occurred.

For other car lines, notably GM cars, the complexity of the engine/model combinations required additional steps to be taken to determine representative configurations. General Motors produces multiple car lines or models with 350 CID engines. However, these 350 CID engines are not the same engine, varying in bore and stroke and cylinder head and piston design. Since Wards data treats GM 350 CID engines commonly, it is impossible to determine or estimate the production for a particular model configuration.

Due to the complexity of Ford models which use the same engines, the situation is similar. There are just too many possibilities to determine the production of specific configurations. Some Chrysler models presented similar problems.

In order to make determinations so that final representative configurations could be established, information had to be acquired directly from the manufacturers. Exhibit I is an example of one of the necessary information responses received from the manufacturers for various model/engine combinations.

The above process was continued for each model produced domestically and for applicable foreign makes for each year researched, and the data accumulated on computer tapes as required. Data for the data base was accumulated on over 1,000 total cars for the years studied. The listing for each year, indicating foreign and domestic configurations is shown in Table 2-3.

TABLE 2-3 MAKE-UP OF DATA BASE - QUANTITY BY YEAR

Year	Domestic	Foreign
1955	32	2
1960	65	17
1965	93	10
1968	105	13
1970	111	20
1971	121	27
1972	126	30
1973	204	46
1974	212	68

Exhibit II shows a representative list of vehicle configurations as utilized in the data base. This example shows the 1974 Chrysler vehicles selected.

Vehicle configurations are listed by year and manufacturer, and the identifying characteristics of model (not included in the data base), body class, body type, curb weight, inertia weight, inertia weight class, engine displacement, transmission type, and model year production quantity. Sources of information used to develop these lists are:

Ward's Automotive Yearbooks

Automotive News Almanac Issues

Automotive News Statistical Issues

MVMA Specifications (AMA for 1955 and 1960 data)

Automobile manufacturers' records

2.2 VEHICLE ATTRIBUTE SELECTION

Based on experience obtained by DOT/TSC with the 1975 vehicle data base and discussions with DOT/TSC and Chilton personnel a list of attributes was developed. The types of data that were considered useful for inclusion in the data base were 1) fuel economy; 2) overall vehicle dimensions, both interior and exterior; 3) engine and drivetrain characteristics; 4) emission control equipment and emission levels for 1973 and 1974; 5) production; 6) performance; and 7) price. Approximately 50 attributes were selected to describe each of the 1,069 vehicles. The selected vehicle attributes and the attribute definitions follows.

Vehicle Attributes Definition

The vehicle attributes selected for this study are listed below with their corresponding definitions. The attributes are listed in field order of the data input and are identified by their field numbers and attribute name.

01. Vehicle Identification Code

The code to identify the vehicle includes the manufacturer, domestic or import designation, body class, body type and model year e.g., General Motors (GMC), Domestic (D), Intermediate (5), Station Wagon (1), 1974 (74).

02. Transmission, Number of Gears

Automatic, manual or semi-automatic and the number of gear ratio changes in forward speed.

03. Cubic Inch Displacement

The volume in cubic inches displaced by one piston as it moves from the bottom to the top of its stroke, times the number of cylinders.

04. Rear End Ratio

The standard, or most popular rear end ratio, the ratio of input to output revolutions of the final drive gearing.

05. Number of Engine Cylinders and Arrangement

Number of cylinders and the arrangement in the cylinder block (V, L, or H arrangement) and 8, 6, or 4 cylinders. R denotes Rotary and the number of chambers is listed. Diesel engine is noted in comments.

06. Compression ratio

The ratio of the maximum volume displaced (volume of a cylinder plus the volume of the combustion chamber) to the minimum volume (combustion chamber volume).

07. Stroke

The maximum distance the piston travels in its cylinder measured parallel to the cylinder bore from the top of the stroke to the bottom

08. Engine Horsepower

Net horsepower (as defined in SAE standard J 245) the maximum brake power output of a "fully equipped" engine with all accessories necessary to perform all its intended functions unaided, including, but not limited to, basic built-in components, such as intake air system, exhaust system, cooling system, alternator, starter, and emission control equipment.

09. Engine Revolutions per Minute

The engine revolutions per minute at which engine horsepower is specified.

10. Engine Torque

Net maximum torque in foot pounds of the same "fully equipped" engine as tested for horsepower output. Factored for 1971 and prior years.

11. Engine Revolutions per Minute (Torque)

The engine revolutions per minute at which maximum torque is specified. This specification was factored for 1971 and prior years.

12. Fuel Injection

Carburetor and number of barrels or fuel injection.

*13. Wheelbase

Standard MVMA dimension "L101", the distance between the centers of the front and rear wheels.

*14. Length

Standard MVMA dimension "L103", the overall length of a vehicle including bumper guards if standard

*NOTE: Exhibit III illustrates the passenger car interior and exterior dimensions as defined by MVMA.

equipment.

*15. Width

Standard MVMA dimension "W103", the maximum overall car width including bumpers, moldings, or wheel metal protrusions, measured to the outside of the metal.

*16. Height

Standard MVMA dimension "H101", the overall height as measured with the vehicle in Manufacturer's Design Weight attitude.

17. Curb Weight

Weight of the vehicle including all standard equipment, spare tire and wheel, plus all fluids and lubricants to capacity, and full tank of gasoline, and the weight of major optional accessories normally found on the subject vehicle (air conditioning, power steering and radio if produced on 35 percent or more of production for the particular configuration).

18. Inertia Weight

Curb weight plus 300 lbs. specified as the closest inertia weight class. Will always coincide with EPA class designation for years EPA information is available.

*19. Front Seat Height

Standard MVMA dimension "H30" the verticle dimension from the "H" point to the accelerator heel point.

*NOTE: Exhibit III illustrates the passenger car interior and exterior dimensions as defined by MVMA.

*20. Front Head Room

Standard MVMA dimension "H-61", from the "H" point to the headliner, plus a constant of 4.0 inches, measured along a line 8° to the rear of vertical.

*21. Rear Head Room

Standard MVMA dimension "H63", from the "H" point to the headliner, plus a constant of 4.0 inches measured along a line 8° to the rear of vertical.

*22. Front Leg Room

Standard MVMA dimension "L34", measured along a diagonal line from manikin ankle pivot center to "H" point plus a constant of 10 inches.

*23. Rear Leg Room

Standard MVMA dimension "L51", measured along a diagonal line from the ankle pivot center to the "H" point plus a constant of 10.0 inches, with the foot positioned to the nearest interference between the seat structure and toe, instep,or lower leg.

*24. Front Shoulder Room

Standard MVMA dimension "W3", the minimum dimension measured laterally between the trimmed surfaces on the"X" plane through the "H" point within the belt line to 10 inches above the "H" point.

*25. Rear Shoulder Room

Standard MVMA dimension "W4", the minimum dimension

*NOTE: Exhibit III illustrates the passenger car interior and exterior dimensions as defined by MVMA.

measured laterally between trimmed surfaces on the "X" plane through the "H" point within 10.0 - 16.0 inches above the "H" point.

26. Roominess Factor

The total of attributes number 19 through 25 indicating overall vehicle interior roominess.

27. Trunk Space

Trunk luggage capacity in cubic feet with the spare tire and tools in place for sedans. Cargo volume for station wagons is specified with the rear seats down and the space under the floor (if any) included.

28. Number of Passengers

Number of passengers including the driver for which the vehicle was designed and for which normal seating accomodation is provided as specified in MVMA specifications. For stations wagons, if a third seat option is available, the number of passengers is listed as 7. The number 7 is used for any capacity over 6 regardless of the total.

29. Hydrocarbon Emission Control System

Engine emission system specifically designed to reduce hydrocarbon emission, for example, AIR (air pump).

30. Nitrogen Oxide Emission Control System

Engine emission system specifically designed to reduce nitrogen oxide emission, for example, EGR (exhaust gas circulation).

31. After Treatment Emission Control System

Exhaust emission control system acting on the exhaust gases after they leave the engine, for example, THM (thermal reactor).

32. Hydrocarbon Emission Level

A. For 1973 - 74 models, EPA CVS-1 cycle

B. 1972 and prior models deleted per DOT/TSC instruction.

33. Carbon Monoxide Emission Level

A. For 1973 - 1974 Models, EPA CVS-1 cycle

B. 1972 and prior models deleted per DOT/TSC instruction.

34. Nitrogen Oxide Emission Level

A. For 1973-1974 models, EPA CVS-1 cycle

B. 1972 and prior models deleted per DOT/TSC instruction.

35. Urban Fuel Economy

1975 EPA Federal Test Procedure (FTP) Cycle urban fuel economy equal to:

A. For 1973 - 1974 models, EPA CVS-1 cycle x 1.045[1] factor.

B. 1972 and prior models, fuel economy from literature

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1 SAE Technical Report #75057"Passenger Car Fuel Economy Trends Through 1976" by Austin, Michael and Service.

if available, adjusted to 1975 EPA test level.

36. Drive Cycle - Urban

If not, EPA CVS-1 will indicate other cycle.

37. Highway Fuel Economy

1975 EPA cycle urban economy x 1.42 factor

38. Drive Cycle - Highway

Indicates drive cycle for 37 above.

39. Composite Fuel Economy

1975 cycle combination urban - highway fuel economy (weighted 55 percent urban, 45 percent highway) equal to 1975 urban economy x 1.154[1] factor.

40. Steady State Highway Fuel Economy

Steady speed fuel economy at a given speed. The speed at which steady state economy is measured is noted in the comments (e.g., 40 MPH 60 - attribute 40 at 60 MPH).

41. Acceleration Time

Time in seconds, for a vehicle to accelerate from 0 to 60 MPH. If the 0 to 60 MPH time is not available, 0 to 50 is used and noted in the comments.

42. Passing Time (40 to 60 MPH)

Time in seconds, for vehicle to accelerate from 40 to 60 MPH.

43. Passing Time (35 to 55 MPH)

Time, in seconds, for vehicle to accelerate from 35 to 55 MPH. For 1955 and 1960, where neither 40 to 60

MPH or 35 to 55 MPH times were available then, this attribute was used to record an other available passing time in addition to attribute 44. The passing time speeds are defined in comments.

44. Passing Time (other)

Time in seconds for vehicle to accelerate from one specified speed to another, the speeds are noted in comments.

45. Total yearly production for U.S. sales for a particular model configuration as defined by a Vehicle Identification Code (See 01).

46. Production Volume of Class

Total of all configurations within a class of manufacturer or division. (e.g., Total Chrysler intermediate cars or total Chevrolet intermediate cars).

47. Manufacturer's List Price

The manufacturer's suggested retail price for the basic model determined by adding the cost of the standard model, as identified by the Vehicle Identification Code, and any additional costs for the specified engine and transmission but no other options.

48. Comment - 1 (Maximum 40 characters)

Explanation of peculiar source of data for attributes. For example, if the acceleration time attribute is different than indicated by the definition of that attribute it would be indicated here. Also information concerning a non-standard source for particular attributes would be entered here.

