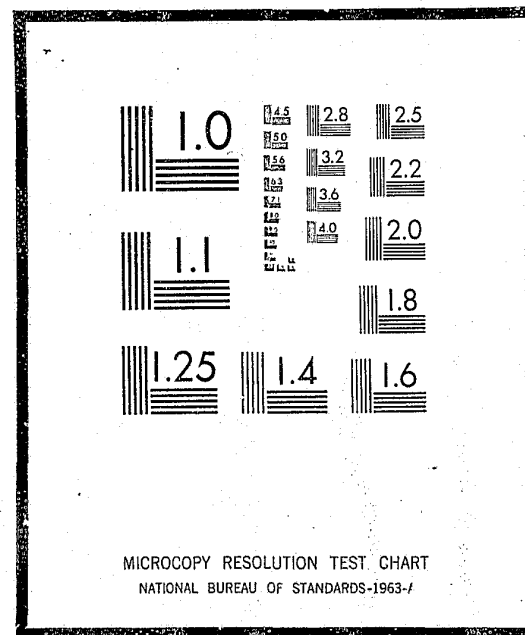


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U.S. DEPARTMENT OF JUSTICE  
LAW ENFORCEMENT ASSISTANCE ADMINISTRATION  
NATIONAL CRIMINAL JUSTICE REFERENCE SERVICE  
WASHINGTON, D.C. 20531

Date filmed

6/9/76

## LOS ANGELES COUNTY - SHERIFF'S DEPARTMENT - VEHICLE TESTING AND EVALUATION PROGRAM - VEHICLE TEST RESULTS, 1975/76

### CONCLUSIONS

- Field evaluations of 1975 vehicles have validated the test methodology.
- The vehicle scoring highest in the instrumented performance phase is expected to perform best under actual field conditions, routine and emergency.
- The Chevrolet Nova scored highest in the instrumented performance phase.
- The highest overall scoring vehicle will likely be not only the best suited but also the most cost effective vehicle.
- The Chevrolet Nova attained the highest overall score of vehicles submitted for testing.

31567

## TEST DESCRIPTION

These test results represent the continuous efforts of the Los Angeles County Sheriff's Department's Automotive Section to identify the vehicle which is best suited to perform law enforcement patrol functions. The tests, as described further on in this report, are used as predictors from which certain knowledge is gathered relative to vehicle performance, safety, usefulness, and operating costs.

This effort permits a marriage of factors addressing concern for the policeman's interest, the overall health of the fleet, and the public's interest.

The policeman's interest (officer safety) is addressed in terms of vehicle performance, vehicle safety, and creature comforts.

The fleet health aspects (inoperative downtime) are addressed through the recognition and evaluation of heat relative to its impact on individual component part deterioration. The addition of state and federal emission control devices has placed an increased burden upon a vehicle's engine, causing it to run hotter, thus increasing lubricant oxidation rates and decreasing component life span. The mechanical evaluation and the emergency equipment adaptation evaluation further relates to fleet health interests in that the ease with which vehicle repairs can be accomplished is rated, as well as the vehicle's adaptability to the installation of communication's equipment.

The taxpaying public's interest (economy of operation) is addressed not only in terms of the vehicles' original purchase cost, but fuel consumption and operating costs as well. Both of these factors are critical aspects of life cycle costing.

All of these factors affect the ability of a department and the individual policeman to deliver services to the public in the most cost effective and efficient manner.

Testing methods currently used by this Department assess not only vehicle performance, safety, and creature comforts but also tend to indicate that the highest scoring vehicle will likely be the most cost effective. Life cycle cost of the competing vehicles combined with test scores are factors now available to provide a more definitive method of selecting the best vehicle offered. Some of these factors are listed as follows:

- Unit cost
- Fuel economy score
- Projected operating costs
- Instrumented performance score
- Ergonomics evaluation (human factors) score
- Heat test score
- Mechanical evaluation score
- Communications equipment adaptability score

Ideally, resale value and itemized parts replacement cost should be included in the life cycle cost factors (Attachment I). This Department, because of unavailability of accurate supportive data, has excluded these two factors from this year's evaluation and testing process. The method currently employed by Los Angeles County of disposing of vehicles that have reached retirement status, precludes a valid determination of potential resale values.

This test procedure, devised with the consultation of Specialist Reserve Deputy John Christy, Executive Editor of Motor Trend Magazine, combines electronic measuring of performance and component heat data with an objective scoring of a number of other factors that have been enumerated in order to ascertain the suitability, safety, and economy of a given vehicle as a police car.

The first test is a preliminary slow and high speed performance and handling evaluation (accomplished by the same two Departmental test drivers for consistency) to determine the handling characteristics and to weed out the obvious unacceptables, those that are demonstrably unstable or otherwise exhibit unsafe characteristics. If the test vehicle is judged "unacceptable" in this preliminary review it is rejected and not subjected to further testing and evaluation.

In the second test, acceptable vehicles are carried through the full procedure beginning with the electronic measuring of a number of their performance characteristics including acceleration from rest and from urban and highway traffic speeds, braking, emergency handling, and steady-state handling. These factors are picked up by means of various potentiometers and transducers and fed into a Hewlett-Packard 7100-B strip chart recorder which graphs the various maneuvers and measurements permanently on electro-sensitive graph paper, providing a permanent record of each test. A detailed account and explanation of this test phase, written by Reserve Deputy Christy, may be found in Attachment II.

The third test is the 72.125 mile economy or mileage loop which is divided equally into urban, suburban and freeway driving conditions, giving a good sampling of average fuel consumption of an unmarked solid color sedan. Patrol mileage use is figured at sixty percent of that of a solid color sedan so that this test can be considered predictive for both types of use. It is scored on the percentage of an assigned "perfect mileage" of twenty miles per gallon.

The fourth evaluation is a rating of human factors and space utilization (ergonomics) done individually and independently by a random sampling of patrol deputies and generally at least one supervisor. The ratings and scores are averaged to minimize personal prejudices an individual may have for or against any given car. This evaluation is used to rate each vehicle comparatively for its overall suitability and efficiency for patrol use.

