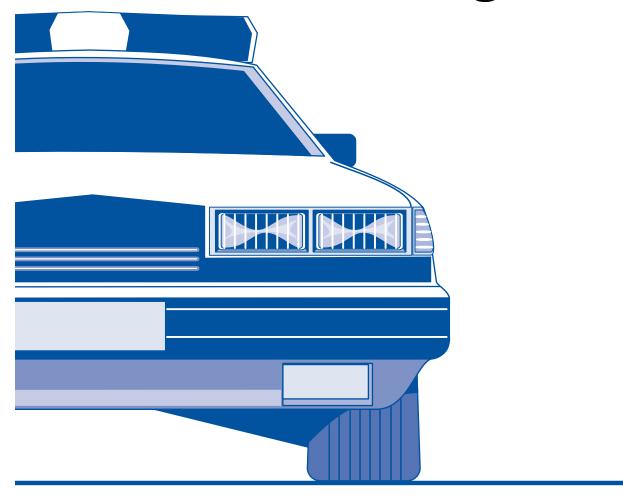


# 1996 Model Year Patrol Vehicle Testing



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#### **U.S. Department of Justice**

Office of Justice Programs
National Institute of Justice

# 1996 Model Year Patrol Vehicle Testing

**November 1995** NCJ 156220

### Prepared by:

Michigan State Police Training Division

Independent Testing & Consulting, Inc. Eaton Rapids, Michigan

#### **Published by:**

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#### **National Institute of Justice**

Jeremy Travis

Director

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The National Institute of Justice is a component of the Office of Justice Programs, which also includes the Bureau of Justice Assistance, Bureau of Justice Statistics, Office of Juvenile Justice and Delinquency Prevention, and Office for Victims of Crime.

### **PREFACE**

We are pleased to share with you the results of our 20th annual evaluation of police patrol package vehicles. We sincerely hope that the data in this report will assist you in making your selection of patrol vehicles for 1996.

You are encouraged to review the information contained in this report in light of the needs of your agency. The factors that we base our scores upon, particularly in the acceleration and top speed categories, are tailored to our needs, which may be quite different from yours. For example, a vehicle that fails to meet our 0–100 acceleration requirement may be very adequate for use by many departments who need quick acceleration to 60 or 70 mph. We want you to be aware that the best car for your agency may be different from the one we identify for our use.

The following police patrol package and special service package vehicles were evaluated this year:

Chevrolet Caprice	. 5.7L SPFI	
Chevrolet Caprice	. 4.3L SPFI	
Ford Crown Victoria	. 4.6L MPFI	
Ford Crown Victoria	. 4.6L MPFI	(CNG)
Ford Crown Victoria	. 4.6L MPFI	(Non-ABS)
Chevrolet Lumina	. 3.1L SPFI	
Chevrolet Camaro	. 5.7L SPFI	(Auto)
Chevrolet Camaro	. 5.7L SPFI	(6-Spd)
Chevrolet Geo Tracker	. 1.6L MPFI	(2wd)
Jeep Cherokee	. 4.0L MPFI	(4wd)
Ford Explorer	. 4.0L MPFI	(4wd)

The Ford Crown Victoria non-ABS car was submitted for brake testing only. Since the braking systems on the two Chevrolet Camaros are identical, only the automatic transmission equipped car was submitted for brake testing.

Most of the test cars were tested on Goodyear Eagle RS-A tires; however, the Jeep Cherokee was on Goodyear Eagle GA tires, the Chevrolet Lumina on Goodyear Eagle GT+4 tires, the Chevrolet Geo Tracker on Uniroyal Tiger Paw tires, and the Ford Explorer on Firestone tires.

At the request of the manufacturers, all vehicles were tested with the transmissions in "overdrive" except the Chevrolet Camaro 6-speed which was run in 5th gear during the top speed run. During all phases of the testing, the Jeep Cherokee and the Ford Explorer were run in four wheel drive.

All of the vehicles were tested with a clean roof (no overhead light or lightbar) and without A-Pillar mounted spotlights. We believe this is the best way to ensure all of the cars are tested on an equal basis. Because there are so many types of equipment in use by agencies across the country, it would be practically impossible to test each car with all of the possible equipment variations. We are confident the test data are representative of the level of performance that can be expected from the various cars tested. Obviously, once overhead lights, spotlights, radios, sirens, and other emergency equipment are installed, overall performance will probably be somewhat lower than we report.

The Chevrolet Caprice 4.3L, the Ford Crown Victoria 4.6L, the Ford Explorer 4.0L, the Jeep Cherokee 4.0L, and the Ford Crown Victoria 4.6L (CNG) were all equipped with electronic speed limiters. Each of these vehicles, except the Ford Crown Victoria 4.6L, reached the top speed preset by the manufacturer.

During the Vehicle Dynamics testing, the front brake rotors on the Jeep Cherokee had to be replaced after four (4) timed laps due to excessive rotor run out (warped).

As always, if anything in this report requires further explanation or clarification, or if I can be of service to you, please feel free to contact me by phone or by mail.

Sgt. Bob Ring Michigan State Police Training Division 7426 North Canal Road Lansing, Michigan 48913 Phone: 517–322–1789

Fax: 517–322–0725

### Order a video of the vehicle evaluation program

In 1988, the Michigan State Police produced a short videotape of the Patrol Vehicle Evaluation Program. The tape gives a thumbnail sketch of the entire test procedure.

Copies of the tape are available by sending a good quality blank videotape (VHS format, at least T–30 in length), along with a self-addressed return mailing label, to:

Sergeant Bob Ring Michigan State Police Training Division Precision Driving Unit 7426 North Canal Road Lansing, MI 48913

### Software helps select vehicles

Staff of the Office of Law Enforcement Standards (OLES) have created a computer program for the National Institute of Justice to help police fleet managers select patrol vehicles that are best suited to their needs. The program, called AutoBid, is based on the Michigan State Police patrol vehicle performance test data.

The program ranks vehicles in two ways: (1) by their test scores alone and (2) by their bid price adjusted for their test scores.

AutoBid runs on MS-DOS $^{\text{TM}}$  microcomputers with at least 512K of RAM. It can run directly from a floppy drive or be installed on a hard drive.

The National Institute of Justice is making limited copies of AutoBid available free to law enforcement agencies. Obtain copies of the program and documentation by writing on your letterhead to the National Law Enforcement and Corrections Technology Center at P.O. Box 1160, Rockville, MD 20849–1160.

### **ACKNOWLEDGMENTS**

We wish to thank Colonel Michael D. Robinson, Director of the *Michigan Department of State Police*, and other top administrators of the department who believe in the importance of this program not only to our department, but to all of law enforcement. Without their support and encouragement, the program could not continue.

We would also like to thank the *Michigan Department of Management and Budget* for their continued support and assistance. Mr. Don Smith and other personnel from the *Motor Transport Division* provide initial check-over of test vehicles, transportation of test and support vehicles to the test sites, and on-site mechanical assistance during the actual testing. This assistance and cooperation is essential to the success of the program.

To the National Institute of Justice's *National Law Enforcement and Corrections Technology Center*, we are most grateful for their continued monetary support of the program. We also extend a special thanks to Ms. Wendy Howe of that staff for her continued assistance at the test sites with timing and scoring.

We also wish to thank the vehicle manufacturers; Ford Motor Company, Chrysler Motors Corporation, and the Chevrolet Division of General Motors Corporation for their work in preparation and submission of the test cars. Their task is monumental and they continue to provide us with excellent vehicles to meet the special needs of law enforcement. For this, we are deeply grateful.

We extend our appreciation to *Chrysler Motors Corporation* for allowing us to again utilize their Chelsea Proving Grounds facility and to the *Penske Corporation* for the use of the Michigan International Speedway road course facility. The success of the program is dependent upon the use of these excellent facilities.

There are many people within the *Michigan Department of State Police* who continue to make significant contributions to the program. A special thanks to the test drivers: Sgt. Dennis Steendam, Rockford Post; Tpr. Mark Reaves, Lapeer Post; Tpr. Doug Lubahn, CID-East Lansing; and Tpr. David Halliday, Brighton Post, who continue to perform their extremely important role in a very professional manner.

Sgt. Bill McFall of the Executive Division, F/Lt. Curtis L. VanDenBerg (retired), and Sgt. David B. Storer (retired) deserve special recognition for their continued assistance with the program which they originated 20 years ago. We also wish to express our deep gratitude to Mrs. Dawn Brinningstaull, who continues to perform a key role with timing and scoring at the test sites, as well as maintaining all records for the program.