49. Comment - 2 (Maximum 40 characters)

Same as (48.) above.

2.3 DATA BASE DEVELOPMENT

After the selection of the vehicle configurations to be included in the data base and the attributes used to describe these configurations the actual collection, collation, and recording of the data on computer tape was begun.

This process involved:

(1) Identifying and locating sources for reference material and gathering reference material.

(2) Recording data on computer coding sheets (Exhibit IV).

(3) Checking coding sheets for accuracy.

(4) Transferring input data from coding sheets to a key tape. After the data was transferred it was key verified.

(5) Processing the keyed data into the Datalog directory system.

(6) Making formatted master list printout and final checking of data for omissions, key punch errors, etc. (For Task I (1974) and Task II (1970-1973) intermediate printout-checking steps were taken to insure data form and content were correct).

(7) Converting Datalog directory output to DOT/TSC tape and master list as required.

2.3.1 Data Research

Identifying and locating sources of data became more difficult as the earlier model years were encountered. Foreign car production information was very limited for 1955 and 1960 and was not listed in the primary source (Wards) for these years. Sources in many cases were available at Chilton Company. Extensive research at the Philadelphia Free Library was necessary. This research utilized much Chilton donated library material and other materials, bound magazines and trade publications. Much of the information was in one year or multi-year bound format with restrictions prohibiting reproduction because of the age and value of the material. Other material was available in only micro-film format and reproduction facilities for micro-film were not available at the library.

Since the data base covered a 20-year period of time, many basic attribute definitions or measuring techniques changed during that time. Correlations were made to adjust the available data to match the attribute definition in current use and as used in the data base. In some cases correlations were easily made (e.g.,curb weight adjustments, by adding weights of missing components, fluids, etc. to the shipping or other known weight to achieve correct curb weight), and in other cases sparce data and information relating to the collecting of the data required heavy reliance on estimates to achieve a correlation.

2.3.2 Body Classes

In 1955 and 1960 a standard size "popular"car, e.g., Chevrolet, Plymouth, Ford,were smaller cars than their 1974 counterparts. As a simple means of assigning a body class designation for the purpose of this study, the body classes were identified by wheelbase designation only. However, during the time period covered by this study, the intermediate car had been introduced into car lines and was thus accomodated by a wheelbase classification. In 1955 and 1960 (prior to intermediates) the wheelbase definition for body class was adjusted to include the AMC, Chevrolet, Ford and Plymouth cars as full-size cars by reducing the lower limit of the full-size class, raising the upper wheelbase limit of the compact category and eliminating the intermediate class for these years. Besides the fact that in 1955 and 1960, 1)intermediate cars as such (a size between standard and compact) did not exist and; 2) cars then known as standard cars had shorter wheelbases in the most popular models, further justification for classifying these cars as "standard" can be made by observing roominess factors. Table 2 -4 shows that, with the exception of Ford, selected 1955 standard cars had larger roominess factors than 1972 comparable intermediates but were smaller than the full-size cars of 1972. Table 2-4 also compares wheelbase, showing how the selected standard size cars changed from 1955 to 1972.

TABLE 2-4 COMPARISON-1955 and 1972 CAR DIMENSIONS

1955 Standard Cars			1972 Intermediate Cars			1972 Standard Cars		
	R.F.	W B		R.F.	W B		R.F.	W B
Amb.	288.9	121.3	Matador	287.2	118	Amb.	286.6	122.
Chev.	286.4	115.0	Chevelle	276.6	116	Chev.	294.6	121.5
Ford	280.3	115.0	Torino	280.6	118	Ford	290.1	121.
Plym.	285.4	115.0	Sattelite	281.5	118	Ply.	293.2	122.

R.F. = Roominess Factor; W B = Wheelbase

2.3.3 Engine Performance

Prior to 1972 maximum horsepower and torque were given as gross values and since 1972 these figures have been given as net values. The addition of emission equipment, lowering of compression ratios,de-emphasis of horsepower ratings, and the fact that the net horsepower is more representative of actual available installed horsepower contributed to this change. There is no perfect direct method of converting from gross to net horsepower ratings other than direct comparative testing. However, it was possible to make some comparisons of gross and net horsepower values for the same engines and develop factors which can be applied to horsepower and torque (separate factors) and note rpm variations for engines of various types, sizes, manufacturer and configuration. (Exhibits V and VI show the data used for comparisons.) Comparisons were made and these correlating values were applied to pre-1972 gross horsepower and torque values to adjust these to net horsepower and torque. Table 2-5 shows these horsepower and torque factors and variations for rpm.

2.3.4 Weights

The curb weight value as defined was not available for domestic and foreign cars for all years desired. Information for foreign cars was usually available in the form of shipping weight. A sufficient amount of weight to represent the vehicle fluids (including fuel) was added to the shipping weight to determine curb weight. Domestic cars required adding to the adjusted curb weight (base curb weight & variation for engine/transmission configuration) to account for certain optional equipment. The adjusting weights are shown in Table 2-6.

2.3.5 Dimensions

Between 1960 and 1965 the SAE method of measuring interior car dimensions for domestic cars and the definitions of certain dimensions changed. The use of the anthropometric dummy or three dimensional manikin for taking certain passenger related measurements was instituted. Dimensions taken

TABLE 2-5 HORSLPOWER AND TORQUE CORRECTION FACTORS
GROSS TO NET HORSEPOWER
(GROSS H.P. x FACTOR = NET H.P.)

Engine Type	Horsepower Factor	RPM Reduction or Factor	Torque Factor	RPM Change
4 Cylinder & Rotary Engine	0.89	-200 RPM	0.89	+200 RPM
6 Cylinder	0.76	3600 RPM and above -400 RPM. Under 3600 RPM use 0.90 factor.	0.80	
8 Cylinder 1.) 315 CID and below Non High Performance	0.70	1.) -200 RPM if max. gross HP at 3000 RPM or above. 2.) .95 factor under 3000 RPM		
2.) High performance - Extra high compression ratio - 5000 RPM max.or more - 225 gross HP or more.	0.80		0.80	-200 RPM
8 Cylinder 1.) 315-350-380 CID 2.) Under 4801 RPM at Gross Horsepower 3.) Under 250 Gross Horsepower (up to 360 CID engine) 360 to 380 use judgement as to high performance engine or not (under 260 horsepower) - Any Two of Above - . . . . Non high performance	0.[illegible]	From 4400 to 4800 RPM Gross use 4000 RPM Net Below 4000 to 36000 RPM use: -400 RPM below 3600 use 0.90 factor	0.80	-2[illegible] RPM

TABLE 2-5 HORSEPOWER AND TORQUE CORRECTION FACTORS
GROSS TO NET HORSEPOWER
(GROSS H.P. x FACTOR = NET H.P.) (continued)

Engine Type	Horsepower Factor	RPM Reduction or Factor	Torque Factor	RPM Change
8 Cylinder High Performance 1.) 315-350-380 CID 2.) Over 4800 RPM at Gross Horsepower 3.) Over 250 Gross Horsepower (up to 360 CID) 360-380 use judgement as to high performance or not 260 HP or above - Any Two of Above -	0.80	-200 RPM	0.84	-300 RPM
Revs at Gross Horsepower above 5200 RPM	0.85	-200 RPM	0.85	-200 RPM
8 Cylinder 1.) 390-460 CID 2.) Under 320 Gross Horsepower 3.) Under 4500 RPM at Gross Horsepower - Any Two of Above . . . . Non-high Performance	0.70	Above 3600 RPM use: -400 RPM Below 3600 use 0.90 Factor	0.80	-200 RPM
8 Cylinder - High Performance 1.) 390 - 460 CID 2.) Over 4500 RPM at Gross Horsepower 3.) Over 330 Gross Horsepower - Any Two of Above -	0.80	4800 RPM gross or above use: -400 RPM Under 4800 RPM use: -200 RPM	0.80	3400 RPM or above use: -400 RPM, under 3400 use: -200 RPM
8 Cylinder 460 CID and above, 4500 RPM or less	0.65	-400 RPM	0.76	-400 RPM

TABLE 2-6 WEIGHTS ADDED TO ADJUSTED CURB WEIGHT TO OBTAIN ACTUAL CURB WEIGHT

General Motors	Radio -	08	Radio -	08
	Power Steering -	28		
	A/C -	96	A/C	96
	Total	132		104
Chrysler	Radio -	7	Radio -	7
	Power Steering -	43		
	A/C -	87	A/C -	87
	Total	137		94
AMC	Radio -	6	Radio -	6
	Power Steering -	30		
	A/C -	81	A/C -	81
	Total	117		87
Ford	Radio -	7	Radio -	7
	Power Steering -	38		
	A/C -	118	A/C -	118
	Total	163		125
Studebaker-Packard	Radio -	8	Radio -	8
	Power Steering -	30		
	A/C -	118	A/C -	118
	Total	156		125

The above weights are added to the adjusted curb weights (which include transmission and engine specified) to obtain actual curb weight.

prior to this (1955 and 1960 data base years) do not relate directly to the subsequent measurements but the discrete use of a combination of early measurements and arbitrary constants can closely approximate the later dimensioning when applied to the early data. Table 2-7 shows the corrections as applied to appropriate interior dimensions for domestic cars.

Foreign car interior dimensions were not available in MVMA format for any of the years studied. From the various sources (Table 2- 12), information was collected for each model year and studied. Dimensions such as seat height, headroom and leg room when available were taken as equivalent to the attribute definitions even though the exact measuring techniques were not exactly the same. However, some pieces of dimensional information were missing from available data sources. Since it was considered quite important to have a representative roominess factor for all cars, various techniques were applied to fill the gaps. Since foreign cars seldom change body styles, in relation to domestic cars, it was possible to apply known data from a model/year configuration to other years which featured the same body. This was done where applicable for trunk space as well as interior dimensions. In cases where dimensions were not available, estimates were made referencing similar sized cars to provide information. In some cases front dimensions were available but not rear. The rear dimensions were

TABLE 2-7 CORRECTION VALUES FOR INTERIOR DIMENSIONS - DOMESTIC CARS

Attribute Number	Name	Definition and M.V.M.A. designition	1955/1960	Correction Values	Equivalent for Data Base
19	Front seat Height	Verticle dimension from the "H" point to accelerator heel point. "H30"	"H3" floor to seat cushion top *12.6"	minus cushion rise (F to rear) *-2.3"	"H-30" *10.3"
20 (21)	Front headroom or (Rear headroom)	"H-61" ("H-63") "H" point to head-liner plus 4"	"H-1" Seat cushion to headliner *35.4	plus constant 4" +4"	(H-63) *39.6
22 (23)	Front leg room (Rear leg room)	"L-34" ("L-51") A diagonal line from ankle pivot point to "H" point + 10"	"L4" Seat back, to cushion top to floor *42.3"	minus constant 4" -4"	"L-34" (L-51) *38.3"

* Dimensions used to illustrate adjustment for 1955 Buick

proportioned from the front using knowledge of the car, similar cars, and/or other model car configurations to reinforce the estimate.