The ergonomics evaluation is followed by a similar type of rating performed by mechanics of the County Mechanical Department to determine the day-to-day serviceability and maintenance of the vehicle and a predictive evaluation of the time, ease, and cost of major repairs. These ratings are again scored and averaged to avoid any conscious or unconscious prejudices.

The fifth test measures vehicle heat. Heat has been found to be a significant factor in the life span of the engine and drive train of the car and has become more suspect with recently added emission control devices. Temperatures of the engine oil and the transmission fluid often approach the breakdown point of these lubricants and fluids with resultant serious shortening of the life expectancy of the major components involved.

The heat test's purpose is two-fold: 1) to see if the manufacturer of the car is aware of and taking care of the problem, and 2) to project the probable life time of the vehicle before a breakdown occurs or a major service procedure becomes necessary. It further enables fleet managers to set proper maintenance schedules should the car be purchased and put into police service. The heat levels of each component fluid are measured. In this case, as in that of the performance characteristics, the individual component merits attention as one may score inordinately low, indicating a probable trouble spot that can either be taken care of or be a cause for rejection.

The sixth evaluation is that made by the Communications Department for radio installation. Factors taken into account include ease of installation, component placement, the routing of various conductors and other factors such as concealment in undercover cars and executive vehicles.

In each test, every effort has been made to keep the laboratory procedures in as close a relationship to the real-world use of the vehicles as possible. The cars are driven on real streets and highways as well as on a test track, by real deputies with real pump gasoline in the tanks. The maneuvers during the electronic test procedures are those encountered in actual patrol and emergency operations which the car will face in the field. Thus, not only are these tests of value as comparative data in selecting and acquiring suitable vehicles, but they form a basis for prediction and projection, as far as is feasible, of the future life expectancy and performance of the selected vehicle or vehicles during their period of Departmental use.

Each segment in its own right represents a test or valid point for selection or rejection and together they combine to give a currently unparalleled set of criteria for use in selection and use projection of a police vehicle.

A weighted scoring system is utilized to assign percentage values to each of the six test segments.

Instrumented performance....	25%
Heat test.....	25%
Fuel economy.....	25%
Ergonomics evaluation.....	15%
Mechanical evaluation.....	5%
Communications evaluation...	5%

Emphasis is thereby given to scientifically obtained data, while subjective evaluations are assigned lower values.

## TEST RESULTS

The Los Angeles County Sheriff's Department specifications for 1976 model police sedans were made available to interested automotive manufacturers on a timely basis to allow for proper preparation and delivery of a test vehicle.

Certain 1976 model year police packaged sedans were submitted for testing but are not included in this report for the specific reasons outlined as follows:

A Ford LTD 460 CID and a Mercury Montego 460 CID exceeded our specifications limitations in the cubic inch displacement category. The Ford LTD 460 CID additionally exceeded our wheel base specifications limitations.

A 1976 Dodge Coronet, 400 CID, did not perform satisfactorily during the initial handling and performance phase and was disqualified because of unacceptable handling and braking characteristics.

The 1976 Ford Torino, 400 CID, was in fact a Gran Torino and did not meet our specifications pertaining to interior appointments. It came equipped with a six-way electrically powered seat with fabric upholstery, electrically powered windows, cruise control, AM/FM stereo, and carpeted floor. Such luxury appointments would obviously unfairly influence an ergonomics evaluation. When the manufacturer was requested to but did not furnish us a properly equipped Torino, all further testing on this vehicle was halted. Instrumented performance, economy and heat tests had already been performed by that time and the results are published within this report. No final score was assigned because testing could not be completed.

Pontiac submitted two four door LeMans models, one equipped with a 3.08 rear axle ratio and the other equipped with a so-called performance 3.23 rear axle ratio. The published test scores pertain only to the vehicle with the 3.08 rear axle ratio, although final scores for both vehicles were nearly identical.

American Motors Corporation did not submit any vehicles for testing.

None of the vehicles submitted for testing completely met the County's equipment specifications. Some of these discrepancies could have a definite impact on the bid price. For example, a vehicle not equipped with limited slip differential, as specified, will cost approximately \$40.00 less than one properly equipped with such a differential. A detailed list of discrepancies is shown in Attachment III.

# INFORMATIONAL HARDWARE DESCRIPTION

	DODGE DART	PLYMOUTH FURY	PONTIAC LE MANS	MERCURY MONTEGO	CHEVROLET NOVA	FORD TORINO
Engine	360	360	400	400	350	400
Carburetor-Exhaust	4 BBL - Single	4 BBL - Single	4 BBL - Single	2 BBL - Single	4 BBL - Single	2 BBL - Single
Horsepower @ RPM	175 @ 4000	175 @ 4000	185 @ 3600	144 @ 3600	165 @ 3800	144 @ 3600
Torque lbs. @ RPM	270 @ 1600	270 @ 1600	310 @ 1600	255 @ 2200	260 @ 2400	255 @ 2200
Compression Ratio	8.4 - 1	8.4 - 1	8.0 - 1	8.0 - 1	8.50 - 1	8.0 - 1
Axle Ratio	3.21	3.21	3.08	3.25	3.08	3.25
Steering	Power	Power	Power	Power	Power	Power
Tire Size	ER70 x 14	GR70 x 15	GR70 x 15	HR78 x 15	FR70 x 14	HR70 x 15
Suspension - Front	Torsion Bar	Torsion Bar	Coil Spring	Coil Spring	Coil Spring	Coil Spring
Suspension - Rear	Leaf Spring	Leaf Spring	Leaf Spring	Leaf Spring	Leaf Spring	Leaf Spring
Brakes	F/Disc R/Drum	F/Disc R/Drum	F/Disc R/Drum	F/Disc R/Drum	F/Disc R/Drum	F/Disc R/Drum
Overall length	203.4"	218.4"	212.0"	219.7"	196.7"	218.0"
Overall height	54.0"	54.0"	53.5"	53.3"	54.3"	53.3"
Weight	3725	4150	4305	4555	3720	4650
Wheelbase	111.0"	117.5"	116.0"	118.0"	111.0"	118.0"
Head room - Front	38.3"	38.6"	38.1"	38.0"	39.5"	38.0"
Head room - Rear	37.2"	37.3"	36.9"	36.9"	36.5"	36.9"
Leg room - Front	41.9"	42.3"	42.5"	42.3"	41.7"	42.3"
Leg room - Rear	35.2"	35.2"	37.0"	37.1"	36.3"	37.1"
Shoulder room - Front	55.4"	59.2"	59.6"	58.5"	56.6"	58.5"
Shoulder room - Rear	55.5"	59.3"	58.9"	58.2"	56.7"	58.2"
Hip room - Front	56.9"	59.2"	54.7"	58.8"	54.3"	58.8"
Hip room - Rear	56.9"	59.2"	57.8"	56.7"	46.4"	56.7"