Thanks also to Curtis L. VanDenBerg, now President of *Independent Testing & Consulting, Inc.*, for preparing this year's evaluation report.

Finally, we want to thank those who represent law enforcement and purchasing agencies throughout the United States and Canada, for your continued support and encouragement. We are happy for the opportunity to make a contribution to the law enforcement community and will strive to be responsive to your needs.

### **About the National Institute of Justice**

The National Institute of Justice is a principal research branch of the U.S. Department of Justice. The Institute's mission is to develop knowledge about crime, its causes and control. Priority is given to policy-relevant research that can yield approaches and information that State and local agencies can use in preventing and reducing crime. The decisions made by criminal justice practitioners and policymakers affect millions of citizens, and crime affects almost all our public institutions and the private sector as well. Targeting resources, ensuring their effective allocation, and developing new means of cooperation between the public and private sector are some of the emerging issues in law enforcement and criminal justice that research can help illuminate.

Carrying out the mandate assigned by Congress in the Justice Assistance Act of 1984, the National Institute of Justice:

- Sponsors research and development to improve and strengthen the criminal justice system and related civil justice aspects, with a balanced program of basic and applied research.
- Evaluates the effectiveness of justice improvement programs and identifies programs that promise to be successful if continued or repeated.
- Tests and demonstrates new and improved approaches to strengthen the justice system, and recommends
  actions that can be taken by Federal, State, and local governments, private organizations, and individuals to
  achieve this goal.
- Disseminates information from research, demonstrations, evaluations, and special programs to Federal, State, and local governments, and serves as an international clearinghouse of justice information.
- Trains criminal justice practitioners in research and evaluation findings, and assists practitioners and researchers through fellowships and special seminars.

The Director of the Institute is appointed by the President of the United States and, upon confirmation by the Senate, serves at the President's pleasure. The Director establishes the research and development objectives of the Institute. The Director has final authority to approve grants, contracts, and cooperative agreements, and maintains responsibility for fiscal operations of the Institute. In establishing its research agenda, the Institute is guided by the priorities of the Attorney General and the needs of the criminal justice field. The Institute actively solicits the views of law enforcement, courts, and corrections practitioners as well as the private sector to identify the most critical problems and to plan research that can help resolve them.

#### **Jeremy Travis**

Director
National Institute of Justice

### The National Law Enforcement and Corrections Technology Center

The National Institute of Justice (NIJ), responding to recommendations by the law enforcement community, has converted its Technology Assessment Program Information Center (TAPIC) into the National Law Enforcement and Corrections Technology Center (NLECTC), which is composed of the national center, four regional centers, the Border Research and Technology Center, the Office of Law Enforcement Standards (OLES), and the Office of Law Enforcement Technology Commercialization (OLETC).

These facilities are part of a new law enforcement and corrections information network that will make it easier for agencies and departments to locate new products and for industry to identify law enforcement and corrections requirements.

NLECTC's major responsibilities and goals are:

- Working with OLES, to establish voluntary standards for selected law enforcement equipment and manage voluntary compliance testing programs.
- To develop critical product data bases for law enforcement and corrections that include information such as who manufactures
  what, what the points of contact are, what testing or evaluation information is available, and what other law enforcement agencies
  use the product and can discuss its effectiveness.
- To assist law enforcement in understanding what technologies are available, how they can be used, and what advantages they
  offer.
- To evaluate products, such as body armor, firearms, vehicle tires, and handcuffs.
- To conduct field demonstrations of new law enforcement technologies.
- To collect law enforcement needs and requirements information for use by industry in developing affordable technologies for law enforcement.
- To disseminate information about its resources and services through newsletters, product bulletins, consumer product lists, articles in criminal justice periodicals, exhibits and presentations at criminal justice conferences, and online access.
- To coordinate the Law Enforcement and Corrections Technology Advisory Council (LECTAC), which is composed of nationally
  recognized professionals from Federal, State, and local criminal justice agencies. LECTAC helps NIJ set priorities for developing
  new equipment standards, for testing available products, and establishing future program initiatives for NLECTC.

To receive more information or to add your name to the NLECTC mailing list, call 800-248-2742 or 301-251-5060.

#### National Law Enforcement and Corrections Technology Center

1600 Research Boulevard P.O. Box 1160 Rockville, MD 20849–1160

The following is a list of NLECTC regional and affiliated facilities that assist NIJ in fulfilling its mission.

#### **NLECTC Northeast Region**

Rome Laboratories 26 Electronic Parkway Griffiss AFB, NY 13441–4514 (p) 315–330–3527 (f) 315–330–3022

#### **NLECTC Southeast Region**

Code 40 4600 Marriott Drive North Charleston, SC 29406–6504 (p) 803–974–5400 (f) 803–974–4031

#### **NLECTC Rocky Mountain Region**

2050 East Iliff Avenue Denver, CO 80208 (p) 303–871–2829 (f) 303–871–2500

#### **NLECTC West Region**

P.O. Box 92957 Mail Station M8/224 Los Angeles, CA 90009–2957 (p) 310–336–2171 (f) 310–336–2227

#### **Border Research and Technology Center**

U.S. Attorney's Office 880 Front Street Room 6293 San Diego, CA 92101–8800 (p) 619–557–5610 (f) 619–557–5782

#### Office of Law Enforcement Standards

National Institute of Standards and Technology Building 225 Room A323 Gaithersburg, MD 20899 (p) 301–975–2757 (f) 301–948–0978

#### Office of Law Enforcement Technology Commercialization

316 Washington Avenue Wheeling, WV 26003 (p) 304–243–2520 (f) 304–243–2539

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**Ergonomics and Communications Evaluation** 

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### **TEST EQUIPMENT**

The following test equipment is utilized during the acceleration, top speed, braking, and vehicle dynamics portions of the evaluation program.

# DATRON TECHNOLOGY, INC., 33533 West Twelve Mile Road, Suite 180, Farmington Hills, Michigan 48331

DLS Smart Sensor - Optical non-contact Speed and Distance Sensor

#### CHRONOMIX CORPORATION, 650F Vaqueros Avenue, Sunnyvale, California 94086–1920

Compusport 737 - Select Printing Timer

#### LABORATORY EQUIPMENT CORPORATION (Labeco), Box 158, Mooresville, Indiana 46158

Tracktest Fifth Wheel

DD1.1 Digital Velocity Meter

DD2.1 Digital Distance Meter

Transmitter Assembly for DD1.1 and DD2.1

#### MICRO SWITCH, Division of Honeywell, Freeport, Illinois 61032

Modulated L.E.D. Control (Photoelectric micro-switch) Model FE-MLS-3A

#### BELL HELMETS, Box 927, Rantol, Illinois 61866

Nascar Helmet - Model MC-400

#### AMMCO TOOLS, INC., Wacker Park, North Chicago, Illinois 60064

Decelerometer, Model 7350

# ALGE -TELESIGNAL TX/RX, Phoenix Sports Technology, 1344 Rt. 100 S., P.O. Box 774, Trexlertown, Pennsylvania 18087

Alge Sports Timing Telesignal Transmitter - Model TX

Alge Sports Timing Telesignal Receiver - Model RX

Michigan 3905–0010 June 1995

# STATE OF MICHIGAN DEPARTMENT OF MANAGEMENT AND BUDGET OFFICE OF PURCHASING

Specifications for

POLICE CAR: PATROL 4-Door Sedan

#### **MAKE**

Chevrolet Caprice Ford Crown Victoria

#### **BID REQUIREMENTS**

Prior to bidding, a car dealer, manufacturer, or representative will be required to furnish a "police package" vehicle for test purposes. All test vehicles shall be 1996 models, which are equipped with the drive train, suspension, and brake components, as well as tires, interior appointments and instrumentation as called for in the specification requirements on all vehicles in this requisition. Submitters of vehicles shall declare in writing any deviations from the specifications at the time of delivery of these test cars. Interior and exterior colors shall be the manufacturer's option. One (1) extra set of engine belts and four (4) wheels and tires shall be provided on test day for each car submitted. Test vehicles submitted shall have undergone sufficient break-in to permit extended periods of maximum acceleration and high speed driving. Brakes on the test cars shall have been burnished prior to delivery.

Test cars shall be delivered to the Motor Transport Division, State Secondary Complex, 6951 Crowner Drive, Lansing, Michigan, no later than 4:00 PM, September 11, 1995.