2.3.6 Emissions

Emission levels were listed for 1973 and 1974 model years only. Although emission levels were recorded for 1972 using constant volume sampling no fuel economy data was available from EPA for 1972. It was determined by DOT/TSC that 1973 and later data was significant and that 1972 and earlier emission data need not be included.

The EPA tested a certain number of vehicles for emission and fuel economy levels in 1973 and 1974. These test vehicles served to represent that entire production fleet for these years. The results were published in the Federal Register for 1973 and 1974 and indicated models and engine family and the test vehicle representing the models. Since many of the specific configurations were not tested, data was selected from appropriate test vehicles to represent the model configurations selected for the data base. Selected configurations were matched to test vehicles by matching most closely the fuel economy attributes (in order of importance: inertia weight class, CID axle ratio and transmission type.) Inertia weight class was always matched. When the matches were made, emission and fuel economy data from the test vehicles were utilized in the data base for the represented and tested configurations. Table 2-8 shows the 1974 Chrysler models with 198-225 CID engine family as represented by six test vehicles. Satellite and Coronet models were represented in the data base by a Dodge Sport Wagon. This test vehicle is indicated by asterisks. This test vehicle had compatible Inertia Weight Class, engine and transmission attributes but a different axle ratio than the represented configurations. Comparative attributes are noted for the represented Satellite and Coronet models in italics.

2.3.7 Fuel Economy

The urban fuel economy values obtained from the 1973 and 1974 EPA tests were adjusted by multiplying by 1.045[1] to put them on the 1975 Federal Test Procedure basis which includes cold start and hot start urban test cycles instead of the 1972 test procedures cold start only method.

For 1973 and 1974 the composite city/highway fuel economy value was determined by multiplying 1975 FTP urban fuel economy by 1.154[1]. The highway fuel economy was determined by multiplying the urban value by 1.42[1] (which is the sales weighted ratio of highway to urban fuel economy for the 1975 fleet as tested by EPA).

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1 Reference: SAE Report #750957 "Passenger Car Fuel Economy Trends through 1976" by Austin, Michael and Service.

TABLE 2-8 SELECTION OF REPRESENTATIVE TEST VEHICLES - EXAMPLE

1974 MODEL YEAR LIGHT DUTY VEHICLES

MANUFACTURER (MODELS)	ENGINE FAMILY DISP. (CUBIC IN.)	ENGINE FAMILY FAMILY DESIGNATION	TEST VEHICLES MODEL	ENGINE DISP. & CARB. VENTURIS	TRANS.	INERTIA WEIGHT CLASS (LBS.)	AXLE RATIO	FUEL ECON. (MPG)	CERTIFICATION TEST RESULTS EXHAUST EMISSIONS (GRAMS/MILE) HYDRO-CARBONS	CARBON MONOXIDE	OXIDES OF NITROGEN	EVAPORATIVE EMISSIONS (GMS/TEST) HYDRO-CARBONS
CHRYSLER												
Valiant	198.0,225.0	AG	PLYMOUTH COMP	225.0- 1	A3	3500	2.76	15.7	2.3	31.	2.9	0.2
Duster			PLYMOUTH COMP	225.0- 1	A3	3500	2.76	15.7	2.7	23.	2.6	0.3
Valiant Scamp			DODGE COMP	198.0- 1	A3	3500	3.55	15.0	2.6	21.	3.0	0.3
Valiant Scamp Special			DODGE TRUCK	225.0- 1	M3	4000	3.91	12.1	2.9	37.	2.0	0.5
Valiant Brougham			* DODGE SP WAG	225.0- 1	M3	4000	3.90	11.5	2.8	35.	1.6	0.5
Dart Swinger Special			- DODGE COMP	198.0- 1	A3	3500	2.76	NA 1/	2.2	23.	3.8	0.2
Dart												
Dart Sport												
Dart Custom												
Dart Swinger												
Dart Special Edition												
Satellite Police												
Satellite Taxi												
Satellite *												
Satellite Sebring												
Satellite Custom												
Coronet Police												
Coronet Taxi												
Dodge Taxi												
Coronet *												
Charger Coupe												
Charger												
Coronet Custom												
Tradesman Van												
Sportsman												
Custom Sportsman												
Royal Sportsman												
Tradesman Maxivan												
Royal Sportsman SE												
Sportsman Maxiwagon												
Custom Sportsman Maxiwagon												
Royal Sportsman Maxiwagon												
Custom												
Adventurer												
Adventurer Sport												
Adventurer SE												
Club Cab Custom												
Club Cab Adventurer												
Club Cab Adventurer Sport												
Club Cab Adventurer SE												
AW100 Truck												

	Disp	Trans	IW Class	Axle Ratio
SAT/Coronet	225.0	A3	4000	2.94

1/ Due to analyzer malfunction, no CO_2 data was available and, hence, no fuel economy data were calculated for vehicles designated "N.A." or "not available."

Determining fuel economics for years prior to 1973 presented some difficulties due to the lack of any data recorded by following an EPA 1972 or 1975 FTP test cycle, the variation of test cycles over a period of time by the same organization, the lack of scientifically controlled repetition of test cycles, the lack of any test for many configurations, and the inclination for manufacturers to supply specialized or performance equipped vehicles to testing groups for testing rather than the more standard models.

The fact that fuel economy is affected by such a wide range of factors including the manner in which the vehicle is driven, type of route traveled, vehicle speeds, cold start frequency, accessory equipment use, vehicle weight, axle ratio, transmission type and ambient conditions further complicated comparing road test fuel economy data to EPA data. Tests have indicated[1] that the same group of vehicles tested in a carefully controlled road test will give different relative economies than when tested on carefully controlled dynamometer tests (as EPA) primarily due to variations in aerodynamic characteristics beyond the scope of consideration in the EPA tests but automatically present in road tests. These tests also indicated a variation in comparing the relative results of the two types of tests when observing cars of different weights.

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1 Reference: SAE report #750670 A Technical Report of the 1975 Union 76 Fuel Economy Tests by West, Wusz, Finnigan & Askewold.

The two most significant factors effecting fuel economy appear to be 1.) type of driving and; 2.) vehicle weight. Vehicle weight was matched as closely as possible between road test vehicles and data base configurations. Comparisons between road test drive cycle information and EPA cycle data were based on engineering judgements and consideration of the test cycles. It was found that only about one-third of the numerous road tests available for reference would be applied, even with broadest consideration, to data base configurations listed. Preference was given to data from sources that spanned the largest period of time in the study hence gave an added consistency factor. Data accumulated and the drive cycle used was reviewed and the data was assigned an urban, composite, or highway classification. Comparisons were made between test source data and comparable EPA test data when sufficient information was available. The cycle from each source was assigned an adjustment factor which was multiplied by road test fuel economy data from that source.

The relationships between urban and composite, and urban and highway fuel economy was maintained at a ratio of 1: 1.154 and 1:1.42 respectively throughout the data base. Therefore when only one of the three of these fuel economy values could be obtained or estimated, the other two values would be established by applying the appropriate ratios.

Where data was available from road tests it was factored and presented. Where it was possible to estimate fuel economy of similar cars (i.e., same engine, manufacturer, similar weight, transmission, axle ratio) estimates were made. Where no data was available and there was no similar configuration with data available for comparison the data was omitted. Table 2-9 shows road test cycle factors.

TABLE 2-9 ROAD TEST CYCLE FACTORS

Road Test Milage X Factor = EPA

TEST	FACTOR	EPA EQUIVALENT
Motor Trend 73 Mile (Or car life)	0.9	Composite
Pure-Union Perf. Tests	1.0	Composite
Popular Science Composite	1.3	Composite
Road and Track 41 Mile	0.9	Composite

The factors shown in Table 2-8 were assigned by comparing test cycles and average speeds. The Pure Oil Fuel Economy Test from the performance trials from 1961 to 1970 was judged to give economy values comparable to the EPA composite values. Comparisons of Motor Trend data with the Pure-Union tests resulted in the 0.9 factor assignment. Motor Trend, Road and Track and Road Test Magazine data seemed to compare closely so Road and Track data was assigned a 0.9 factor also. Popular Science milages were lower than Pure Union's and were assigned a 1.3 factor. Car and Driver test data prior to 1973 was too inconsistent to be of value, and was taken in many cases from performance runs. Auto Car data was used in a few instances. Table 2-10 shows some 1970 road test data used to develop the factors. Information that seemed inconsistently high or low was not used.

TABLE 2-10 SELECTED 1970 ROAD TEST FUEL ECONOMY DATA

Car	Disp. CID	Fuel Economy - MPG		
		Pure-Union	Motor Trend Hiway	Pop. Sci.
Ford	390	15.10	16.7	
Maverick	200	22.15	23.1	
Chevrolet	350	16.62	18.5	
Coronet	440	14.42	15.7	
Rebel	232			19.0
Hornet	232	25.08		
Toranado	455	13.38		9.4

Table 2-11 shows various fuel economy road test cycles designated by name of test group.

Pure-Union test data for 1961 were used for applicable 1960 data base configurations when manufacturer, model, engine and transmission were identical. Pure trials for 1960 used a non-representative test cycle.

Steady state fuel economies were not available in many cases and were not listed unless supported by test data.

2.3.8 Vehicle Performance

Acceleration times were recorded for 0 to 60 mph or 0 to 50 mph. When the times entered in attribute 41 were 0 - 50 mph times, this was noted in the comments. If acceleration times were not available no information was estimated. Cars in more recent years (especially smaller ones), suffering from the lack of power brought on by emission equipment and emphasis on fuel economy, are more commonly tested at 0 - 50 mph levels.

Passing times 40 - 60 mph were recorded when data was found. Passing time 35 - 55 mph was not found for any of the configurations and was not recorded. This space (Attribute 43.) was used for an additional "other" passing time for some early years of the study when 40 - 60 mph was not available. If used for another passing time, the speeds were noted in the comments.

TABLE 2-11 ROAD TEST CYCLES

Tester	Cycle	Assigned Classification
Motor Trend/ Car Life	A 73 mile public road loop of approximately 1/3 city, 1/3 suburban and 1/3 highway driving. Maximum speeds do not exceed 60mph. Maximum loop travel time is 2 hrs. Tank is filled before and refilled afterwards at same station. Test loop measures 73.125 miles on a fifth wheel. Testing temperature is 70-80^{O} ambient. Motor is warm on start No special attempts made to gain economy. Driven normally following traffic.	COMPOSITE
Popular Science	Drive steady 45 mph around Bridgehampton (Long Island) N.Y. raceway - a 2.5 mile course with many turns and hills intermixed.	COMPOSITE
Road & Track	A 41 mile public road loop consisting of 40% city and 60% freeway driving. Test vehicle filled before and refilled afterwards at same station.	COMPOSITE
Pure-Union Performance Trials	For this test, every car received a measured gallon of gasoline in a special tank. (The car's regular tank was disconnected and the carburetor was run dry.) The object was to see how far each car could go on its one gallon of gasoline, under typical driving conditions. The entire run was made at an average speed of at least 40 mph. During each 3.7 mile lap around the track, every car had to (1) go through a 1,610-ft. speed zone at a minimum speed of 65 mph and (2) make a complete stop. This is designed to duplicate, in condensed form, normal driving on a tankful of gasoline. The economy test for each car ended when the car ran out of gas and rolled to a stop. The distance it covered was measured by the official car with a "5th wheel" odometer accurate to 1/10 of 1 foot, and mpg calculated.	COMPOSITE

Attribute 44 was used to record other available passing times and the speeds were specified in comments.