# TEST RESULTS - GROUP I

	Dodge Dart	Plymouth Fury	Pontiac Le Mans	Mercury Montego	Chevrolet Nova	Ford Torino
Preliminary Handling Test	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
Instrumented Performance (Time/Speed/g's)						
<u>Acceleration</u>						
0 - 30 mph	3.7 sec	3.9 sec	4.6 sec	3.6 sec	3.8 sec	3.8 sec
0 - 45 mph	6.7 sec	6.8 sec	7.8 sec	6.5 sec	6.3 sec	6.9 sec
0 - 60 mph	10.6 sec	11.0 sec	12.1 sec	10.8 sec	9.5 sec	11.2 sec
1/4 mile standing start	78.9 mph	79.1 mph	73.0 mph	80.0 mph	82.9 mph	78.6 mph
Maximum force (g's)	.53 g	.48 g	.48 g	.51 g	.51 g	.48 g
30 - 50 mph	4.8 sec	5.1 sec	5.8 sec	4.7 sec	3.5 sec	4.1 sec
30 - 65 mph	9.3 sec	9.6 sec	11.8 sec	9.0 sec	7.2 sec	9.2 sec
60 - 80 mph	9.9 sec	8.8 sec	12.7 sec	8.2 sec	6.8 sec	8.1 sec
60 - 95 mph	21.0 sec	19.2 sec	24.0 sec	17.8 sec	16.1 sec	19.2 sec
<u>Braking</u>						
30 - 0 mph	.48 g	.97 g	.87 g	1.0 g	1.2 g	.95 g
60 - 0 mph	1.0 g	1.1 g	.87 g	.97 g	1.2 g	1.0 g
<u>Handling &amp; Recovery</u>						
One lane change	.48 g	.58 g	.45 g	.47 g	.50 g	.55 g
Two lane changes	.825 g	.80 g	.74 g	.80 g	.82 g	.78 g
Three lane changes	.825 g	.78 g	.76 g	.70 g	.825 g	.73 g
Recovery	.87 g	.78 g	.87 g	.75 g	.80 g	.70 g
Left circle (200' DIA)	.782 g	.796 g	.76 g	.81 g	.815 g	.746 g
Right circle (200' DIA)	.76 g	.77 g	.712 g	.723 g	.782 g	.723 g
Total Score, Weighted 25%	14.69	14.76	12.83	14.97	16.83	14.62

# TEST RESULTS - GROUP II

	Dodge Dart	Plymouth Fury	Pontiac LeMans	Mercury Montego	Chevrolet Nova	Ford Torino
Heat Test Peak Temperatures Recorded	°F/Score	°F/Score	°F/Score	°F/Score	°F/Score	°F/Score
Radiator Coolant	240/2.36	217/5.55	227/4.16	235/3.05	227/4.16	250/.97
Engine Oil	276/4.25	277/4.23	290/3.96	295/3.85	285/4.06	315/3.44
Transmission Oil	255/4.69	200/5.83	244/4.92	235/5.10	251/4.77	245/4.90
Power Steering Fluid	255/4.69	270/4.38	314/3.46	290/3.96	275/4.27	300/3.75
Total Score, Weighted 25%	15.99	19.99	16.50	15.96	17.26	13.06

Fuel Economy						
Actual Miles Per Gallon	12.78	11.28	11.91	12.67	14.61	12.45
Total Score, Weighted 25%	15.98	14.10	14.89	15.84	18.26	15.56

Ergonomics (Human Factors)						
Averaged Score, Weighted 15%	8.65	8.86	10.45	9.12	8.99	N/A

Communications Evaluation						
Averaged Score, Weighted 5%	2.68	2.11	1.82	2.00	2.54	N/A

Mechanical Evaluation						
Averaged Score, Weighted 5%	2.87	2.65	2.50	2.60	2.79	N/A



## BASIC LIFE CYCLE COSTING

Predictors: Purchase price, fuel consumption, parts cost and resale value.

Constants: A. Retirement mileage factor  
 B. Number of units to be purchased  
 C. Sixty percent of miles per gallon of economy road test.  
 D. Present or projected cost per gallon for gasoline.

1. Purchase price
2. Add: Total projected fuel dollar cost =  $A \div C \times B \times D$ .
3. Add: Parts cost and repair frequency if known (see note below).
4. Subtract: Projected resale value.

Note: For an in-depth analysis of life cycle costing refer to the report by the Technical Analysis Division, Institute for Applied Technology, National Bureau of Standards, U.S. Department of Commerce, entitled "Life Cycle Costing of Police Patrol Cars: Summary Report", Publication NBSIR74-471 or the full report "Life Cycle Costing of Police Patrol Cars: Efficiency in Vehicle Acquisition, Operation and Disposition".