Each vehicle shall be subjected to six (6) competitive and qualification tests. Any vehicle which fails to meet the minimum standards found under the Qualification Testing section of this specification will not be considered for this bid.

The State of Michigan shall not be responsible for any damage during the tests or the condition of 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 test vehicles will be tested and driven under the supervision of the Michigan Department of State Police by employees of the department or personnel designated by the department.

Vehicles used for testing will be available for pick-up by the submitter no later than one (1) month following completion of testing.

#### SCORING AND BID ADJUSTMENT FORMULA

The vendor's bid for each vehicle that passes the qualification tests will be artificially adjusted, based on the scoring and bid adjustment methodologies described at the conclusion of this specification. The vehicle to be purchased will be determined by the adjusted low bid price. Purchase price will be that quoted by the vendor.

#### **SPECIFICATIONS**

Model: 1996 CURRENT NEW - STANDARD FACTORY EQUIPPED Vehicles are to

be factory equipped with the following items, unless dealer installation is herein

permitted:

**Air Bags:** Vehicle to be equipped with driver and passenger side air bag passive restraint

system.

**Air-Conditioning:** System must be designed to prevent component damage due to high speed driv-

ing.

**Alternator System:** Transistorized regulator, 130 amp. minimum output capacity, minimum curb idle

output of 45 amps (at manufacturer's recommended idle speed). Shall be of heavy duty design, capable of surviving patrol car operation. Output ratings are for typical underhood ambient temperatures and *not* S.A.E. rating method.

Antenna: Standard AM type original equipment antenna, externally mounted in factory

predrilled location. Antenna wire to run to normal AM/FM radio dash opening.

(Antenna may be dealer installed.)

**Antifreeze:** To be equipped with antifreeze protection to  $-35^{\circ}$  F minimum.

**Battery:** 12 volt, minimum 730 cold cranking amps.

**Body Side Molding:** Vehicle to be equipped with body side molding. Molding on front doors to be

deleted. No holes to be on doors for moldings.

**Brakes:** Vehicle to be equipped with power assisted, four-wheel disc, antilock brake

system.

**Cigarette Lighter:** To be located on instrument panel, wired independent of ignition system.

**Cooling System:** Vehicle to have maximum size cooling system available, incorporating

"coolant recovery" system.

**Differential:** Heavy duty, limited slip or electronic traction control required.

**Engine:** Engine to be the largest cubic inch/liter displacement available in the model

of vehicle submitted, with specific displacement to be the manufacturer's option providing the car will meet or exceed the vehicle performance require-

ments in the Qualification Testing section of this specification.

Floor Mat: Full floor mat, heavy duty rubber, front and rear.

Glass: All windows shall be heat absorbing (tinted) type.

**Headlights:** To be equipped with high and low beam quartz-halogen headlamps.

**Hood Latch Release:** To be equipped with inside hood latch release.

**Keys:** Three (3) keys to be furnished with each car. (Third key may be dealer

supplied on original equipment blank only.)

**License Plate Brackets:** Vehicle shall be equipped with manufacturer supplied front and rear license

plate brackets. (Dealer installation is permitted.)

**Lights, Auxiliary:** Vehicle to be equipped with two (2) rear facing, three- (3) to four- (4) inch

diameter red auxiliary lights installed on the left and right sides of the rear deck storage area (package shelf). Intensity of the lights shall not be greater than that of the vehicle taillights. (Factory or dealer installation must be approved by the

Michigan State Police.)

#### **SPECIFICATIONS** (continued)

**Lights, Interior:** Dome light to be mounted on headliner on longitudinal center line of vehicle

approximately twenty-five (25) inches from windshield garnish molding. Dome light to be controlled by moving the instrument light intensity switch to maximum position. Operation to be independent of other lights. Vehicle to be equipped with two (2) separately switched map lights to direct a restricted beam of light to the driver and/or the front seat passenger. (Exact mounting position to be approved by the Michigan State Police.) No interior light to be illumi-

nated by open doors.

Vehicle to be equipped with an auxiliary light mounted next to the windshield garnish molding in center of vehicle. This auxiliary light to be a dome type light with switch mounted adjacent to, or as an integral part of the light. Operation of

auxiliary light to be independent of standard dome light.

Lights, Engine and Trunk Compartments:

To be equipped with engine and trunk compartment lights controlled by

mercury switches.

**Locks:** To be equipped with power door locks. All locks on a car to be keyed alike,

different key for each car.

Mirrors, Rearview: Inside: Day/Night type

Outside: Remote control type, installed on left-hand and right-hand doors. Controls to be within convenient reach of driver. Rectangular design - approximate size 5" x 3"; minimum viewing area of fifteen (15) square inches.

**Paint Color:** To be same color as Dulux 93-032. Paint color code to be indicated on

production code plate.

**Prior** to initial delivery of patrol vehicles, the manufacturer shall schedule a pilot

model inspection in order to determine compliance with the specifications. The inspection shall be conducted at <u>each point of vehicle assembly, unless an alternate location is specifically agreed to by the Michigan State Police</u>. Responsibility for all costs incurred (not to exceed four (4) representatives of

the State of Michigan) will be that of the dealer or manufacturer.

**Predelivery Service:** Vehicles to undergo predelivery service as provided in the State of Michigan

Vehicle Specification book. (May be completed by dealer.)

**Radio:** AM/FM Radio to be deleted if offered as standard equipment.

**Radio Noise Suppression:** Vehicle shall be equipped with standard AM and police radio noise supression

package, to include any optional grounding straps. The vehicle shall not interfere with signals received or transmitted by the mobile police radio system, nor shall

the vehicle be affected by the operation of a police mobile transmitter.

**Radio Speakers:** A permanent magnet speaker(s), either oval or round, to be mounted in the

speaker opening(s) provided on the dash/door of the unit. Speaker(s) to be of a quality equal to automotive grade. Speaker leads connected to the speaker terminals, not grounded, shall extend three (3) feet beyond the lower edge of the center of the dashboard. (Dealer may install wiring extension.)

One-Speaker Installation: Speaker to be located in the center of dashboard. Voice coil impedance eight (8) ohms, power handling capacity eight (8)

watts, minimum.

(OR)

#### **SPECIFICATIONS** (continued)

Two/Four-Speaker Installation: Speakers to be located on left and right sides of dashboard (preferred location) or positioned in the forward portion of the left- and right-hand front doors. Four speaker system to include two additional speakers installed on rear deck shelf. Voice coil impedance of all speakers combined shall equal eight (8) ohms, power handling capacity ten (10) watts, minimum.

**Rear-Window Defogger:** 

Electrical grid type. Control to be within convenient reach of driver, control switch to be clearly marked as to function.

**Roof Top Reinforcement** and **Special Wiring:** 

Install a steel plate at least 2.25mm thick by 10" wide to the underside of the top, centered on the longitudinal center line of the roof panel. Plate is to extend from the windshield header to the first top cross-member support and is to be welded at both ends. Plate to hold roof skin in its normal position, not allowing skin to deflect if pressure is applied to top surface. The purpose of the plate is to support the overhead emergency light.

Drill one hole through roof panel and reinforcing plate approximately 19" from windshield molding on longitudinal center line. (Exact placement of hole to be approved by Michigan State Police.) Feed at least three (3) insulated stranded wires (minimum of one #12 and two #16) through hole in roof, and route directly to either side of top at a right angle to the longitudinal center line, thence to a pillar and down inside the pillar, then route wires in a concealed manner to the area under the dashboard. Wires to extend 18" above roof hole, and a minimum of 36" from under the dash at the center. Top hole to be sealed to prevent entry of water. Wires to be concealed between headliner and roof panel.

**Seat Assembly, Front:** 

Bucket seat type, 45/45 or 40/40, individually adjustable. The driver's seat only to be 6-way power. Both seats to have heavy duty interior construction designed for rugged police use, comfortable foam-padded seat cushions and backs. To permit the installation of radio equipment, a minimum width of ten (10) inches is required between the bucket seats. Floor-mounted shift lever with console not permitted.

**Spare Tire:** 

Full-size spare tire and wheel to be mounted in trunk.

**Speedometer:** 

Shall be calibrated to within  $\pm$  3 mph accuracy, 0–140 mph scale minimum. Analog type scale graduations to be linear and of 1 or 2 mph increments. Digital type speedometer to be in 1 mph increments.