Production volume information was not available for all configurations in published literature but was acquired from the manufacturers if necessary. This information was gathered in the process of data base vehicle selection.

2.4 INFORMATION SOURCES

The sources of information used to compile the information included in the data base is shown in Table 2-12. The table shows the sources, specified by attribute and applicable model year.

Source material was obtained from Chilton Library sources, the Philadelphia Free Library, private literature collections and automobile manufacturers.

In some cases original publications were not available for direct reference, e.g., some issues of Ward's Automotive Yearbook and Automotive News Almanac issue. In these instances information was supplied by photo-copying the originals from the publisher's archive file.

TABLE 2-12 ATTRIBUTE SOURCE TABLE
Years Studied 1955, 1960, 1965, 1968, and 1970 to 1974 only

	Attribute	
01	Vehicle identification	1955 to 1974 Wards
02	Transmission & no. of gears	1955 to 1974 MVMA (AMA), A/N, 1955 to 1973 AI, 1970 to 74 ECP, 1973-74 R
03	Cubic inch displacement	1955 to 1974 MVMA (AMA), A/N, 1955 to 1973 AI, 1970 to 74 ECP, 1974 R
04	Rear ratio	1955 to 1974 MVMA (AMA), A/N, 1955 to 1973 AI, 1970 to 74 ECP, 1974 R
05	Engine type	1955 to 1974 MVMA (AMA), A/N, 1955 to 1973 AI, 1970 to 74 ECP, 1974 R
06	Compression ratio	1955 to 1974 MVMA (AMA), A/N, 1955 to 1973 AI, 1970 to 1974 ECP, 1974 R
07	Stroke	All years MVMA (AMA), A/N, 1955 to 1973 AI, 1970 to 1974 ECP, 1974 R
08	Engine horsepower	
09	Horsepower RPM	
10	Engine Torque	
11	Torque RPM	
12	Fuel Injection	
13	Wheel Base	
14	Length	
15	Width	
16	Height	
17	Curb Weight	
18	Inertia weight class	Comp.
19	Front seat height	1955 to 1974 MVMA (AMA), 1955 to 1971 A/N, AI, 1965-70, 72-74 A, 72-74 AC, 74 DOT, 72-73 J
20	Front head room	1955 to 1974 MVMA (AMA), 1955 to 1974 A/N, 1955 to 1973 AI, 65 to 1974 A, 72 to 74 AC, 73 CR, 74 DOT, 72-73 J
21	Rear head room	1955 to 1974 MVMA (AMA), 1955 to 1973 AI, 1965 to 74 A, 72 to 74 AC, 1974 DOT, 1973 CR, 1972-73 J 1955 to 70 A/N
22	Front leg room	1955 to 1974 MVMA (AMA), 1955 to 1974 A/N, 1955 to 1973 AI, 65 to 1974 A 72 to 74 AC, 1974 DOT, 1973 CR, 72-73 J
23	Rear leg room	1955 to 1974 MVMA (AMA), 1955 to 1973 AI, 65 to 1974 A, 1955 to 1970 A/N, 1974 DOT, 1973 CR, 1972 to 1974 AC
24	Front shoulder room	1955 to 1974 MVMA (AMA), 1965 to 74 A, 72 to 74 AC, 65 to 73 J, 55 & 60, A/N AI, 1974 DOT
25	Rear shoulder room	1955 to 1974 MVMA (AMA), 1965 to 74 A, 72 to 74 AC, 65 to 73 J, 55 & 60, A/N AI, 1974 DOT
26	Roominess factor	1955 to 1974 Comp, 68 to 74 AC, 1955 to 1974 A/N, 55 to 1973 J

Note: items 07–17 are bracketed together with the source "All years MVMA (AMA), A/N, 1955 to 1973 AI, 1970 to 1974 ECP, 1974 R".

TABLE 2-12 ATTRIBUTE SOURCE TABLE (continued)

27 Trunk space	1955 to 1974 MVMA (AMA), 71 to 74 AC, 70-74 ECP, 74 DOT, 55-71 A/N, 65-73 A, 55-73 J
28 No. of passengers	1955 to 1974 MVMA (AMA), 1955 to 1974 A/N, 1970 to 1974 ECP, 1955 to 1972 AI, 1974 DOT
29 Hydrocarbon ECS	1965-1974 MVMA (AMA) 1965 to 1974 CPE, 65-74 CPI, 1971 to 1972 CBMW, 71-72 CS
30 Nitrogen OX ECS	
31 After treat ECS	
32 Hydrocarbon emissions	1974 & 1973 EPA
33 CO emissions	
34 Nitrogen OX emissions	
35 Urban fuel economy	1974 & 73 EPA, 1955 to 1972 MT, 60-72 RT, 65-72 R, 60-72 A, 60 to 72 CD, 60 to 72 PS, 70-72 ECP, 60 to 68 CL
36 Drive cycle urban	1974-73 EPA
37 Highway fuel economy	1974 & 73 EPA, 1955 to 1972 MT, 60-72 RT, 65-72 R, 60 to 72 A, 60-72 CD, 60 to 72 PS, 70-72 ECP, 60 to 68 CL
38 Drive cycle highway	1974 & 73 EPA
39 Compos.fuel economy	1974 & 73 EPA, 1955 to 72 MT, 60-72 RT, 65-72 R, 60 to 72 A, 60-72 CD, 60 to 72 PS, 70-72 ECP, 60 to 68 CL
40 Steady state	1955-74 MT, 60-74 RT, 60-74 R, 60-74 PS, 70-74 CD, 60-74 A, 70 to 74 ECP, 60-68 CL
41 Acceleration 0-60	1955-74 MT, 60-74 RT, 60-74 R, 60-74 PS, 70-74 CD, 60-74 A, 70-74 ECP, 60-68 CL, 60-70 PPT
42 Passing (40-60 MPH)	1955-74 MT, 60-74 RT, 60-74 R, 60-74 PS, 70-74 CD, 70-74 ECP, 60-74 A, 60-68 CL
43 Passing (35-55 MPH)	1955-60 MT, 60 PS, 60 CL
44 Passing other	1955-74 MT, 60-74 RT, 60-74 R, 60-74 PS, 70-74 CD, 70-74 ECP, 60-74 A, 60-68 CL, 60-70 PPT
45 Model,Production vol.	1955-74 Wards, 65, 68, 71 to 74 F, 71 to 74 C, 65-74 P, 70 to 72, 74 B, 68-74 O, 65-73 M, 73 PL, D, 55-68 MP, 55-60 A/N 55 AI
46 Class Production vol.	1955-74 Wards, 65, 68, 71 to 74 F, 71 to 74 C, 65-74 P, 70-72, 74 B, 68-74 O, 65-73 M, 73 PL, D, 55-60 AN, 55 AI
47 List price	1970 to 74 ECP, 55-73 A/N, 55-68 AI
48 Comment 1	
49 Comment 2	

TABLE 2-12 ATTRIBUTE SOURCE TABLE (continued)

ABBREVIATIONS

Key	Source
A	Auto Car
AC	Auto Manufacturers Competitive Car Spec.
AI	Automotive Industries Statistical Issue
A/N	Automotive News Statistical Issue
B	Buick Division oi General Motors Co.
C	Chevrolet Division of General Motors Co.
CBMW	Chilton - BMW II Repair Manual
CD	Car and Driver
CL	Car Life
Comp.	Computations
CPE	Chilton - Motor/Age Professional Emission Diagnostic & Safety Manual
CPI	Chilton Professional Import Automotive Repair Manual
CR	Consumer Reports Magazine
CS	Chilton SAAB 99 Repair Manual
D	Dodge Division of Chrysler Corp.
DOT	DOT/TSC 1975 Data Base
ECP	Edmunds Car Prices
EPA	EPA Test Data from Federal Registers
F	Ford Division of Ford Motor Company
J	Judgement used in selective areas where hard data was not available
M	Mercury Division of Ford Motor Company
MB	Mercedes Benz of North America
MT	Motor Trend
MVMA (AMA)	Motor Vehicle Manufacturers Association formerly AMA
O	Oldsmobile Division of General Motors Corp.
P	Pontiac Division of General Motors Corp.
PL	Plymouth/Chrysler Division of Chrysler Corporation
PPT	Pure Oil Performance Trials
PS	Popular Science
R	Road Test Magazine
RT	Road and Track
W	Wards

2.5 COLLATING AND DATA PROCESSING

Date accumulated during this project was collated and recorded on magnetic tape. Data has been delivered on nine (9) track unlabeled tape, at a recording mode of 800 BPI, conforming to 8-bit EBCDIC interchange code. As specified by contract, each tape has been accompanied by a structure definition sheet and a file description. The definition sheet, file description, code tables and body class definitions follow in Tables 2-13 to 2-16.

TABLE 2-13 STRUCTURE DEFINITION SHEET

1. Contract
2. Data Tile
3. Tape ID
4. Number of Blocks
5. Number of Records

CHILTON DATA PROCESSING SERVICES

TABLE 2-14 FILE DESCRIPTION

SYSTEM NAME DOT/TSC CONTRACT SYS. STEP NO. 300

SYS. STEP NAME Tape Conversion DATE 5 / 28/76 NEW x REV ____

FILE DESCRIPTION FILE ID. ____________

FILE NAME DOT/TSC Historical Data Base REC. SIZE 295

DISK ORGANIZATION N/A FILE SEQ. N/A BLOCK SIZE 2950

FIELD TYPES = A-alphanumeric; I-integer; R-real

FLD	SUB FLD	FIELD NAME	POSITION FROM	TO	# OF BYTES	FLD TYP	DEC POS	ABBR.	REMARKS
01	00	Vehicle Ident.	1	11	11	A	O	VID	
	01	Rec#	1	3	3	I	O		Sequent.
	02	Manufacturer	4	6	3	A	0		Table A
	03	Dom/Imp	7	7	1	A	O		D or I
	04	Body Class	8	8	1	I	0		Table B
	05	Body Type	9	9	1	I	O		Table C
	06	Model Year	10	11	2	I	O		
02	00	Trans & # Gears	12	14	3	A	O	TR	
	01	Transmission	12	12	1	A	O		
	02	# of Gears	13	14	2	A	O		Just.Lft
03	00	Cubic Inch Disp	15	17	3	I	O	CID	
04	00	Rear End Ratio	18	21	4	R	2	RR	
05	00	Eng. Type & # Cyl	22	23	2	A	O	CY	
	01	Type	22	22	1	A	O		
	02	# Cylinders	23	23	1	I	O		
06	00	Compress Ratio	24	27	4	R	1	CR	
07	00	Stroke	28	31	4	R	2	STR	
08	00	Engine HP	32	34	3	I	O	HP	
09	00	Horsepower RPM	35	38	4	I	O	RPM	
10	00	Engine Torque	39	41	3	I	O	TOR	