## TEST SCORE OVERVIEW

	Chevrolet Nova	Plymouth Fury	Dodge Dart	Mercury Montego	Pontiac LeMans
Instrumented Performance	16.83	14.76	14.69	14.97	12.83
Heat Test	17.26	19.99	15.99	15.96	16.50
Fuel Economy	18.26	14.10	15.98	15.84	14.89
Ergonomics	8.99	8.86	8.65	9.12	10.45
Mechanical Evaluation	2.79	2.65	2.87	2.60	2.50
Communications Evaluation	2.54	2.11	2.68	2.00	1.82
Total Score	66.67	62.47	60.86	60.49	58.99

PROJECTED FUEL COSTS OVER  
70,000 MILES SERVICE LIFE\*

Fuel cost: \$.503 per gallon

1976 Vehicles

1. Nova	\$4,015 per vehicle
2. Dart	\$4,591 "
3. Montego	\$4,653 "
4. Torino	\$4,714 "
5. Le Mans	\$4,931 "
6. Fury	\$5,201 "

\*Based on 60% of miles per gallon attained in fuel economy test run.

## INSTRUMENTED PERFORMANCE TEST DESCRIPTION

The results show graphically speed and acceleration in terms of miles per hour and time. Each accelerative maneuver or subtest is scored by subtracting the actual time from an assigned "perfect" time; the higher the actual time taken to perform the maneuver, the lower the resultant score. In addition to time and speed, measurements are made of the vehicle's acceleration, deceleration and lateral acceleration or resistance to skidding in terms of percentages of gravity (g-force). At the risk of oversimplification it may be stated that a deceleration g-force rating of 1.0 g, either laterally or in braking, is the resistance to a force tending to move the car equal to the weight of the vehicle. As examples, a racing car will exhibit lateral g-forces of 1.1 to as much as 1.3 g; a very good sports car will exhibit forces on the order of 0.8 to 0.9 g in transient and steady-state turns. We have learned through experience that a sedan with a properly balanced high performance or police interceptor suspension can show lateral g-forces in steady-state turns (around a 200-ft. diameter circle) on the order of 0.7 to 0.8 g and transient turns from 0.7 to above 0.9 g. A well-balanced sedan with disc front brakes, semi-metallic brake linings and the proper sized modern radial tires can be expected to deliver deceleration rates of between 0.9 and 1.1 g. Since the g-force curve is geometric rather than arithmetical, each additional percentage of g is greater than the one preceding it. As a consequence the difference between 0.8 g and 0.9 g is considerably higher than that between 0.7 and 0.8 g.

Submitted cars are run through two subtests designed to measure their resistance to side force or skidding. The first of these is a series of increasing-severity lane changes with recovery to the first lane between each change. Measurements in terms of g-force are made for each change as well as for the recovery. This test relates directly to the ability of the car in the field to not only perform an evasive maneuver successfully but to recover from the maneuver safely. The greater the g-force scores in this test are, the better the ability is of the car to perform safely in an emergency situation. The second subtest is a steady-state turn around a 200 ft. diameter circle, a standard industry test. This test shows the balance of the car as well as its ability to remain stable in a long turn or curve. The higher the g-force generated in this test, the better the suspension is balanced and therefore the more neutral with less tendency to extremes of oversteer or understeer. The g-force readings from the chart on these tests and in the multiple controlled braking tests are then scored directly by multiplying each by ten (10) and adding them to the time and speed scores generated by the other subtests in the series, the total of all subtests divided by two is then the instrumented performance score of the test vehicle.

EQUIPMENT SPECIFICATIONS DISCREPANCIES

Chevrolet Nova:

- No inside hood latch
- No power steering cooler

Plymouth Fury:

- Interior rear door handles operable
- No outside mirror, right side

Dodge Dart:

- No limited slip differential
- No dual horns
- No outside mirror, right side
- Interior rear door handles operable

Mercury Montego:

- No limited slip differential
- No low gear transmission lock-out
- Interior rear door handles operable
- No rear window defogger
- Interior appointments not to specifications:
  - Carpeted floor mats, front, rear and trunk
  - Dome light not disconnected from door action

Ford Torino:

- No limited slip differential
- No low gear transmission lock out
- Interior rear door handles operable
- Interior appointments not to specifications:
  - Vehicle came equipped with Gran Torino luxury options such as electrically powered seat, windows, and door locks as well as non-heavy duty cloth upholstered seats and cruise control.
  - Dome light not disconnected from door action.

Pontiac LeMans:

- No limited slip differential
- No power steering cooler
- No electric trunk release
- No rear window defogger
- No trunk light
- No trunk lid travel limiter
- Interior rear door handles operable



County of Los Angeles  
Office of the Sheriff

PETER J. PITCHESS, SHERIFF

Los Angeles, California 90012

January 15, 1976

U.S. Department of Justice  
Law Enforcement Assistance Administration  
National Criminal Justice  
Reference Service  
Washington, D.C. 20530

Dear:

Enclosed are the results of tests conducted on 1976 police equipped vehicles by the Los Angeles County Sheriff's Department.

The purpose of this testing effort is to benefit not only this Department but the entire law enforcement community by identifying the vehicles which will provide field officers with a useful tool that is safe to operate and most cost effective, based on life cycle considerations.

To our knowledge, these tests are the most comprehensive and extensive in the area of police vehicle testing. In an effort to validate our testing procedure a controlled field evaluation program was initiated which addressed itself to areas of performance, ergonomics, operating and maintenance costs, and fuel consumption. This evaluation process, conducted throughout most of 1975, has proven, to our satisfaction, the validity and reliability of our testing program.

The testing and evaluation process is financed in its entirety by the Los Angeles County Sheriff's Department's budget and does not involve any grant agency funds.

We are pleased to share our test results with you and provide them for whatever use you deem appropriate.

Please be assured of our continued cooperation in all matters of mutual concern.