**Spotlights:** 

Unity, Model #225 (equipped with Halogen spotlamp H7635), to be mounted on left-hand and right-hand "A" pillars. Left and right spotlights to be wired independent of ignition, individually fused with 10 to 20 amp capacity. Spotlight fuses shall be readily accessible to the driver, with location in the fuse panel preferred. Spotlights shall be factory installed if offered by the vehicle manufacturer. (Any non-factory installation shall be authorized by the vehicle manufacturer. Installation to be approved by the Michigan State Police.)

**Steering:** 

Power steering, manufacturer to provide steering gear which affords maximum "firm feel" and fast return characteristics, designed for high-speed, pursuit-type driving.

**Steering Wheel:** 

Tilt type steering wheel required. Round antislip surface.

**Suspension System** 

Police:

To include heavy duty springs front and rear, in combination with heavy duty shock absorbers, and front and rear heavy duty stabilizer bars.

4

#### **SPECIFICATIONS** (continued)

**Technical Service** Manufacturer to supply four (4) copies of all Technical Service Bulletins covering **Bulletins:** 

vehicles purchased under this specification. May be supplied on disk if approved

by Motor Transport Division.

Tires: Tires, (including spare), to be Goodyear, police pursuit radials, per State of

> Michigan specification 5260-S1, July 1991. Speed rating to meet or exceed vehicle performance capabilities. (Tires to be approved by Michigan State

Police.)

**Tools:** Wheel wrench and jack to be provided.

**Transmission:** To be 3- or 4-speed, fully automatic, heaviest duty available. Must incorporate

low-gear lockout to prevent manual shifting.

Trim: Front and rear bumper valances (facias) to be color coordinated. Color to be

approved by Michigan State Police.

**Trunk Mat:** To be full floor.

Trunk Release, Remote: To be equipped with electrically operated remote control trunk release. Control to

> be within convenient reach of the driver, preferably located on right side of steering column (in glove box not acceptable). Electric system wired independently of ignition switch. (Dealer may relocate control and/or alter factory

wiring to conform with this requirement.)

Seats to be upholstered in heavy duty cloth or combination of heavy duty cloth **Upholstery:** 

and vinyl (blue). All vinyl is *not* acceptable.

Wheels and Covers: To be 15" heavy duty construction, designed for police use, black in color.

Hubcaps are preferred. Full wheel covers are acceptable.

Windows, Power: Side windows to be electrically powered with each door having it's own window

> control. The driver's door to have controls for all windows. Rear-door powerwindow switches to be deactivated. Rear power windows to be operable from

driver's position only.

Windshield Wipers/

Washers: Multiple speed electric, to include intermittent feature.

Wiring, Special: Vehicle to include a 30-amp circuit breaker-equipped battery feed auxiliary wire,

and a 20-amp circuit breaker-equipped ignition feed auxiliary wire. Wires to

extend 2 feet beyond center of dash area. #12 wire minimum.

**NOTE:** No dealer advertising to be on vehicles.

### **QUALIFICATION TESTING**

To qualify for bidding, all vehicles submitted by manufacturers must meet each of the following performance standards:

#### 1. ACCELERATION

0-60 mph—10.0 seconds or less

0-80 mph—17.2 seconds or less

0-100 mph—28.2 seconds or less

Each vehicle will make four (4) acceleration runs, and the times for the four (4) runs will be averaged.

#### 2. TOP SPEED

A speed of 110 mph must be attained within a 1-mile distance, and 120 mph within a 2-mile distance. For purposes to be explained in the test report, the vehicle will, after attaining the 120 mph minimum, be accelerated to the maximum speed attainable within 14 miles.

#### 3. BRAKING

- a. Test vehicles will be required to make four (4) consecutive stops from 90 mph, with a constant deceleration rate of 22 ft./sec.<sup>2</sup> maintained from 90 to 0 mph. Immediately following this brake heat-up procedure, a measured, controlled impending skid (threshold) stop will be made from 60 mph.
- b. After a 4-minute wait, test "a" will be repeated. Immediately following, each vehicle is required to complete a panic stop from 60 mph. Evidence of severe brake fade and the ability of the vehicle to stop in a straight line within its own lane will be evaluated.
- c. A minimum of 25.0 ft./sec.² average must be attained on the two (2) measured impending skid (threshold) stops.

#### **COMPETITIVE TEST CATEGORIES**

Each vehicle to be considered for the bid will be evaluated in the following weighted categories:

CATEGORY	CATEGORY WEIGHT
Vehicle Dynamics	30 points
0–100 Acceleration	20 points
Braking	20 points
Top Speed	15 points
Ergonomics/Communications	10 points
Fuel Economy	5 points

### **SCORING METHODOLOGY**

Raw Score: A raw score is developed for each vehicle by testing in each of the above catego-

ries. These scores are expressed in terms of seconds, miles-per-hour, feet-per-

second<sup>2</sup>, points, or miles-per-gallon.

**Deviation Factor:** The best scoring vehicle in each test category receives a "0" as its deviation

factor. The decimal equivalent of the percentage by which each of the other vehicles varies from the best score in that category is that vehicle's deviation

factor.

Weighted Category Score: Each vehicle's weighted category score is determined by multiplying its deviation

factor (as determined above) by the category weight.

**Total Weighted Score:** The total weighted score for each vehicle is derived by adding together the six (6)

weighted category scores for that vehicle.

### **BID ADJUSTMENT METHODOLOGY**

**Bid Adjustment Figure:** The bid adjustment figure will be one percent (1%) of the lowest bid price

received.

**Actual Dollar Adjustment:** To determine the actual dollar amount by which each vehicle's bid price will be

adjusted, the bid adjustment figure is multiplied by that vehicle's total weighted

score.

**Adjusted Bid Price:** The actual dollar adjustment amount arrived at for each vehicle is then added to

that vehicle's actual bid price. The resultant figure is the adjusted bid price upon

which the purchasing decision is based.

MAKE Chevrolet	MODEL Caprice			SALE	S CODE NO.	1BL19	
ENGINE DISPLACEMENT	CUBIC INCHES 350			LITEI	RS	5.7	
FUEL SYSTEM	Sequential	l Port F	uel Inje	ection	EXHA	UST	Dual
HORSEPOWER (SAE NET)	260 @ 500	00 RPN	Л	•			
TORQUE	330 ft.lbs.	@ 240	0 RPM				
COMPRESSION RATIO	10.5 : 1						
TRANSMISSION	MODEL	4L6	60-E	ТҮРЕ	4-Sp	eed Electronic	Automatic
	LOCKUP '	TORQ	UE CO	NVERT	ER? Y	es	
	OVERDRI	VE?	Yes				
AXLE RATIO	3.08 : 1						
STEERING	Integral Ge	ear with	h Powe	r Piston	and Vai	ne Type Pump	
TURNING CIRCLE (CURB TO CURB)	43.0 ft.						
TIRE SIZE, LOAD & SPEED RATING	P225 / 70F	R15	100V				
SUSPENSION TYPE (FRONT)	Independent SLA, Coil Spring and Steel Anti-Roll Bar						
SUSPENSION TYPE (REAR)	Salisbury 4 Link Coil Spring and Steel Anti-Roll Bar						
GROUND CLEARANCE, MINIMUM	6.2 in.		LOCA	TION	Rear I	_ower Trailing	Arm Bracket
BRAKE SYSTEM	Power, Sin	ngle Ca	aliper, A	ntilock			
BRAKES, FRONT	ТҮРЕ		Vented	l Disc	SWEP	T AREA	242.3 sq.in.
BRAKES, REAR	ТҮРЕ		Vented	l Disc	SWEP	T AREA	197.3 sq.in.
FUEL CAPACITY	GALLONS	S	23.0		LITEI	RS	87.1
GENERAL MEASUREMENTS	WHEELBA	ASE	115.9 i	n.	LENG	TH	214.1 in.
	TEST WE	IGHT	4249 lk	os.	HEIG	НТ	55.7 in.
HEADROOM	FRONT		39.2 in	-	REAR	1	37.9 in.
LEG ROOM	FRONT		42.2 in		REAR		39.5 in.
SHOULDER ROOM	FRONT		63.4 in		REAR	L	63.4 in.
HIP ROOM	FRONT		57.0 in	•	REAR	\	56.9 in.
INTERIOR VOLUME	FRONT 60.2 cu.ft. REAR 54.0				54.0 cu.ft.		
	COMBINED 114.2 cu.ft. TRUNK 20.			20.4 cu.ft.			
EPA MILEAGE EST. (MPG)	CITY 1	7	HIGH	WAY	26	COMBINED	20