CHILTON TABLE 2-14 FILE DESCRIPTION (continued)
DATA PROCESSING SERVICES

SYSTEM NAME DOT/TSC CONTRACT SYS. STEP NO. 300

SYS. STEP NAME Tape Conversion DATE 5 / 28 /76 NEW x REV. ____

FILE DESCRIPTION FILE ID. ____________

FILE NAME DOT/TSC Historical Data Base REC. SIZE 295

DISK ORGANIZATION N/A FILE SEQ. N/A BLOCK SIZE 2950

FIELD TYPES = A-alphanumeric; I-integer; R-real

FLD	SUB FLD	FIELD NAME	POSITION FROM	TO	# OF BYTES	FLD TYP	DEC POS	ABBR.	REMARKS
11	00	Torque RPM	42	45	4	I	O	RMT	
12	00	Fuel Injection	46	48	3	A	O	FI	
13	00	Wheel Base	49	53	5	R	1	WB	
14	00	Length	54	58	5	R	1	LT	
15	00	Width	59	62	4	R	1	WD	
16	00	Height	63	66	4	R	1	HT	
17	00	Curb Weight	67	70	4	I	O	CWT	
18	00	Inertia Weight	71	74	4	I	O	IWT	
19	00	Front Seat Height	75	78	4	R	1	FSH	
20	00	Front Head Room	79	82	4	R	1	FHR	
21	00	Rear Head Room	83	86	4	R	1	RHR	
22	00	Front Leg Room	87	90	4	R	1	FLR	
23	00	Rear Leg Room	91	94	4	R	1	RLR	
24	00	Front Shoulder Room	95	98	4	R	1	FSR	
25	00	Rear Shoulder Room	99	102	4	R	1	RSR	
26	00	Roominess Factor	103	107	5	R	1	RF	
27	00	Trunk Space	108	112	5	R	1	TS	
28	00	# Passengers	113	114	2	I	O	PAS	
29	00	Hydrocarbon ECS	115	117	3	A	O	EHC	
30	00	Nitrogen OX ECS	118	120	3	A	O	ENO	

CHILTON DATA PROCESSING SERVICES

TABLE 2-14 FILE DESCRIPTION (continued)

SYSTEM NAME DOT/TSC CONTRACT SYS. STEP NO. 300

SYS. STEP NAME TAPE CONVERSION DATE 5 / 28 /76 NEW x REV. ____

FILE DESCRIPTION FILE ID. ____

FILE NAME DOT/TSC HISTORICAL CATA BASE REC. SIZE 295

DISK ORGANIZATION N/A FILE SEQ. N/A BLOCK SIZE 2950

FIELD TYPES = A-alphanumeric; I-integer; R-real

FLD	SUB FLD	FIELD NAME	POSITION FROM	TO	# OF BYTES	FLD TYP	DEC POS	ABBR.	REMARKS
31	00	After Treat ECS	121	123	3	A	0	EAT	
32	00	Hydrocarbon Emis.	124	128	5	R	2	LHC	
33	00	CO Emission	129	133	5	R	2	LCO	
34	00	Nitrogen OX. Emis.	134	138	5	R	2	LNO	
35	00	Urban Fuel Econ.	139	142	4	R	1	GEU	
36	00	Drive Cycle - Urb.	143	155	13	A	0	DCU	
37	00	Highway fuel Econ.	156	159	4	R	1	GEH	
38	00	Drive Cycle-Hghway	160	172	13	A	0	DCH	
39	00	Compos. Fuel Econ.	173	176	4	R	1	GEC	
40	00	Steady State	177	180	4	R	1	G50	
41	00	Acceleration	181	185	5	R	2	A60	
42	00	Passing (40-60mph)	186	189	4	R	1	A1P	
43	00	Passing (35-55mph)	190	193	4	R	1	A2P	
44	00	Passing (other)	194	197	4	R	1	A3P	
45	00	Model Prod. Vol.	198	203	6	R	2	TP4	Thousand
46	00	Class Prod. Vol.	204	210	7	R	2	MS4	Thousand
47	00	List Price	211	215	5	I	0	MLP	
48	00	Comment 1	216	255	40	A	0	CO1	
49	00	Comment 2	256	295	40	A	0	CO2	

TABLE 2-15 CODE TABLES

TABLE A. MANUFACTURERS:

COMPANY	
VAUXHALL	VAU
AMERICAN MOTORS CORP.	AMC
BRITISH LEYLAND	BRI
CHRYSLER CORP.	CHR
FORD MOTOR CO.	FMC
FIAT	FIA
GENERAL MOTORS CORP.	GMC
VOLKSWAGEN	VWA
TOYOTA	TOY
NISSAN (DATSUN)	NSN
MAZDA	MAZ
PORSCHE-AUDI-VOLKSWAGEN	VWA
MITSUBISHI (DODGE COLT)	MTI
VOLVO	VOL
HONDA	HDA
MERCEDES BENZ	MBL
SUBURU	SUB
BAVARIAN MOTOR WORKS	BMW
SAAB	SBA
PEUGEOT	PEU
STUDEBAKER	STU
AUSTIN HEALEY	AHI
FORD (ENGLISH)	FME
HILLMAN	HIL
METROPOLITAN	MET
MORRIS	MRS
RENAULT	REN
SIMCA	SIM
WILLYS	WLS

TABLE B. BODY CLASS

DESCRIPTION	FILE CODE (VID)
MINI	0
SUBCOMPACT	1
SPORTS	2
COMPACT	3
SPECIALTY COMPACT	4
INTERMEDIATE	5
SPECIALTY INTERMEDIATE	6
STANDARD	7
SPECIALTY STANDARD	8
LUXURY	9

TABLE C. BODY TYPE:

DESCRIPTION	FILE CODE (VID)
STANDARD	0
STATION WAGON	1

TABLE 2-15 (continued)

CODE TABLES

TABLE D. HYDROCARBON EMISSION CONTROL SYSTEMS

TYPE	FILE CODE (EHC)
AIR INJECTION REACTOR (AIR PUMP)	AIR
ENGINE MODIFICATION SYSTEM	EMS

TABLE E. NOX EMISSIONS CONTROL SYSTEMS

TYPE	FILE CODE (ENO)
EXHAUST GAS RECIRCULATING	EGR
TRANSMISSION CONTROLLED SPARK	TCS

TABLE F. AFTER TREATMENT EMISSION CONTROL SYSTSMS

TYPE	FILE CODE (EAT)
CATALYTIC CONVERTER	CAT
THERMAL REACTOR	THM

TABLE 2-16 BODY CLASS DEFINITION

DOT VEHICLE DATA BANK

File Code	Body Class Definition	
0	Mini	Under 80 inch wheelbase
1	Sub Compact	80 - 100 inches wheelbase
2	Sport	Two passenger sports design. May not be high performance in acceleration characteristics - but will be a sports car by design. Examples are: MGB, Spitfire, TR7, 914 Porsche, Corvette, Pantara, etc.
3	Compact	101 - 111 inches wheelbase, 1965 to 1974 101to 114 inches 1955 and 1960
4	Specialty Compact	Compact category wheelbase, but of sporty nature, limited to two-door body configuration and 2+2 or four passenger seating. Examples are: Camaro, Firebird, Mustang
5	Intermediate	112 - 119 inches wheelbase, 1965 to 1974 Class does not exist 1955 and 1960
6	Specialty Intermediate	Intermediate category wheelbase, but of more sporty design, limited to two-door body configuration and 2+2 or four passenger seating. . Examples are: Monte Carlo, Cordoba and Cougar.
7	Standard	120 inches wheelbase up for 1965 to 1974 except for luxuries and specialty standards. The basic full-size car. 114 and over for 1955 and 1960.
8	Specialty Standard	Standard category wheelbase but of more sporty design, normally limited to two door design (four door Thunderbird is exception) and with five or six passenger capacity. Special body differing from standard car line.
9	Luxury	The high priced cars aimed at the buyer who can spend a lot of money for extra refinements and appointments. Usually the largest cars but in all cases the most expensive cars.

3. CONCLUSIONS

Data was collected, correlated and collated covering the defined attributes of the physical, operating, performance, and economy characteristics for the model years 1955, 1960, 1965, 1968, 1970 through 1974 and for the vehicle configurations representative of the total fleet for the United States. Characteristics were documented for over 1000 vehicle configurations for all attributes for which information was available or could be reasonably extrapolated from available information.

With the addition of this data base to the existing DOT automotive data base, the ability of the Transportation Energy Efficiency Program to support DOT policy making decisions has been greatly enhanced.

4. RECOMMENDATIONS

In order to sustain the ability of the DOT to make policy decisions based on most current information this data base information should be up-dated annually to reflect the most recently available information. The necessary data to perform this task should be available by the end of the calendar year of the subject model year. The data could be collected, correlated and collated by the end of the first quarter of the year following the subject model year. Unfortunately the last data available (model year production information) is one of the first pieces of information needed to select representative configurations.

Because of the obvious need to extend controls to other types of transportation such as light trucks and vans, a similar data base should be created as a source of automotive characteristics most commonly used in research analyses and discussions concerning automotive energy consumption. The study should include coverage of recent years to accumulate the base line characteristics of the subject vehicles.

APPENDIX A
REPORT OF INVENTIONS

Contract DOT-TSC-1174 concerned the collection of existing data on automobile characteristics. Although some extrapolation and/or interpretation of data was used by the contractor as part of the methodology for task completion, no "subject inventions" were achieved during the performance of work on this contract.

APPENDIX B
EXHIBITS

EXHIBIT I

RECEIVED
JUL 12 1976
BUICK MOTOR DIV.
CAR
DISTRIBUTION

July 9, 1976

Mr. D. F. McGarry
Car Distribution
Buick Motor Division
Flint, MI 48550

Dear Mr. McGarry:

Please advise for statistical purposes the following information per our telephone conversation Friday, July 9, 1976.

1973 Model Year:

Production quantity of Century series with 350 CID engine
Production quantity of Le Sabre series with 350 CID engine

1972 Model Year:

Production quantity of Skylark series with 350 CID engine
Production quantity of Le Sabre series with 350 CID engine

1971 Model Year:

Production quantity of Skylark series with 350 CID engine
Production quantity of Le Sabre series with 350 CID engine

1970 Model Year:

Production quantity of Skylark series with 350 CID engine
Production quantity of Le Sabre series with 350 CID engine

Thank you for your help.