Sincerely,

PETER J. PITCHESS, SHERIFF

*Victor D. Riesau*  
Victor D. Riesau, Chief  
Technical Services Division

COUNTY OF LOS ANGELES  
REQUISITION TO PURCHASING & STORES DEPARTMENT  
BOLD RULE AREA-PSD USE ONLY

1975/76 DEPARTMENT NAME & SHIPPING ADDRESS  
MECHANICAL DEPARTMENT  
SHOPS & GARAGES  
1100 NORTH EASTERN AVENUE  
LOS ANGELES, CALIFORNIA 90063

DATE 9-5-75

QUOTE NUMBER CLOSURES P. O. NO.

N & A CODE X  
0491 -15

REQUISITION NUMBER  
661624 7

REQUESTED DELIVERY DATE &/OR SPECIAL INFORMATION

STOCK ITEM QUANTITY UNIT DESCRIPTION QUANTITY UNIT DIRECT PURCHASE CASH DISC.  
NUMBER FURNISHED FROM PRICE

232 each 1976 sedans(Class 256) as per  
attached specifications #661624 7, in  
accordance P&SD Purchase Standards 908& 939.

197 each Group I, sedans, 4 door, black & white

20 each Group II, sedans, 4 door, single tone  
colors(colors to be selected)

15 each Group III, sedans, 4 door, single tone  
colors(colors to be selected) to be  
equipped with a standard broadcast radio.

Sheriff

Item 39R - 219 each Sheriff

Item 41R - 1 each Biscamluz Center

Item 42R - 5 each Central Men's Jail

Item 43R - 2 each Detention Camps

Item 45R - 2 each Sybil Brand

Item 46R - 3 each Wayside

FOR FURTHER INFORMATION CALL  
JF Beach

MECHANICAL  
BY  
DEPARTMENT  
SIGNATURE OF DEPARTMENT HEAD OR AUTHORIZED REPRESENTATIVE  
DATE FILLED SIGNATURE DATE RECEIVED SIGNATURE

clm

Los Angeles County  
1975/76 VEHICLE SPECIFICATIONS  
FOR THE PURCHASE OF SHERIFF VEHICLES, 1975/76  
FOR LOS ANGELES COUNTY

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It is the intent of these specifications to obtain a vehicle that will most nearly meet the needs of the Los Angeles County Sheriff's Department in the areas of officer safety and usefulness as a police vehicle. Cost effectiveness as determined through life cycle costing will also be evaluated. All installations will be made in a neat and workmanlike manner and all equipment furnished will be subject to the approval of the Purchasing Agent, Chief, Shop and Garages Division and the using Department.

#### SELECTION OF SUCCESSFUL BIDDERS

Successful bidders will be selected on the basis of a combination of a vehicle's overall score in the seven phase testing process and additional considerations affecting life cycle costs, ie, unit cost, parts replacement costs, fuel costs and unit resale value.

#### GENERAL SPECIFICATIONS AND STANDARDS

The body, finish, and fittings shall be the latest model, shall not have been used in demonstrator or other service, and shall be factory standard in all respects not in conflict with specific requirements:

The design of the vehicle must be such that it does not hamper or restrict subsequent installation and use of emergency equipment, red/amber lights and siren, to the satisfaction of the Los Angeles County Sheriff's Department.

Where specifications for particular items are not defined, manufacturer's standards are either satisfactory, or they are not applicable to this vehicle.

All standard equipment is to appear on the vehicle as listed in the 1976 brochure.

lb

Bid Number \_\_\_\_\_

Specification #661624 7

Make \_\_\_\_\_

Model \_\_\_\_\_

Firm Name \_\_\_\_\_

Address \_\_\_\_\_

Bidder's specifications must be filled in completely by bidder and returned to Purchasing Agent.

Specification No. \_\_\_\_\_

Page 2

(cont.)

Bidder to fill in the attached parts price list showing list prices and discounts extended to L.A. County.

All parts furnished on the vehicle(s) except special items for radio and other special equipment requested or supplied by the County will be listed in the Parts Book, a supplemental heavy duty parts book and/or a supplemental special parts listing or letter. Twenty (20) copies of each of the above and twenty (20) copies of the Maintenance Manual or Shop Manual must be furnished by the successful bidder(s) within 45 days of the receipt of the purchase order. Bidders shall submit detailed literature of the vehicle they propose to furnish.

Failure to submit this information is sufficient cause for rejection of bid.

Dealer to furnish Dealer's Bill of Sale in the name of Los Angeles County, 1100 North Eastern Avenue, Los Angeles, California 90063.

#### EMISSION STANDARDS

Manufacturer's Standard Equipment and all devices necessary to comply with the State of California Administrative Code, and the Federal Motor Vehicle Safety Standards will be included. Vehicle must comply with all California Motor Vehicle Pollution Control Board requirements on crankcase, exhaust and fuel emissions.

In compliance with the Los Angeles County Board Order #126, every 1976 model vehicle with a 6,000 #GVW or less shall be tested for exhaust emissions by the manufacturer before delivery. The results of this test will be furnished, showing the concentration of hydro-carbons (HC), carbon monoxide (CO), and nitrous oxide (NOX) at the time of delivery to Los Angeles County. Vehicles not meeting the State of California Assembly Line Emission Standards will not be accepted.

dd

(Cont.)

## WARRANTY

Warranty work will be performed at a dealership in the area in which the vehicle is working. Warranty period will start on the first day of the month that the vehicle is put into service. Use of other than Original Equipment parts will not void warranty.

## LIQUIDATED DAMAGES

All time limits stated in the Purchase Order are of the essence and should the delivery not be completed on or before the time stipulated, it is mutually agreed by and between the successful bidder and the County of Los Angeles that:

A delay would seriously affect the public and the operation of the Los Angeles County; that a reduction in the unit price of five dollars (\$5) per calendar day for each and every day for each unit which exceeds the delivery time set forth in the Purchase Order is the nearest measure of damages for each delay that can be fixed at this time; therefore, the County and the successful bidder hereby establish said reduction in the unit price of five dollars (\$5) per calendar day for each and every day of delay for each unit as liquidated damages and not as a penalty of forfeiture for the breach of agreement to complete delivery by the successful bidder on or before the time specified in the Purchase Order.