MAKE Ford	MODEL Crown Victoria			SALE	S CODE NO.	P71	
ENGINE DISPLACEMENT	CUBIC INCHES 281			LITE	RS	4.6	
FUEL SYSTEM	Multiport F	uel Inj	ection		EXH	AUST	Dual
HORSEPOWER (SAE NET)	210 @ 425	50 RPN	Л				
TORQUE	270 ft.lbs.	@ 325	0 RPM				
COMPRESSION RATIO	9.0 : 1						
TRANSMISSION	MODEL	4R7	70W	ТҮРЕ	4-Sp	eed Electronic	Automatic
	LOCKUP '	TORQ	UE CO	NVERT	ER? Y	es	
	OVERDRI	VE?	Yes				
AXLE RATIO	3.27 : 1						
STEERING	Recirculating	g ball &	nut w/int.	pwr. (co	nstant ra	tio), speed sensiti	ve variable assist
TURNING CIRCLE (CURB TO CURB)	39.1 ft.						
TIRE SIZE, LOAD & SPEED RATING	P225 / 70R15 100V						
SUSPENSION TYPE (FRONT)	Independent SLA with Ball Joint and Coil Spring						
SUSPENSION TYPE (REAR)	4 Bar Link with Springs on Axle						
GROUND CLEARANCE, MINIMUM	6.1 in.	L	OCATIO	)N	Rear Su	spension Lowe	er Arm at Axle
BRAKE SYSTEM	Power, Sin	igle Ca	aliper, A	ntilock			
BRAKES, FRONT	ТҮРЕ		Vented	Disc	SWEI	PT AREA	239.8 sq.in.
BRAKES, REAR	ТҮРЕ		Solid D	isc	SWEI	PT AREA	189.4 sq.in.
FUEL CAPACITY	GALLONS	S	20.0		LITE	RS	75.7
GENERAL MEASUREMENTS	WHEELBA	ASE	114.4 i	n.	LENG	TH	212.0 in.
	TEST WEI	IGHT	3974 lb	s.	HEIG	НТ	56.7 in.
HEADROOM	FRONT		38.4 in		REAF	<b>t</b>	38.0 in.
LEG ROOM	FRONT		42.5 in		REAF	R	39.7 in.
SHOULDER ROOM	FRONT		60.5 in		REAF	R	60.3 in.
HIP ROOM	<b>FRONT</b> 59.1 in.			REAF	2	57.6 in.	
INTERIOR VOLUME	FRONT 58.6 cu.ft.			REAF	<b>R</b>	52.7 cu.ft.	
	COMBINE	ED	111.3 c	cu.ft.	TRUN	NK	20.6 cu.ft.
EPA MILEAGE EST. (MPG)	CITY 1	7	HIGH	WAY	23	COMBINED	19

MAKE Ford	MODEL Crown Victoria			ES CODE NO.	P71		
ENGINE DISPLACEMENT	CUBIC INCHES 281			RS	4.6		
FUEL SYSTEM	Multiport Fuel	Injection (CNG)	EXH	AUST	Single		
HORSEPOWER (SAENET)	178 @ 4500 I	RPM					
TORQUE	237 ft.lbs. @	3250 RPM					
COMPRESSION RATIO	10.0 : 1						
TRANSMISSION	MODEL 4	R70W TYPI	E 4-Sp	peed Electronic	Automatic		
	LOCKUP TOI	RQUE CONVER	TER? Y	'es			
	OVERDRIVE:	? Yes					
AXLE RATIO	2.73 : 1						
STEERING	Recirculating ball	& nut w/int. pwr. (co	nstant rati	io), speed sensitiv	e variable assist		
TURNING CIRCLE (CURB TO CURB)	39.1 ft.						
TIRE SIZE, LOAD & SPEED RATING	P225 / 70R15	100V					
SUSPENSION TYPE (FRONT)	Independent SLA with Ball Joint and Coil Spring						
SUSPENSION TYPE (REAR)	4 Bar Link with Springs on Axle						
GROUND CLEARANCE, MINIMUM	6.1 in.	LOCATION	Rear Su	uspension Low	er Arm at Axle		
BRAKE SYSTEM	Power, Single	Caliper, Antilock					
BRAKES, FRONT	ТҮРЕ	Vented Disc	SWE	PT AREA	239.8 sq.in.		
BRAKES, REAR	ТҮРЕ	Solid Disc	SWE	PT AREA	189.4 sq.in.		
FUEL CAPACITY (4 CNG Tanks)	GALLONS	10.0*	LITE	RS	37.9*		
GENERAL MEASUREMENTS	WHEELBASE	114.4 in.	LENG	GTH	212.0 in.		
	TEST WEIGH	T 4299 lbs.	HEIG	HT	56.7 in.		
HEADROOM	FRONT	38.4 in.	REAI	R	38.0 in.		
LEG ROOM	FRONT	42.5 in.	REAI	R	39.7 in.		
SHOULDER ROOM	FRONT	60.5 in.	REAI	R	60.3 in.		
HIP ROOM	FRONT	REAI	R	57.6 in.			
INTERIOR VOLUME	FRONT 58.6 cu.ft.			R	52.7 cu.ft.		
	COMBINED	111.3 cu.ft.	TRUN	NK	14.0 cu.ft.		
EPA MILEAGE EST. (MPG)	<b>CITY</b> 17*	HIGHWAY	26*	COMBINED	20*		

<sup>\*</sup>Vehicle equipped with 4 CNG tanks. Total fuel capacity and EPA mileage estimates are stated in gasoline equivalent.

MAKE Chevrolet	MODEL	Capi	rice		SALE	S CODE NO.	1BL19
ENGINE DISPLACEMENT	CUBIC INCHES 265			LITE	RS	4.3	
FUEL SYSTEM	Sequentia	al Port F	-uel Inje	ection	EXHA	UST	Single
HORSEPOWER (SAENET)	200 @ 50	00 RPN	/	'			
TORQUE	240 ft.lbs.	. @ 240	00 RPM				
COMPRESSION RATIO	9.0 : 1						
TRANSMISSION	MODEL	4L6	60-E	ТҮРЕ	4-Sp	eed Electronic	Automatic
	LOCKUP	TORQ	UE CO	NVERT	ER? Ye	es	
	OVERDR	IVE?	Yes				
AXLE RATIO	3.23 : 1						
STEERING	Integral G	ear wit	h Powe	r Piston	and Var	ne Type Pump	
TURNING CIRCLE (CURB TO CURB)	43.0 ft.						
TIRE SIZE, LOAD & SPEED RATING	P225 / 70	R15	100V				
SUSPENSION TYPE (FRONT)	Independent SLA, Coil Spring and Steel Antiroll Bar						
SUSPENSION TYPE (REAR)	Salisbury 4 Link Coil Spring and Steel Antiroll Bar						
GROUND CLEARANCE, MINIMUM	6.2 in.		LOCA	TION	Rear I	_ower Trailing	Arm Bracket
BRAKE SYSTEM	Power, Si	ingle Ca	aliper, A	ntilock			
BRAKES, FRONT	ТҮРЕ		Vented	l Disc	SWEP	T AREA	242.3 sq.in.
BRAKES, REAR	ТҮРЕ		Vented	l Disc	SWEP	T AREA	197.3 sq.in.
FUEL CAPACITY	GALLON	<b>IS</b>	23.0		LITEI	RS	87.1
GENERAL MEASUREMENTS	WHEELE	BASE	115.9 i	n.	LENG	TH	214.1 in.
	TEST WI	EIGHT	4180 lk	os.	HEIG	НТ	55.7 in.
HEADROOM	FRONT		39.2 in	-	REAR		37.9 in.
LEG ROOM	FRONT		42.2 in		REAR		39.5 in.
SHOULDER ROOM	FRONT		63.4 in		REAR		63.4 in.
HIP ROOM	FRONT		57.0 in		REAR	<u> </u>	56.9 in.
INTERIOR VOLUME	FRONT		60.2 cu	60.2 cu.ft. REAR			54.0 cu.ft.
	COMBIN	ED	114.2	cu.ft.	TRUN	K	20.4 cu.ft.
EPA MILEAGE EST. (MPG)	CITY	18	HIGH	WAY	26	COMBINED	21