Very truly yours,

Charles K. Cantwell

Charles Cantwell

CC:pc

Chilton Company/Radnor, Pennsylvania, 19089 215-687-8200

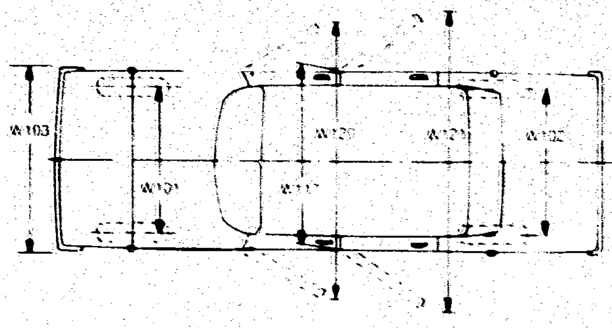
EXHIBIT II CHRYSLER CARS SELECTED FOR DATA BASE

Domestic or Imported	Manufacturer	Division	Model	Class	Body Type	Curb.	Inertia Weight	Inertia Weight Class	Engine	Trans.	Production
D	Chrysler	Ply/Dod	Val/Dar	COMP	STD	3222	3522	3500	198	A3	36,986
				"	"	3211	3511	3500	225	M3	53,539
				"	"	3216	3516	3500	225	A3	398,058
				"	"	3327	3627	4000	318	A3	220,923
D	Chrysler	Ply/Dod	Sat/Coro Charger	INT	STD	3752	4052	4000	225	A3	15,667
				"	"	3817	4117	4000	318	A3	192,909
				"	"	3875	4175	4000	360	A3	8,606
				"	"	3974	4274	4500	400	A3	8,006
				"	"	4104	4404	4500	440	A3	8,306
				"	SW	4382	4682	4500	318	A3	26,099
D	Chrysler	Ply/Dod	Bar/Chal	SPEC COMP	STD	3478	3778	4000	318	M3	1,641
				"	"	3452	3752	4000	318	A3	15,854
				"	"	3684	3984	4000	360	M4	709
				"	"	3647	3947	4000		A3	2,058
D	Chrysler	Ply/Dod Chr	Fu/Mon Chr	STD	STD	4395	4694	4500	360	A3	74,041
					"	4497	4797	5000	400	A3	121,572
						4545	4845	5000	440	A3	44,000
					SW	5069	5369	5500	400	A3	25,458
D	Chrysler	Chr	Imp	LUX	STD	5095	5395	5500	440	A3	12,725

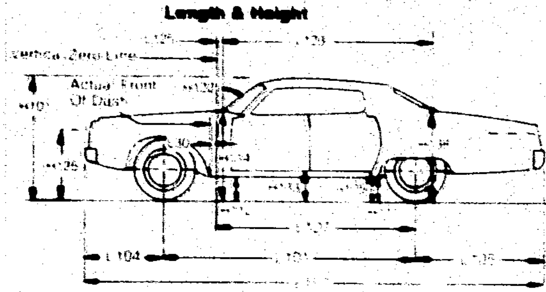
EXHIBIT III PASSENGER CAR DIMENSIONS

EXTERIOR CAR AND BODY DIMENSIONS

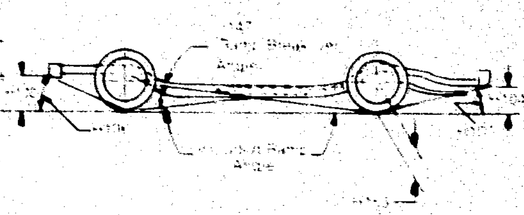
Width



Length & Height

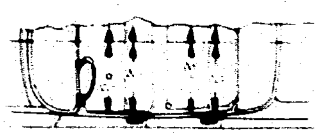


Ground Clearance

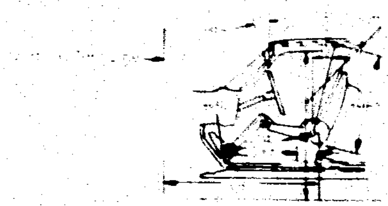


INTERIOR CAR AND BODY DIMENSIONS

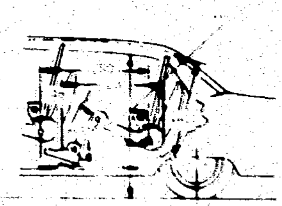
Width



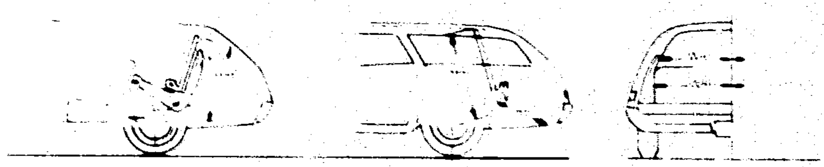
Front Compt.



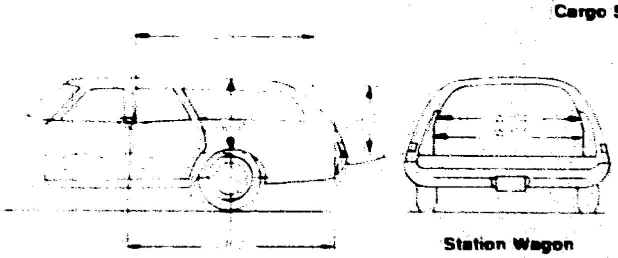
Rear Compt.



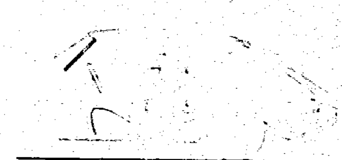
Third Seat



Cargo Space



Station Wagon



Hatchback

EXHIBIT IV

DT MAINTENANCE

EDP JOB NO. 300-KP-24

DATE

REMARKS

D/N	VEHICLE I.D. NO.	MFR.	O	C	T	YR.	T/C
1 2	3 5	6 8	9	10	11	12 13	80
D T							

A – Add
C – Change
D – Delete

F/N	Field	Columns
0 2	TR	14 15 16 18
0 3	CID	14 15 16 18
0 4	RR	14 15 16 19
0 5	CY	14 15 16 17
0 6	CR	14 15 16 19
0 7	STR	14 15 16 19
0 8	HP	14 15 16 18
0 9	RPM	14 15 16 19
1 0	TOR	14 15 16 18
1 1	RMT	14 15 16 19
1 2	FI	14 15 16 19
1 3	WB	14 15 16 20
1 4	LT	14 15 16 20
1 5	WD	14 15 16 19
1 6	HT	14 15 16 19
1 7	CWT	14 15 16 19
1 8	IWT	14 15 16 19
1 9	FSH	14 15 16 19
2 0	FHR	14 15 16 19
2 1	RHR	14 15 16 19
2 2	FLR	14 15 16 19
2 3	RLR	14 15 16 19
2 4	FSR	14 15 16 19
2 5	RSR	14 15 16 19
2 6	RF	14 15 16 20
2 7	TS	14 15 16 20
2 8	PAS	14 15 16 17
2 9	EHC	14 15 16 18
3 0	ENO	14 15 16 18
3 1	EAT	14 15 16 18
3 2	LHC	14 15 16 20
3 3	LCO	14 15 16 20
3 4	LNO	14 15 16 20
3 5	GEU	14 15 16 19
3 6	DCU	14 15 16 28
3 7	GEH	14 15 16 19
3 8	DCH	14 15 16 28
3 9	GEC	14 15 16 19
4 0	G50	14 15 16 19
4 1	A60	14 15 16 20
4 2	A1P	14 15 16 19
4 3	A2P	14 15 16 19
4 4	A3P	14 15 16 19
4 5	TP4	14 15 16 21
4 6	MS4	14 15 16 22
4 7	MLP	14 15 16 20
4 8	C02 COMMENT 1	14 15 16 20 30 40 50 55
4 9	C01 COMMENT 2	14 15 16 20 30 40 50 55

FORM 10136 (6 76)