Liquidated damages shall not apply to time elapsing between date of delivery and date of notification to the successful bidder or rejection of sub-specification material.

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The above conditons may be invoked if deliveries exceed the specified time or if replacement of material not meeting specifications exceeds the specified time.

Should the successful bidder be obstructed or delayed in the work required to be done herewith by changes in the work or by any default, act, or omission of the inability to obtain materials, equipment or labor due to Federal Government restrictions arising out of the defense or war program, then the time of completion shall be extended for such periods as may be agreed upon by the County and the successful bidder. Should there be insufficient time to grant such extensions prior to completion date of the contract, the County may, at the time of acceptance of the work, waive liquidated damages which may have accrued for failure to complete the work on time, due to any of the above, after hearing evidence as to the reasons for such delay and making a finding as to the cause of same.

In the event that the successful bidder is on strike at the time of the award of the bid, the County reserves the option to accept the first acceptable bid from a manufacturer that is not on strike.

## DELIVERY

The vehicles delivered to the County of Los Angeles by the successful bidder will be identical in every respect with the accepted test vehicle furnished including all accessories, even though they may not be called for specifically in the specifications.

Cars will have the dealer preparation service work normally performed by the dealer completed before delivery. Cars,

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upon delivery will be ready for service. (Exception: Paint protective coating need not be removed.) Cars not ready for service will not be accepted when delivered. It will be the dealers responsibility to return them to the agency for proper preparation.

Vehicles will be delivered to the County of Los Angeles Garage, 1055 N. Alameda, Los Angeles, California 90012, between the hours of 7:30 a.m. and 3:00 p.m. only, in accordance with the following schedule:

1. Within 60 calendar days after receipt of Purchase Order, 50 Black and White vehicles shall be delivered.
2. During the successive 30 day period, an additional 100 Black and White vehicles shall be delivered.
3. During the next successive 30 day period, the balance of the vehicles shall be delivered.
4. Failure to accept these warranty and delivery conditions may be sufficient cause for rejection of bid.

NOTE: The above delivery schedules are minimum. The successful bidder may, if he so desires, deliver the vehicles at a faster rate.

## TESTING:

Prior to close of the bid, a car dealer, manufacturer, or his representative will be required to furnish a vehicle for test purposes. The Pomona Test Track will be closed to testing 12-1-75. Test on all vehicles must be completed prior to that date. This vehicle will be equipped with the engine, brakes, springs, shock absorbers, steering gear, tires, wheels, stabilizer bars, and all other special equipment as called for as part of the specifications required on all vehicles in this requisition.

The vehicles furnished by the successful bidder will be identical to the vehicle submitted for testing.

These demonstrator vehicles will be subjected to a seven phase performance and acceptability test series. The County of Los Angeles will not be responsible for any damage during the test or the condition of

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the vehicle when returned to the submitter after testing. Furthermore, all cars tested will be at the owner's risk for any damage occurring to the vehicles for any reason.

The company shall furnish the tires and wheels used for testing at the track.

Vehicles will be tested and driven under the supervision of the Los Angeles County Sheriff's Department and will be tested and driven by employees of the department or personnel designated by the department.

At the completion of the preliminary test and the six mode test and evaluation series it may be required that the vehicle tested be retained in the custody of the Sheriff's Department. It will be returned to the County Shops where the brake shoes and pads and the shock absorbers shall be removed and impounded as a control and check on the brakes and shock absorbers supplied on any vehicles purchased and supplied in this requisition. Manufacturers shall be prepared to furnish replacement brakes and shock absorbers which will be installed on the test vehicle prior to return to the manufacturer.

After closing of bids, upon request of the County of Los Angeles, the successful bidder(s) will within three (3) days return the test vehicle(s) for inspection and compliance tests. If the vehicle(s) is (are) accepted, it (they) will be used by the County of Los Angeles to make up radio, siren and special equipment brackets as necessary. The County retains the option to purchase the test vehicle(s) as part of the overall purchase. In any case, it will be necessary for the test vehicle(s) to remain in the possession of the County Shops for approximately four (4) weeks.

NOTE: See appendix for vehicle test procedure.

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VEHICLE SPECIFICATIONS

## ENGINE:

Engine not to exceed 401 cubic inch displacement. Vehicle should meet the following performance/requirements: 0 to 60 mph, 11.0 seconds; speed at the end of standing ¼ mile: 80.0 mph; 60 to 95 mph, 15.0 seconds. Top speed: 110 mph. Engine will be equipped with a 4 barrel carburetor. Note: If fuel injection is utilized Los Angeles County may purchase a limited number for test purpose. Engine must be operable on 91 R.O.N. fuel. Pulley sizes, belt arrangements, and all accessories will be identical on all cars delivered under this order.

Manufacturer's standard oil filter with replaceable element shall be furnished.

All engines to be equipped with factory installed coolant recovery system. Dealer installed after-market systems will NOT be acceptable. Silicon hose is desired. Additional cost of silicon hose will be considered in the bid evaluation.

## TRANSMISSION:

To be three-speed (minimum) fully automatic, heaviest duty available. All transmissions must be of the same make and model. Each transmission shall be equipped with a suitable device to prevent the transmission from being manually shifted into the lowest range from the driver's compartment. An alternative is a fail-safe lock-out with a full guarantee that will prevent shifting either manually or automatically into low gear at any speed over 35 mph. Such a lock-out must operate both in acceleration and in over-run or deceleration downhill.

NOTE: Particular attention will be paid during testing and possible subsequent service to the behavior of this component. Problem transmission will be cause for rejection of vehicle.

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## REAR AXLE:

Heavy duty. Specify ratios available. Ratio offered as first choice to be compatible with performance and economy requirements. Limited slip differential is required.

SUSPENSION:

Heavy duty suspension system, front and rear, is required; additionally, heavy-duty shock absorbers, front and rear, with no less than 30% rebound control are a requirement.