MAKE Chevrolet	MODEL Lum	ina	SALE	S CODE NO.	1WL69	
ENGINE DISPLACEMENT	CUBIC INCHES	191	LITE	RS	3.1	
FUEL SYSTEM	Sequential Port	Fuel Injection	EXH	AUST	Single	
HORSEPOWER (SAE NET)	160 @ 5200 RP	M				
TORQUE	185 ft.lbs. @ 400	00 RPM				
COMPRESSION RATIO	9.5 : 1					
TRANSMISSION	MODEL 4T	60-E <b>TYPE</b>	2 4-Sp	peed Electronic	Automatic	
	LOCKUP TORQ	QUE CONVERT	TER? Y	es		
	OVERDRIVE?	Yes				
AXLE RATIO	3.33 : 1					
STEERING	Power Rack and	l Pinion				
TURNING CIRCLE (CURB TO CURB)	39.0 ft.					
TIRE SIZE, LOAD & SPEED RATING	P215 / 65R15	95H				
SUSPENSION TYPE (FRONT)	Independent McPherson Strut, Coil Springs and Stabilizer Bar					
SUSPENSION TYPE (REAR)	Independent Tri-Link Coil Spring over Strut and Stabilizer Bar					
GROUND CLEARANCE, MINIMUM	6.2 in.	LOCATION	Rear	Exhaust Pipe		
BRAKE SYSTEM	Power, Dual Hyd	draulic, Antilock				
BRAKES, FRONT	ТҮРЕ	Vented Disc	SWEI	PT AREA	169.1 sq.in.	
BRAKES, REAR	ТҮРЕ	Solid Disc	SWEI	PT AREA	161.6 sq.in.	
FUEL CAPACITY	GALLONS	16.6	LITE	RS	62.8	
GENERAL MEASUREMENTS	WHEELBASE	107.5 in.	LEN(	STH	200.9 in.	
	TEST WEIGHT	3426 lbs.	HEIG	НТ	55.2 in.	
HEADROOM	FRONT	38.4 in.	REAL	R	37.4 in.	
LEG ROOM	FRONT	42.4 in.	REAL	2	36.6 in.	
SHOULDER ROOM	FRONT	58.4 in.	REAL	2	57.4 in.	
HIP ROOM	FRONT	55.4 in.	REAL	2	55.3 in.	
INTERIOR VOLUME	FRONT	55.0 cu.ft.	REAL	2	45.5 cu.ft.	
	COMBINED	100.5 cu.ft.	TRUN	NK	15.7 cu.ft.	
EPA MILEAGE EST. (MPG)	CITY 19	HIGHWAY	29	COMBINED	22	

MAKE Chevrolet	MODEL	Camaro		SALE	CS CODE NO.	1FP87	
ENGINE DISPLACEMENT	CUBIC INCHES 350			LITE	RS	5.7	
FUEL SYSTEM	Sequential P	ort Fuel Inje	ection	EXH	AUST	Dual	
HORSEPOWER (SAENET)	285 @ 5200	RPM					
TORQUE	325 ft.lbs. @	2400 RPM					
COMPRESSION RATIO	10.4 : 1						
TRANSMISSION	MODEL	4L60-E	TYPE	2 4-Sp	peed Electronic	Automatic	
	LOCKUP TO	ORQUE CO	NVERT	TER? Y	es		
	OVERDRIV	E? Yes					
AXLE RATIO	3.23 : 1						
STEERING	Power, Rack	and Pinion	, Hydra	ulic			
TURNING CIRCLE (CURB TO CURB)	39.0 ft.						
TIRE SIZE, LOAD & SPEED RATING	P245 / 50ZR16						
SUSPENSION TYPE (FRONT)	Independent SLA type, Coil over Monotube Gas-Charged Shocks and Stabilizer Bar						
SUSPENSION TYPE (REAR)	Salisbury Axle, Torque Arm, Trailing Arm, Track Bar, Coil Springs, Monotube Gas-Charged Shocks, & Stabilizer Bar						
GROUND CLEARANCE, MINIMUM	4.4 in.	LOCA	TION	Catal	ytic Converter S	Shield	
BRAKE SYSTEM	Power, Singl	le Caliper, A	ntilock				
BRAKES, FRONT	ТҮРЕ	Vented	Disc	SWEI	PT AREA	207.0 sq.in.	
BRAKES, REAR	ТҮРЕ	Vented	d Disc	SWEI	PT AREA	175.0 sq.in.	
FUEL CAPACITY	GALLONS	15.5		LITE	RS	58.7	
GENERAL MEASUREMENTS	WHEELBAS	SE 101.1 i	n.	LENG	STH	193.2 in.	
	TEST WEIG	HT 3480 lk	os.	HEIG	HT	51.3 in.	
HEADROOM	FRONT	37.2 in		REAL	2	35.3 in.	
LEG ROOM	FRONT	43.0 in		REAL	3	26.8 in.	
SHOULDER ROOM	FRONT	57.4 in		REAL	R	55.8 in.	
HIP ROOM	FRONT	52.8 in		REAL	R	44.4 in.	
INTERIOR VOLUME	FRONT	53.1 cu	u.ft.	REAL	2	28.8 cu.ft.	
	COMBINED	81.9 cı	u.ft.	TRUN	NK	(See below)*	
EPA MILEAGE EST. (MPG)	CITY 17	HIGH	WAY	25	COMBINED	20	

<sup>\*</sup>Cargo Volume—with 2d seat up-12.9 cu. ft./with 2d seat down-32.8 cu. ft.

MAKE Chevrolet	MODEL Car	maro	SALE	S CODE NO.	1FP87		
ENGINE DISPLACEMENT	CUBIC INCHES 350			RS	5.7		
FUEL SYSTEM	Sequential Port	Fuel Injection	EXH	AUST	Dual		
HORSEPOWER (SAE NET)	285 @ 5200 RF	PM	1				
TORQUE	325 ft.lbs. @ 24	00 RPM					
COMPRESSION RATIO	10.4 : 1						
TRANSMISSION	MODEL M	M6 TYP	E 6-Sp	peed Manual			
	LOCKUP TOR	QUE CONVER	TER? N	/A			
	OVERDRIVE?	Yes					
AXLE RATIO	3.42 : 1						
STEERING	Power, Rack ar	d Pinion, Hydr	aulic				
TURNING CIRCLE (CURB TO CURB)	39.0 ft.						
TIRE SIZE, LOAD & SPEED RATING	P245 / 50ZR16						
SUSPENSION TYPE (FRONT)	Independent SLA type, Coil over Monotube Gas-Charged Shocks and Stabilizer Bar						
SUSPENSION TYPE (REAR)	Salisbury Axle, Torque Arm, Trailing Arm, Track Bar, Coil Springs, Monotube Gas-Charged Shocks, and Stabilizer Bar						
GROUND CLEARANCE, MINIMUM	4.4 in.	LOCATION	Catal	ytic Converter S	Shield		
BRAKE SYSTEM	Power, Single C	Caliper, Antilock	(				
BRAKES, FRONT	ТҮРЕ	Vented Disc	SWEI	PT AREA	207.0 sq.in.		
BRAKES, REAR	ТҮРЕ	Vented Disc	SWEI	PT AREA	175.0 sq.in.		
FUEL CAPACITY	GALLONS	15.5	LITE	RS	58.7		
GENERAL MEASUREMENTS	WHEELBASE	101.1 in.	LENG	STH	193.2 in.		
	TEST WEIGHT	3457 lbs.	HEIG	HT	51.3 in.		
HEADROOM	FRONT	37.2 in.	REAL	₹	35.3 in.		
LEG ROOM	FRONT	43.0 in.	REAL	-	26.8 in.		
SHOULDER ROOM	FRONT	57.4 in.	REAL	₹	55.8 in.		
HIP ROOM	FRONT	52.8 in.	REAL	₹	44.4 in.		
INTERIOR VOLUME	FRONT 53.1 cu.ft. REAR			2	28.8 cu.ft.		
	COMBINED	81.9 cu.ft.	TRUN	NK	(See below)*		
EPA MILEAGE EST. (MPG)	CITY 16	HIGHWAY	27	COMBINED	20		

<sup>\*</sup>Cargo Volume—with 2d seat up–12.9 cu. ft./with 2d seat down–32.8 cu. ft.