EXHIBIT V

1971 U. S. PASSENGER CARS

STANDARD ENGINES—RATINGS and PERFORMANCE

Passenger Car Make and Model	Type, No. of Cylinders, Valve Arrangement	Bore and Stroke (in.)	Displacement: Cubic Inches	Displacement: Cubic Centimeters	Compression Ratio Nominal	Brake Horsepower at RPM: Gross	Brake Horsepower at RPM: Net	Torque at RPM: Gross	Torque at RPM: Net	HP per Cu. In.: Gross	HP per Cu. In.: Net	Cylinder Head Combustion Chamber Volume c.c.	Engine Installation Angle (deg.)
AMERICAN MOTORS CORP.													
Gremlin, Hornet, Javelin, Matador	IL-6-OHV	3.75x3.[illegible]	232.0	[illegible]	[illegible]	135 [illegible]		210 1600		.582		64.[illegible]	Ver
Ambassador	IL-6-OHV	3.75x3.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		240 1600		.[illegible]		64.[illegible]	Ver
Ambassador	[illegible]-V8-OHV	3.[illegible]x3.44	[illegible]	[illegible]	[illegible]	210 4400		[illegible] 2600		.691		50.02	Ver
Hornet, Javelin	[illegible]-V8-OHV	4.[illegible]x3.44	[illegible]	[illegible]	[illegible]	240 [illegible]		[illegible]		.[illegible]1		57.02	Ver
CHECKER MOTOR CORP.													
Marathon	IL-6-OHV	3.[illegible]x3.[illegible]	[illegible]	[illegible]	[illegible]	145 4300		230 1600		.[illegible]		72.30	6
CHRYSLER CORP.													
Plymouth													
Valiant, Barracuda	IL-6-OHV	3.40x3.64	[illegible]	[illegible]	[illegible]	125 [illegible]		1[illegible] 2000		.631		56.90	Lat[1]
Satellite, Fury	IL-6-OHV	3.40x4.12	225.0	[illegible]	[illegible]	145 [illegible]		215 2400		.644		56.90	Lat[1]
Valiant	[illegible]-V8-OHV	3.91x3.31	318.0	5212	[illegible]	230 [illegible]		320 2000		.723		66.30	Lat[1]
Barracuda	[illegible]-V8-OHV	4.04x3.31	340.0	5573	10.[illegible]	275 [illegible]		340 3200		[illegible]		71.20	Lat[1]
Barracuda	[illegible]-V8-OHV	4.25x3.38	383.0	6277	[illegible]	300 [illegible]		410 3400		.783		[illegible].70	Lat[1]
Fury	[illegible]-V8-OHV	4.32x3.75	440.0	7212	[illegible]	335 [illegible]		[illegible] 3200		.761		[illegible].70	Lat[1]
Satellite	[illegible]-V8-OHV	4.32x3.75	440.0	7212	[illegible]	370 [illegible]		[illegible] 3200		.841		[illegible].70	Lat[1]
Dodge													
Challenger, Dart	IL-6-OHV	3.40x3.64	[illegible]	3240	[illegible]	125 [illegible]		185 2000		.631		[illegible].90	Lat[1]
Challenger, Coronet, Charger, Polara	IL-6-OHV	3.40x4.12	225.0	[illegible]	[illegible]	145 [illegible]		215 2400		.644		[illegible].90	Lat[1]
Charger	[illegible]-V8-OHV	3.91x3.31	318.0	5212	[illegible]	230 [illegible]		320 2000		.723		[illegible].30	Lat[1]
Dart	[illegible]-V8-OHV	4.04x3.31	340.0	5573	10.20	275 [illegible]		340 3200		[illegible]		71.20	Lat[1]
Polara, Monaco	[illegible]-V8-OHV	4.25x3.38	383.0	6277	[illegible]	275 4400		375 2800		.718		[illegible].70	Lat[1]
Challenger, Monaco	[illegible]-V8-OHV	4.25x3.38	383.0	6277	[illegible]	[illegible]		410 3400		.783		[illegible].70	Lat[1]
Charger	[illegible]-V8-OHV	4.32x3.75	440.0	7212	[illegible]	370 [illegible]		[illegible] 3200		.841		[illegible].75	Lat[1]
Chrysler													
Newport	[illegible]-V8-OHV	4.25x3.38	383.0	6277	[illegible]	275 4400		375 2800		.718		[illegible].70	Lat[1]
300, New Yorker	[illegible]-V8-OHV	4.32x3.75	440.0	7212	[illegible]	335 4400		[illegible] 3200		.761		[illegible].70	Lat[1]
Imperial													
LeBaron	[illegible]-V8-OHV	4.32x3.75	440.0	7212	[illegible]	335 [illegible]		[illegible] 3200		.761		[illegible].70	Lat[1]
FORD MOTOR CO.													
Ford													
Pinto	IL-4-OHC	3.19x3.06	97.6	[illegible]	[illegible]	75 5000		9[illegible] 3000		.768			3 15
Maverick	IL-6-OHV	3.50x2.94	170.0	2786	8.70	100 4200		1[illegible] 2600		[illegible]		54.[illegible]	4 35
Ford	IL-6-OHV	4.00x3.18	240.0	3934	[illegible]	140 4000		2[illegible] 2200		.583		67.50	4 30
Mustang, Torino	IL-6-OHV	3.68x3.91	250.0	[illegible]	[illegible]	145 4000		2[illegible] 1600		[illegible]		[illegible]	4 7
Mustang	[illegible]-V8-OHV	4.00x3.00	302.0	[illegible]	[illegible]	210 [illegible]		2[illegible] 2600		[illegible]		[illegible]	4 7
Torino, Ford	[illegible]-V8-OHV	4.00x3.50	351.0	5753	[illegible]	240 4600		3[illegible] 2600		[illegible]		[illegible]	4 [illegible]
Torino	[illegible]-V8-OHV	4.00x3.50	351.0	5753	10.70	285 5400		370 3400		.812		[illegible].18	4°
Thunderbird	[illegible]-V8-OHV	4.36x3.59	429.0	7031	10.[illegible]	360 4600		4[illegible] 2800		.838		7[illegible].70	7 [illegible]
Mercury													
Comet	IL-6-OHV	3.50x2.94	170.0	2786	8.70	100 4200		149 2600		[illegible]		54.[illegible]	4 35
Montego	IL-6-OHV	3.68x3.91	250.0	[illegible]	[illegible]	145 4000		232 1600		[illegible]		[illegible]	4 7
Cougar, Montego, Mercury	[illegible]-V8-OHV	4.00x3.50	351.0	5753	[illegible]	240 4600		350 2600		[illegible]		[illegible]	4
Montego	[illegible]-V8-OHV	4.00x3.50	351.0	5753	10.70	285 5400		370 3400		.812		[illegible].18	4°
Mercury	[illegible]-V8-OHV	4.00x4.00	400.0	6556	[illegible]	260 4400		400 2200		.650		7[illegible]	4 [illegible]
Mercury	[illegible]-V8-OHV	4.36x3.59	429.0	7031	10.50	320 4400		460 2200		.746		7[illegible].70	4 [illegible]
Lincoln													
Lincoln, Mark III	[illegible]-V8-OHV	4.36x3.85	460.0	7539	10.00	365 4600		500 2800		.793		7[illegible].70	6 [illegible]
GENERAL MOTORS CORP.													
Chevrolet													
Vega	IL-4-OHC	3.50x3.63	140.0	2295	8.00	[illegible] 4600	[illegible] 4400	136 2400	121 2[illegible]	.643	.571	[illegible]	3 [illegible]
Nova, Camaro, Chevelle, Chevrolet	IL-6-OHV	3.[illegible]x3.53	250.0	4098	8.50	145 4200	110 3800	230 1600	185 1600	[illegible]	.440	[illegible]	3 [illegible]
Monte Carlo	[illegible]-V8-OHV	4.[illegible]x3.48	[illegible]	5737	8.50	245 4800	165 4000	350 2800	2[illegible] 2400	.7[illegible]	.471	[illegible].01	4 [illegible]
Chevrolet, Corvette	[illegible]-V8-OHV	4.[illegible]x3.48	350.0	5737	8.50	270 4800	210 4400	[illegible] 3200	[illegible]	.771	.[illegible]	[illegible].01	3
Pontiac													
Firebird, LeMans	IL-6-OHV	3.[illegible]x3.53	250.0	[illegible]	8.50	145 4200	110 3800	230 1600	185 1600	.580	.440		3°10'[2]
Catalina	[illegible]-V8-OHV	3.[illegible]x3.75	350.0	5737	8.00	250 4400	165 4200	350 2400	275 2[illegible]	.714	.471		3°10'
Grand Prix	[illegible]-V8-OHV	4.12x3.75	400.0	6556	8.20	300 4800	255 4400	400 3600	340 3200	.7[illegible]	.[illegible]		4 7
Bonneville	[illegible]-V8-OHV	4.12x3.75	455.0	7457	8.20	280 4400	190 3200	455 2000	[illegible]	.615	.418		3 4'
Grand Ville	[illegible]-V8-OHV	4.15x4.21	455.0	7457	8.20	325 4400	2[illegible] 4000	455 3200	[illegible]	.714	.[illegible]		3°4'
Buick													
Skylark	IL-6-OHV	3.87x3.53	250.0	4098	8.50	145 4800	110 3600	2[illegible] 2400	1[illegible] 2400	.[illegible]	.440		4 [illegible]
LeSabre	[illegible]-V8-OHV	3.80x3.85	350.0	5737	8.50	230 4400	155 3800	3[illegible] 2400	27[illegible] 2400	.657	.443		[illegible]°18'
Centurion, Electra, Riviera	[illegible]-V8-OHV	4.31x3.90	455.0	7457	8.50	315 4400	230 4000	[illegible]	[illegible]	.692	.[illegible]		[illegible]°18'[3]
Oldsmobile													
F-85, Cutlass	IL-6-OHV	3.[illegible]x3.53	250.0	[illegible]	8.50	145 4200	110 3[illegible]	2[illegible] 2000	1[illegible] 2[illegible]	.[illegible]	.440	[illegible]	4°27'
Cutlass, Delta	[illegible]-V8-OHV	4.[illegible]x3.38	350.0	5737	8.50	240 4200	160 4000	[illegible] 2400	275 2400	.[illegible]	.457	[illegible]	4 2[illegible]°[4]
Delta	[illegible]-V8-OHV	4.13x4.25	455.0	7457	8.50	280 4000	185 3600	[illegible]	[illegible]	.615	.407	77 [illegible]	3 18'
88	[illegible]-V8-OHV	4.13x4.25	455.0	7457	8.50	320 4400	225 3600	[illegible]	[illegible]	.703	.[illegible]	77 [illegible]	3°18'
4-4-2	[illegible]-V8-OHV	4.13x4.25	455.0	7457	8.50	340 4600	270 4400	[illegible]	370 3200	.747	.593	[illegible].75	4 2[illegible]
Toronado	[illegible]-V8-OHV	4.12x4.25	455.0	7457	8.50	350 4400	275 4200	[illegible]	375 2[illegible]	.7[illegible]	.[illegible]	77.[illegible]	Ver
Cadillac													
Calais, DeVille, Fleetwood	[illegible]-V8-OHV	4.30x4.06	472.0	7734	8.50	345 4400	220 4000	[illegible]	380 2400	.731	.[illegible]	77.00	6°30'
Eldorado	[illegible]-V8-OHV	4.30x4.30	500.0	8196	8.50	365 4400	235 3800	535 2[illegible]	410 2400	.730	.470	7[illegible].00	Ver

ABBREVIATIONS

IL—In line.
Lat—Lateral.
OHC—Overhead camshaft.
OHV—Overhead valve.
V—Vee-type engine.
Ver—Vertical.

[1]—Lateral, 0°0' inclined rear to front, 2°30' to 3°.
[2]—LeMans, 4.0°.
[3]—Riviera, 5°0'.
[4]—Delta, 3°15'.