Heavy-duty stabilizer bars, front and rear where available, giving the best combination to reduce body roll and provide flat cornering must be standard equipment. Stabilizer bars are not to extend below lowest point of vehicle chassis.

TIRES AND WHEELS:

5 each, not smaller than ER70 x 14 or GR70 x 15, depending on make and model of vehicle. If these sizes not available, specify sizes proposed to be furnished.

Tires must conform to Los Angeles County Purchasing Standard 939, attached.

Wheels: Five wheels (police special) not less than 6 inch rim width.

BRAKES:

Must be power disc brakes on front wheels of all vehicles. Drums or discs will be acceptable on rear wheels. Skid limiting brake system may be acceptable after evaluation.

Heaviest duty semi-metallic or sintered metallic type linings or their wet and dry performance equivalent must be furnished.

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Brakes must be of sufficient capacity and effectiveness to meet the following test parameters: 30 to 0 mph - 1.0 g average of four stops as outlined in test procedures. 60 to 0 mph - 0.80 g average of four stops as outlined in the test procedures. Equality of application at end of test will be evaluated and remain a factor.

#### STEERING:

Power steering and power steering cooler are required. Tilt steering shall be quoted as an option in the bid process.

#### WHEELBASE:

118 inch maximum, 105 inch minimum. Bidders may request a waiver on wheelbase limitations either up or down which will be considered during evaluation of the bids.

#### ELECTRICAL:

Battery not less than 70 ampere-hour rating.

Alternator not less than 60 ampere output, and not less than 15 ampere output at 700 engine rpm. Dual belt drive preferred. Belts, dual or single, must be of a high performance type.

All units must have Electronic Ignition.

The wiring on all vehicles must be identical in every respect. Silicone high tension wiring is required.

#### BODY STYLE:

Four door sedan. To be painted black and white or stock colors as specified. Paint layout will be provided to the successful bidder(s).

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#### INTERIOR:

Heavy duty rubber floor mats-front and rear.

Floor mat -- trunk.

Ash trays -- front and rear on solid colors.

Ash tray required in front only on Black and Whites.

Cigarette lighter (front only).

Shall be equipped with a dome light (dome light not to operate with opening and closing of doors.)

Rear door handles to be furnished and installed but to be inoperative from inside on black and white vehicles only.

Padded dash, as non-reflective as possible, to eliminate glare in the windshield.

Inside rear view mirror-day and night type.

#### UPHOLSTERY: Black and White Sedans:

Heavy duty front seats with heavy duty foam rubber required. Seats to be installed in the chassis in the rearmost position.

Heavy duty rear seats.

Solid vinyl headliner and side panels, or acceptable equivalent. (Cloth not acceptable.)

Solid vinyl covered arm rests, front only.

Solid vinyl covered rear seat and lazy back.

Front seat and lazy back to be solid vinyl.

Color of front seat and lazy back to be selected by the Los Angeles County Sheriff's Department, and will be the same color in all cars.

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UPHOLSTERY: Plain colored sedans.

All single tone plain colored cars to have cloth (or breathable vinyl) and vinyl trim. Exterior and interior colors selected will be standard with successful bidder.

Single tone colored cars that are equipped with a Standard Broadcast radio will have not less than three interior color selections.

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SPECIALTY ITEMS:

All cars will be equipped with air conditioning, factory built-in, with the heater as an integral unit. Units tested at the track will be equipped with air conditioning, power steering and any other item included in these specifications.

To be equipped with rear window defogger.

Dual electric windshield wipers (two or more speeds).

Single key locking system for all cars, including trunk and glove compartment. All cars to be keyed alike and each car to have four keys.

Hood to be controlled by an inside release located on the driver's side. There must be sufficient difference of the hood control from the brake release that there can be no confusion between the two under any circumstance or condition.

Deck lid to be controlled through a remote control switch. The wire will terminate near center of driver's compartment leaving approximately 4' of wire to connect to control switch. Los Angeles County will locate and connect to button. Deck lid control mechanism to be electric.

Deck lid, when opened remotely, must be restrained from opening completely in order to prevent damage to the hinges. Deck lid must remain in the full open position, when opened manually. Trunk light to be installed and connected to turn on automatically when deck lid is opened.

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Outside rear view mirrors, non-glare -- door mounted left and right sides.

Parking brake indicator light.

Dual horns.

Speedometer to be accurate within  $\pm$  three (3) percent. Speedometer calibration certificate to be furnished.

Tinted glass throughout.

A flexible waterproof conduit with an inside diameter of not less than 1½ inch will be installed. It will descend from the floor of the trunk, running into the motor area and terminating in the upper area of the firewall into the interior of the vehicle. This end to be secured by U-clamp or other suitable clamping devices.

Maximum length of the conduit shall not exceed 10 feet, 9 inches. It must be at least 4 inches away from the engine exhaust system. Flexible conduit shall be adequately supported by U-clamps or other suitable type clamping device. (Emergency control units are later mounted on the tunnel between front seat and dash.)

NOTE: If conduit runs on the inside of the vehicle, it will be necessary to run it through the firewall and clamp as previously specified. Installation shall not interfere with positioning of rear seat cushion, rear doors or any other portion of the vehicle chassis. Entire installation must be approved by the Los Angeles County Communications Department.

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Vehicle shall incorporate certain radio frequency interference suppression measures and devices so that radio interference generated as the result of its operation does not exceed the limits established in S.A.E. Standard J 551 entitled "Measurement of Vehicle Radio Interference (30 to 400 megacycles)."

Manufacturer shall supply certification of compliance with S.A.E. Standard J 551 at time of delivery of the test car.