MAKE Chevrolet Geo	MODEL Tracker (2wd)		SALE	S CODE NO.	CE10305		
ENGINE DISPLACEMENT	CUBIC INCHES 97			LITE	RS	1.6	
FUEL SYSTEM	Multiport F	uel Inj	ection		EXH	AUST	Single
HORSEPOWER (SAE NET)	95 @ 5600	RPM		'			
TORQUE	98 ft.lbs. @	2 4000	RPM				
COMPRESSION RATIO	9.5 : 1						
TRANSMISSION	MODEL	N/A	4	TYPE	4-Sp	eed Electronic	Automatic
	LOCKUP	TORQ	UE CON	VERT	ER? Y	es	
	OVERDR	IVE?	Yes				
AXLE RATIO	5.125 : 1						
STEERING	Power Re	ecircula	ating Ball				
TURNING CIRCLE (CURB TO CURB)	35.4 ft.						
TIRE SIZE, LOAD & SPEED RATING	P195 / 75I	R15					
SUSPENSION TYPE (FRONT)	Independe	ent Coi	l Spring	McPhe	erson St	rut	
SUSPENSION TYPE (REAR)	Rigid Axle with Lower Trailing Arm and Upper "A" Share Arm						
GROUND CLEARANCE, MINIMUM	7.6 in.		LOCAT	ION	Rear	Differential	
BRAKE SYSTEM	Power Ass	sisted I	Hydraulic	, Antilo	ock Opti	onal	
BRAKES, FRONT	ТҮРЕ		Vented	Disc	SWEI	PT AREA	185.0 sq.in.
BRAKES, REAR	ТҮРЕ		Drum		SWEI	PT AREA	111.0 sq.in.
FUEL CAPACITY	GALLON	S	14.5		LITE	RS	54.9
GENERAL MEASUREMENTS	WHEELB	ASE	97.6 in.		LENG	STH	158.7 in.
	TEST WE	IGHT	2713 lbs	S.	HEIG	HT	65.7 in.
HEADROOM	FRONT		40.6 in.		REAL	₹	40.0 in.
LEG ROOM	FRONT		42.1 in.		REAL	₹	32.7 in.
SHOULDER ROOM	FRONT		51.6 in.		REAL	R	51.2 in.
HIP ROOM	FRONT		51.6 in.		REAL	2	44.9 in.
INTERIOR VOLUME	FRONT 51.0 cu.ft.		REAL	R	38.2 cu.ft.		
	COMBINI	E <b>D</b>	89.2 cu.	ft.	TRUN	NK	45.0 cu.ft.
EPA MILEAGE EST. (MPG)	CITY 2	22	HIGHV	VAY	26	COMBINED	24

MAKE Chrysler Jeep	MODEL Cherok	(ee (4x4)	SALE	S CODE NO.	AHB		
ENGINE DISPLACEMENT	CUBIC INCHES	LITE	RS	4.0			
FUEL SYSTEM	Multiport Fuel Inj	ection	EXHA	UST	Single		
HORSEPOWER (SAE NET)	190 @ 4750 RPI	M					
TORQUE	225 ft.lbs. @ 400	00 RPM					
COMPRESSION RATIO	9.2 : 1						
TRANSMISSION	MODEL AW30	043LE TYPE	2 4-Spee	d Electronic Automa	atic-4-Wheel Drive		
	LOCKUP TORQ	QUE CONVERT	TER? Y	es			
	OVERDRIVE?	Yes					
AXLE RATIO	3.55 : 1						
STEERING	Power Recircula	ting Ball, 14.0:	l				
TURNING CIRCLE (CURB TO CURB)	35.7 ft.						
TIRE SIZE, LOAD & SPEED RATING	P225 / 70R15	100H					
SUSPENSION TYPE (FRONT)	Link Coil Springs, Gas-Charged Shocks, Stabilizer Bar						
SUSPENSION TYPE (REAR)	Multi-Leaf Springs, Gas-Charged Shocks, Stabilizer Bar						
GROUND CLEARANCE, MINIMUM	8.5 in.	LOCATION	Front	Axle Housing			
BRAKE SYSTEM	Power, Single Ca	aliper Front, Du	io Servo	Rear, Antilock			
BRAKES, FRONT	TYPE	Vented Disc	SWEF	T AREA	192.6 sq.in.		
BRAKES, REAR	ТҮРЕ	Drum	SWEF	T AREA	110.0 sq.in.		
FUEL CAPACITY	GALLONS	20.2	LITE	RS	76.5		
GENERAL MEASUREMENTS	WHEELBASE	101.4 in.	LENG	TH	165.3 in.		
	TEST WEIGHT	3582 lbs.	HEIG	НТ	63.2 in.		
HEADROOM	FRONT	38.0 in.	REAR	R	38.0 in.		
LEG ROOM	FRONT	41.0 in.	REAR	<b>t</b>	35.3 in.		
SHOULDER ROOM	FRONT	55.3 in.	REAR	<b>t</b>	55.3 in.		
HIP ROOM	FRONT	55.3 in.	REAR	R	44.5 in.		
INTERIOR VOLUME	FRONT	REAR	R	42.8 cu.ft.			
	COMBINED	93.1 cu.ft.	TRUN	NK .	(See below)*		
EPA MILEAGE EST. (MPG)	CITY 15	HIGHWAY	20	COMBINED	17		

<sup>\*</sup>Cargo Volume—with 2d seat up-35.7 cu. ft./with 2d seat down-71.5 cu. ft.

MAKE Ford	MODEL Explorer (4x4)		SALES CODE NO.		U34		
ENGINE DISPLACEMENT	CUBIC INCHES 245				LITEI	RS	4.0
FUEL SYSTEM	Multiport Fuel Injection			EXHAUST		Single	
HORSEPOWER (SAE NET)	160 @ 4200 RPM						
TORQUE	225 ft.lbs. @ 2800 RPM						
COMPRESSION RATIO	9.0 : 1						
TRANSMISSION	MODEL E4LD-E TYPE 4-Speed Electronic Automatic-4-Wheel Drive						atic-4-Wheel Drive
	LOCKUP	TORQ	UE CO	VERT	ER? Ye	es	
	OVERDRIVE? Yes						
AXLE RATIO	3.55 : 1						
STEERING	Power Integral Rack and Pinion (17:1 Ratio)						
TURNING CIRCLE (CURB TO CURB)	37.3 ft.						
TIRE SIZE, LOAD & SPEED RATING	P225 / 70R15 100S						
SUSPENSION TYPE (FRONT)	SLA type (Independent), Torsion Bar						
SUSPENSION TYPE (REAR)	Multi-Leaf Spring, Semi-Floating Axle						
GROUND CLEARANCE, MINIMUM	7.4 in. LOCATION Rear Axle						
BRAKE SYSTEM	Power, Single Caliper, Antilock						
BRAKES, FRONT	TYPE Vented Disc		SWEP	T AREA	203.6 sq.in.		
BRAKES, REAR	ТҮРЕ		Solid Disc		SWEPT AREA		193.2 sq.in.
FUEL CAPACITY	GALLONS 2		21.0		LITERS		80.0
GENERAL MEASUREMENTS	WHEELBASE 111.5 in.			n.	LENGTH		188.5 in.
	TEST WE	IGHT	4249 lb	s.	HEIG	НТ	67.5 in.
HEADROOM	FRONT		39.8 in		REAR		39.3 in.
LEG ROOM	FRONT		42.4 in		REAR	<u> </u>	37.7 in.
SHOULDER ROOM	FRONT		57.1 in		REAR		56.0 in.
HIP ROOM	FRONT		51.9 in	n. REAR			51.7 in.
INTERIOR VOLUME	FRONT		55.9 cu	.9 cu.ft. REAI		<u> </u>	48.0 cu.ft.
	COMBIN	ED	103.9 c	u.ft.	TRUN	K	(See below)*
EPA MILEAGE EST. (MPG)	CITY	15	HIGH	WAY	20	COMBINED	17

<sup>\*</sup>Cargo Volume—with 2d seat up-42.6 cu. ft./with 2d seat down-81.6 cu. ft.