AUTOMOTIVE INDUSTRIES, March 15, 1971

EXHIBIT VI

1972 U. S. PASSENGER CARS

STANDARD ENGINES—RATINGS and PERFORMANCE

Passenger Car Make and Model	Engine: Type, No. of Cylinders, Valve Arrangement	Bore and Stroke (in.)	Displacement: Cubic Inches	Displacement: Cubic Centimeters	Compression Ratio	Net Brake Horsepower at RPM	Net Torque at RPM	Net HP per Cu. In.	Cylinder Head Combustion Chamber Volume (c.c.)	Engine Installation Angle (deg.)	Head Gasket Volume (c.c.)	Deck Clearance (minimum)	Maximum Combustion Chamber Volume (c.c.)
AMERICAN MOTORS CORP.													
Gremlin, Hornet, Javelin (SST), Matador	IL-6-OHV	3.75x3.50	232.0	[illegible]	8.00	100 [illegible]	185 [illegible]	.431	[illegible]	Ver	4 [illegible]	[illegible] Be	91 03
Gremlin, Hornet, Javelin, Matador, Ambassador	90°-V8-OHV	3.75x3.44	[illegible]	[illegible]	8.40	150-[illegible]	[illegible]	.[illegible]	[illegible]	Ver	5 [illegible]	[illegible] Be	85 73
CHECKER MOTORS CORP.													
[illegible]	IL-6-OHV	3 [illegible]x3.53	250.0	[illegible]	8.50	110 [illegible]	185 1600	.440	72.71	6	[illegible]	[illegible] Be	71.75
[illegible]	90°-V8-OHV	4 [illegible]x3.48	350.0	5737	8.50	165-[illegible]	[illegible]	.471	75.47	6	4.56	025 Be	74 47
CHRYSLER CORP.													
Plymouth: Valiant	IL-6-OHV	3.40x3.[illegible]	[illegible]	[illegible]	8.40	[illegible]	[illegible]	.[illegible]	[illegible]	Lat[1]	3.91	055 Be	73 21
Barracuda, Satellite	IL-6-OHV	3.40x4.12	225.0	[illegible]	8.40	110-[illegible]	[illegible]	.[illegible]	[illegible]	Lat[1]	3.91	150 Be	82 01
Valiant, Barracuda, Satellite, Fury	90°-V8-OHV	3.91x3.31	318.0	5212	8.[illegible]	150 [illegible]	[illegible]	.[illegible]	[illegible]	Lat[1]	7 [illegible]	[illegible] Be	85 73
Valiant, Barracuda	90°-V8-OHV	4 [illegible]x3.31	[illegible]	5873	8.[illegible]	[illegible]	[illegible]	.[illegible]	71.[illegible]	Lat[1]	8.34	[illegible] Be	92 79
Satellite	90°-V8-OHV	4.[illegible]x3.[illegible]	[illegible]	[illegible]	8.[illegible]	[illegible]	[illegible]	.[illegible]	[illegible]	Lat[1]	3.51	150 Be	82 81
Dodge: Dart	IL-6-OHV	3.40x3.64	[illegible]	[illegible]	8.40	100 [illegible]	160 [illegible]	.[illegible]	[illegible]	Lat[1]	3.91	055 Be	73 21
Challenger, Charger, Coronet	IL-6-OHV	3.40x4.12	225.0	[illegible]	8.40	110 [illegible]	185 [illegible]	.[illegible]	[illegible]	Lat[1]	3.91	150 Be	82 01
Dart, Challenger, Charger, Coronet, Polara	90°-V8-OHV	3.91x3.31	318.0	5212	8.[illegible]	150 [illegible]	[illegible]	.477	[illegible]	Lat[1]	7.83	[illegible] Be	85 73
Dart	90°-V8-OHV	4.04x3.31	340.0	5873	8.50	[illegible]	[illegible]	.700	71.[illegible]	Lat[1]	8.34	064 Be	92.79
[illegible]	90°-V8-OHV	4.[illegible]x3.[illegible]	[illegible]	[illegible]	8.[illegible]	175 [illegible]	285 2400	.[illegible]	70.40	Lat[1]	10 34	077 Be	85 10
Chrysler: Newport Royal	90°-V8-OHV	4.[illegible]x3.58	[illegible]	[illegible]	8.[illegible]	175 [illegible]	285 2400	.[illegible]	70.40	Lat[1]	10 34	077 Be	95 10
Newport Custom	90°-V8-OHV	4.34x3.38	400.0	[illegible]	8.20	190 [illegible]	310 2400	475	[illegible] 20	Lat[1]	5 [illegible]	[illegible] Be	114 12
New Yorker	90°-V8-OHV	4.32x3.75	440.0	7212	8.20	225 [illegible]	345 3200	.511	[illegible]	Lat[1]	5 [illegible]	130 Be	124 84
Imperial: LeBaron	90°-V8-OHV	4.32x3.75	440.0	7212	8 20	225 4400	345 3200	.511	[illegible].20	Lat[1]	5.[illegible]	.130 Be	124 84
FORD MOTOR CO.													
Ford: Pinto	IL-4-OHV	3.19x3.[illegible]	87.0	[illegible]	8.[illegible]	54 [illegible]	[illegible] 2400	551	7.70	3 15	4 [illegible]	[illegible]5	53 10
[illegible]	IL-6-OHV	3.50x2.94	170.0	2786	8 30	82 [illegible]	170 1800	482	54 [illegible]	4 35			
Ford Custom, Galaxie 500	IL-6-OHV	4 [illegible]x3.18	240 0	3934	8.50	103 3800	170 2200	429	67.50	4 20			
Torino	IL-6-OHV	3 [illegible]x3 91	250.0	[illegible]	8 [illegible]	95 3600	181 1600	.380	60 93	4 7	4 99	.130	93 05
Mustang, Granada	IL-6-OHV	3 [illegible]x3 91	250 0	[illegible]	8 [illegible]	[illegible] 3800	181 1600	.[illegible]	[illegible] 93	4 7	4.99	.130	93 05
Ford Custom, Galaxie 500	90°-V8-OHV	4 00x3 00	302 0	4949	8 50	140 4000	230 2250	464	58 70	4 20[2]	10 90	024 Be	66 70
Torino, Mustang	90°-V8-OHV	4 00x3 00	302 0	4949	8 [illegible]	141 4000	212 2000	467	58 20	4	10.10	024 Be	77 54
Maverick	90°-V8-OHV	4 00x3 00	302 0	4949	8 50	143 4200	212 2000	474	58 20	4 7	10 10	023 Be	77 54
Ford LTO	90°-V8-OHV	4 00x3 50	351 0	5753	8 30	153 3800	266 2000	436	60 40	4 20	8 10	018 Be	67 00
Thunderbird	90°-V8-OHV	4 36x3 50	429 0	7031	8 50	212 4400	327 2600	494	91 40	4 35	10 70	037 Be	112 00
Mercury: Comet	IL-6-OHV	3.50x2.94	170.0	2786	8 30	82 4400	129 1800	482	54 00	4 35			
Montego	IL-6-OHV	3 60x3 91	250 0	4099	8 00	95 3600	181 1600	380	60 93	4 7	4 99	130	93 05
Montego	90°-8-OHV	4 00x3 00	302 0	4949	8 50	140 4000	230 2200	464	58 20	4	10 10	023 Be	77 54
Comet	90°-V8-OHV	4 00x3 00	302 0	4949	8 50	143 4200	242 2900	474	58 70	4 7	10.10	02[illegible] Be	77 54
Monterey	90°-V8-OHV	4 00x3 50	351 0	5753	8 60	163 3800	277 2000	464	78 40	4 20	8 32		85 72
Cougar	90°-V8-OHV	4 00x3 50	351 0	5753	8 00	164 4000	276 2900	467	78 40	4	8 31	016	90 95
Montego	90°-V8-OHV	4 00x3 50	351 0	5753	8 60	246 5400	290 3800	707	75 40	4	10 29	016	90 36
Marquis	90°-V8-OHV	4 36x3 50	429 0	7031	8 50	200 4400	322 2600	469	91 40	4 35	10 70	072 Be	100 60
Lincoln: Mark IV	90°-V8-OHV	4 36x3 85	460 0	7535	8 50	212 4400	342 2600	461	91 40	6 30	10 70	032	121 90
Continental	90°-V8-OHV	4 36x3 85	460 0	7539	8 50	224 4400	357 2000	487	91 40	6 30	10 70	032	12[illegible] 90
GENERAL MOTORS CORP.													
Chevrolet: Vega	IL-4-OHC	3.50x3 63	140 0	2295	8 50	80 4400	121-20-2000	571	73 50	3 50	7 26	011 Ab	72 00
Nova, Camaro, Chevelle, Chevrolet	IL-6-OHV	3.88x3 53	250 0	4096	8 50	110 3600	185 1600	440	72 71	4 46[3]	6 66	006 Be	71 71
Nova, Camaro, Chevelle	90°-V8-OHV	3 88x3 25	307 0	5031	8 50	130 4000	230 2400	423	74 56	4 46[3]	3 32	025 Be	71 47
Monte Carlo, Chevrolet	90°-V8-OHV	4 00x3 48	350 0	5737	8 50	165 4000	280 2400	471	75 47	4 46	4 56	025 Be	71 47
Corvette	90°-V8-OHV	4 00x3 48	350 0	5737	8.50	200 4400	300 2800	571	75 47	3	4 56	025 Be	71 47
Chevrolet	90°-V8-OHV	4 13x3 75	400 0	6556	8 50	170 3400	325 2000	425	75 47	4 46	4 56	025 Be	71 47
Pontiac: Firebird, Ventura II, LeMans	IL-6-OHV	3 88x3 53	250 0	4096	8 50	110 3800	185 1600	440	93 00	3 16[4]			
Firebird, LeMans	90°-V8-OHV	3 88x3 75	350 0	5737	8 00	160 4400	270 2000	457	89 76	2 00[5]			
Catalina	90°-V8-OHV	4 12x3 75	400 0	6556	8 20	175 4000	310 2400	438	96 36	3 15			
Firebird, Grand Prix	90°-V8-OHV	4 12x3 75	400 0	6556	8 20	250 4400	325 3200	625	56 61	2 40[6]			
Bonneville	90°-V8-OHV	4 15x4 21	455 0	7457	8 20	185 4000	350 2000	407	112 64	3 4			
Grand Ville	90°-V8-OHV	4.15x4 21	455.0	7457	8 20	220 3600	350 2400	483	111 89	3 4			
Firebird	90°-V8-OHV	4.15x4 21	455 0	7457	8 40	300 4000	415 3200	659	111 89	2 49			
Buick: Skylark Custom	90°-V8-OHV	3 80x3 85	350 0	5737	8 50	150 3800	265 2400	429	55 07	4 37	7 87	053	95 39
LeSabre Custom	90°-V8-OHV	3 80x3 85	350 0	5737	8 50	155 3800	270 2300	443	55 07	4 15	7 87	053	95 39
Skylark GS	90°-V8-OHV	3.80x3 85	350 0	5737	8 50	190 4000	285 2800	543	55 07	4 37	7 87	053	95 39
Centurion, Electra 225, Custom	90°-V8-OHV	4 31x3 90	455 0	7457	8.50	225 4000	360 2600	495	70 97	4 15	10 33	034	120 20
Riviera	90°-V8-OHV	4.31x3 90	455.0	7457	8.50	250 4000	375 2800	549	70 97	5 0	10 33	034	120 20
Riviera GS	90°-V8-OHV	4.31x3 90	455.0	7457	8 50	260 4400	380 2800	571	70 97	5 6	10 33	034	120 20
Oldsmobile: F-85, Cutlass, Delta, Royale	90°-V8-OHV	4 06x3 38	350 0	5737	8.50	160 3800	275 2400	.457	60 56	4 37[7]	5 32[8]	022 Be[9]	59 96
F-85, Cutlass, Delta, Royale	90°-V8-OHV	4 06x3 38	350 0	5737	8 50	180 4000	275 2800	514	60 56	4 37[7]	5 32[8]	022 Be[9]	89 96
98	90°-V8-OHV	4 13x4 25	455 0	7457	8 50	225 3600	360 2600	495	69 75	3 29	5 37	002 Be	111 08
Toronado	90°-V8-OHV	4 13x4.25	455 0	7457	8 50	265 4200	375 2600	582	69 75	Ver	5 32	002 Be	111 08
Cadillac: Calais, DeVille, Fleetwood	90°-V8-OHV	4 30x4 06	472 0	7736	8 50	220 4000	365 2400	466	74 60	4 24	9 50	005 Ab	1[illegible] 00
Eldorado	90°-V8-OHV	4 30x4 30	500 0	8196	8 50	235 3800	385 2400	470	74 60	Ver	9 50	005 Ab	1[illegible] 00

ABBREVIATIONS

[1] [illegible]
[2] [illegible]
[3] [illegible]
[4] [illegible]
[5] [illegible]
[6] [illegible]
[7] [illegible]
[8] [illegible]
[9] [illegible]
Ab [illegible]
Be [illegible]
IL [illegible]
Lat [illegible]
OHC [illegible]
OHV [illegible]
V [illegible]
Ver [illegible]

AUTOMOTIVE INDUSTRIES, March 15, 1972

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