APPENDIXVEHICLE TEST PROCEDURE

## PRELIMINARY HANDLING AND PERFORMANCE TEST:

Vehicles will be tested for cornering, steering, and other road handling characteristics, including stability, at the Pomona Fairgrounds Driver-Training facility or other suitable place designated by the Sheriff's Department. Vehicles will be evaluated by the driver and/or passengers conducting the test and their opinions will be considered in rating the vehicles for overall suitability and for further testing. This test will be conducted by two or more Los Angeles County drivers who will take up to four practice laps of the designated course to familiarize themselves with the vehicle. Following this, four additional laps will then be completed and the roadability formally noted by the driver. An additional two laps may be driven in the opposite direction for further evaluation. The drivers will then evaluate the vehicles for handling on the test track, for stability and control at high speeds and for ease of control at slow speeds. Any vehicle passing the preliminary test will be admitted to the remaining six-mode test procedure as outlined on the following pages. Vehicles not receiving a satisfactory rating in the preliminary test will not be admitted to the remainder of the test phases.

## INSTRUMENTED PERFORMANCE TEST:

The instrumented performance test shall consist of five major parts, all electronically recorded on a specially modified strip chart recorder. These series will be as follows:

1. Acceleration from 0 to 30 mph, 45 mph, 60 mph timed in seconds and speed at the end of a quarter mile. Also scored is initial accelerative force as expressed in percentages of gravity (g-force).
2. Acceleration from typical average traffic speeds as follows: 30 to 50 mph, 30 to 65 mph, 60 to 80 mph, 60 to 95 mph expressed in seconds.
3. Braking scored in percentages of g-force and recorded in time and g-force. Scores will be the average of no less than four (4) and no more than (6) stops just short of lock-up from 30 mph, followed immediately by the same number from 60 mph. Brake test will be made with no cooling;

period between stop. A final panic stop may be added as a final check on lock-up and fade at the end, but this stop will not be scored. Tests will be recorded by using an Electronic Strip chart Recorder.

4. Handling and recovery. Travelling as closely as possible to an average of 40 mph, the vehicle will make successive lane changes with returns to the right hand lane as follows: single lane change and recovery, double lane change and recovery, triple lane change and recovery. Measurement will be in percentages of lateral g-force as measured by an electronic accelerometer and recorded on the strip chart. Each lane change and the average recovery force will be scored. All lane changes will be within a prescribed distance and marked by cones.
5. Average lateral acceleration (until the vehicle breaks away) in a steady-state turn around a 200-foot diameter (100-foot radius) circle to be measured and recorded as above or alternatively by time and formula as expressed by the formula  $V^2/32.2 \times R = g$  (or  $122.5/t^2 = g$ ). Measurement will be in each direction.

NOTE: Performance score will be the average scores of all test modes.

#### ECONOMY ROAD TEST:

Economy in use of gasoline will be tested on a mixture of surface urban and suburban streets with a freeway mode added. The test will be conducted using gasoline from the pump at West Hollywood Sheriff's Station or other designated facility and will proceed at legal traffic speeds in normal daytime traffic conditions over a prescribed 72.125 mile loop from the start to finish at the original source. Driving mode will be with lights, air conditioner and AM radios in operation. Drivers will be Sheriff's deputies. Measurement will be by gallonage used to the nearest tenth divided into the prescribed miles driven, not into the odometer. The score will be the actual miles per gallon expressed as a percentage of a "perfect" score of 20 mpg.

#### ERGONOMICS EVALUATION:

Each vehicle will be subjected to an ergonomics or human factors evaluation as indicated by the attached worksheet. No fewer than four of these will be scored

by four different members of the Sheriff's Department acting separately and incommunicado of each other. As many as eight may be done in individual cases to assure objectivity.

#### MECHANICAL EVALUATION:

Each vehicle will be evaluated for maintenance and predicted repairability by experienced members of the County Mechanical Department staff. Method of evaluation will be similar to that used in the ergonomics evaluation.

#### HEAT TEST:

The heat test for each vehicle will consist of measurement of the heat generated in the radiator, engine oil, transmission oil, power steering unit and the underhood ambient temperature.

Measurement will be electronic through thermocouple wire. The test mode will be dynamic, not static although a static (idle) mode may be introduced at any time. All heat testing is performed with the air conditioner in operation. Scoring for each component will be on a sliding scale depending on the component or the fluid being evaluated.

NOTE: Fluid cooling equipment to maintain or reduce temperatures on test vehicles must be offered as standard equipment on vehicles submitted to bid.

#### COMMUNICATIONS EVALUATION:

Each vehicle will be evaluated and scored by the Communications Department for its adaptability to communications and other Sheriff's Department equipment prescribed for the particular class of vehicle being considered.

As a part of these specifications, Bidder will fill in the following Parts Price List and submit with your bid. Parts Prices quoted are to be on parts used on your V-8 Engine with a cubic inch displacement between 350 and 401.

Group	Part No.	List Price	Discount Extended to L.A. County	Availability Local or Factory
ENGINE				
Cylinder Head				
Gasket Set				
8 Pistons				
Connecting Rod Bearings				
Main Bearings				
Oil Pan				
Timing Gear				
Timing Chain				
Partial Engine				
Timing Cover				
Ring Set (8 Pistons)				
ELECTRICAL				
Alternator				
Regulator				
Starter				
Complete Distributor				
Distributor Points				
High Tension Wiring				
FUEL				
Carburetor				
Fuel Pump				
Fuel Tank				
COOLING				
Radiator				
Water Pump				
Viscous Drive Pan and Blade Assembly				

## Parts Price List

Group	Part No.	List Price	Discount Extended to L.A. County	Availability Local or Factory
AIR CONDITIONING				
Compressor				
Compressor Clutch				
Condenser				
TRANSMISSION (AUTOMATIC)				
Case				
Converter				
Trans. Rebuild Kit (Complete)				
STEERING				
Gear Box				
Power Steering Pump				
FRONT SUSPENSION				
Lower Arm				
Upper Arm				
Knuckle				
Spindle				
DIFFERENTIAL				
Gear Set				
Axle				
Housing				
BRAKES				
Brake Rotors				
Booster & Master Cyl.				
Brake Pads				
Brake Lining				
Brake Drums, Rear W/Hub				

### Part's Price List

# END