### **TEST VEHICLE DESCRIPTIONS SUMMARY**

	Chevrolet	Chevrolet Ford Ford		Chevrolet
	Caprice			Caprice
ENGINE DISPLACEMENT—CU. IN.	350	281	281	265
ENGINE DISPLACEMENT—LITERS	5.7	4.6	4.6	4.3
ENGINE FUEL SYSTEM	SPFI	MPFI	MPFI (CNG)	SPFI
HORSEPOWER (SAE NET)	260	210	178	200
TORQUE (FT. LBS.)	330	270	237	240
COMPRESSION RATIO	10.5:1	9.0:1	10.0:1	9.0:1
AXLE RATIO	3.08:1	3.27:1	2.73:1	2.23:1
TURNING CIRCLE—FT. CURB to CURB	43.0	39.1	39.1	43.0
TRANSMISSION	Elec. Automatic	Elec. Automatic	Elec. Automatic	Elec. Automatic
TRANSMISSION MODEL NUMBER	4L60E	4R70W	4R70W	4L60E
LOCKUP TORQUE CONVERTER	Yes	Yes	Yes	Yes
TRANSMISSION OVERDRIVE	Yes	Yes	Yes	Yes
TIRE SIZE	P225/70R	P225/70R	P225/70R	P225/70R
WHEEL RIM SIZE—INCHES	15	15	15	15
GROUND CLEARANCE—INCHES	6.2	6.1	6.1	6.2
BRAKE SYSTEM	Power - ABS	Power - ABS	Power - ABS	Power - ABS
BRAKES—FRONT TYPE	Vented Disc	Vented Disc	Vented Disc	Vented Disc
BRAKES—REAR TYPE	Vented Disc	Solid Disc	Solid Disc	Vented Disc
FUEL CAPACITY—GALLONS	23.0	20.0	10.0*	23.0
FUEL CAPACITY—LITERS	87.1	75.7	37.9*	87.1
OVERALL LENGTH—INCHES	214.1	212.0	212.0	214.1
OVERALL HEIGHT—INCHES	55.7	56.7	56.7	55.7
TEST WEIGHT—LBS.	4249	3974	4299	4180
WHEELBASE—INCHES	115.9	114.4	114.4	115.9
HEADROOM FRONT—INCHES	39.2	38.4	38.4	39.2
HEADROOM REAR—INCHES	37.9	38.0	38.0	37.9
LEG ROOM FRONT—INCHES MAX.	42.2	42.5	42.5	42.2
LEG ROOM REAR—INCHES MIN.	39.5	39.7	39.7	39.5
SHOULDER ROOM FRONT—INCHES	63.4	60.5	60.5	63.4
SHOULDER ROOM REAR—INCHES	63.4	60.3	60.3	63.4
HIP ROOM FRONT—INCHES	57.0	59.1	59.1	57.0
HIP ROOM REAR—INCHES	56.9	57.6	57.6	56.9
INTERIOR VOLUME FRONT—CU. FT.	60.2	58.6	58.6	60.2
INTERIOR VOLUME REAR—CU. FT.	54.0	52.7	52.7	54.0
INTERIOR VOLUME COMB.—CU. FT.	114.2	111.3	111.3	114.2
TRUNK VOLUME—CU. FT.	20.4	20.6	14.0	20.4
EPA MILEAGE—CITY—MPG	17	17	17**	18
EPA MILEAGE—HIGHWAY—MPG	26	23	26**	26
EPA MILEAGE—COMBINED—MPG	20	19	20**	21

 $<sup>*</sup> Fuel \ Capacity: Total \ for \ four \ (4) \ Compressed \ Natural \ Gas \ (CNG) \ tanks \ is \ equivalent \ to \ 10 \ gal./37.9 \ liters \ of \ gasoline.$ 

<sup>\*\*</sup> EPA Mileage Estimates are in gasoline equivalent.

# **TEST VEHICLE DESCRIPTIONS SUMMARY**

	Chevrolet	Chevrolet	Chevrolet
	Lumina	Camaro	Camaro
ENGINE DISPLACEMENT—CU. IN.	191	350	350
ENGINE DISPLACEMENT—LITERS	3.1	5.7	5.7
ENGINE FUEL SYSTEM	SPFI	SPFI	SPFI
HORSEPOWER (SAE NET)	160	285	285
TORQUE (FT. LBS.)	185	325	325
COMPRESSION RATIO	9.5:1	10.4:1	10.4:1
AXLE RATIO	3.33:1	3.23:1	3.42:1
TURNING CIRCLE—FT. CURB to CURB	39.0	39.0	39.0
TRANSMISSION	Elec. Automatic	Elec. Automatic	6 Spd. Manual
TRANSMISSION MODEL NUMBER	4T60E	4L60-E	MM6
LOCKUP TORQUE CONVERTER	Yes	Yes	N/A
TRANSMISSION OVERDRIVE	Yes	Yes	Yes
TIRE SIZE	P215/65R	P245/50R	P245/50R
WHEEL RIM SIZE—INCHES	15	16	16
GROUND CLEARANCE—INCHES	6.2	4.4	4.4
BRAKE SYSTEM	Power - ABS	Power - ABS	Power - ABS
BRAKES—FRONT TYPE	Vented Disc	Vented Disc	Vented Disc
BRAKES—REAR TYPE	Solid Disc	Vented Disc	Vented Disc
FUEL CAPACITY—GALLONS	16.6	15.5	15.5
FUEL CAPACITY—LITERS	62.8	58.7	58.7
OVERALL LENGTH—INCHES	200.9	193.2	193.2
OVERALL HEIGHT—INCHES	55.2	51.3	51.3
TEST WEIGHT—LBS.	3426	3480	3457
WHEELBASE—INCHES	107.5	101.1	101.1
HEADROOM FRONT—INCHES	38.4	37.2	37.2
HEADROOM REAR—INCHES	37.4	35.3	35.3
LEG ROOM FRONT—INCHES MAX.	42.4	43.0	43.0
LEG ROOM REAR—INCHES MIN.	36.6	26.8	26.8
SHOULDER ROOM FRONT—INCHES	58.4	57.4	57.4
SHOULDER ROOM REAR—INCHES	57.4	55.8	55.8
HIP ROOM FRONT—INCHES	55.4	52.8	52.8
HIP ROOM REAR—INCHES	55.3	44.4	44.4
INTERIOR VOLUME FRONT—CU. FT.	55.0	53.1	53.1
INTERIOR VOLUME REAR—CU. FT.	45.5	28.8	28.8
INTERIOR VOLUME COMB.—CU. FT.	100.5	81.9	81.9
TRUNK VOLUME—CU. FT.	15.7	12.9*	12.9*
EPA MILEAGE—CITY—MPG	19	17	16
EPA MILEAGE—HIGHWAY—MPG	29	25	27
	-	_	<u> </u>

<sup>\*</sup>Cargo Volume—with 2d seat down-32.8 cu. ft.

# **TEST VEHICLE DESCRIPTIONS SUMMARY**

	Chevrolet Geo Tracker (2wd)	Chrysler Jeep Cherokee (4x4)	Ford Explorer (4x4)
ENGINE DISPLACEMENT—CU. IN.	97	242	245
ENGINE DISPLACEMENT—LITERS	1.6	4.0	4.0
ENGINE FUEL SYSTEM	MPFI	MPFI	MPFI
HORSEPOWER (SAE NET)	95	190	160
TORQUE (FT. LBS.)	98	225	225
COMPRESSION RATIO	9.5:1	9.2:1	9.0:1
AXLE RATIO	5.125:1	3.55:1	3.55:1
TURNING CIRCLE—FT. CURB to CURB	35.4	35.7	37.3
TRANSMISSION	Elec. Automatic	Elec. Automatic	Elec. Automatic
TRANSMISSION MODEL NUMBER	N/A	AW3043LE	E4LD-E
LOCKUP TORQUE CONVERTER	Yes	Yes	Yes
TRANSMISSION OVERDRIVE	Yes	Yes	Yes
TIRE SIZE	P195/75R	P225/70R	P225/70R
WHEEL RIM SIZE—INCHES	15	15	15
GROUND CLEARANCE—INCHES	7.6	8.5	7.4
BRAKE SYSTEM	Power - ABS	Power - ABS	Power - ABS
BRAKES—FRONT TYPE	Vented Disc	Vented Disc	Vented Disc
BRAKES—REAR TYPE	Drum	Drum	Solid Disc
FUEL CAPACITY—GALLONS	14.5	20.2	21.0
FUEL CAPACITY—LITERS	54.9	76.5	80.0
OVERALL LENGTH—INCHES	158.7	165.3	188.5
OVERALL HEIGHT—INCHES	65.7	63.2	67.5
TEST WEIGHT—LBS.	2713	3582	4249
WHEELBASE—INCHES	97.6	101.4	111.5
HEADROOM FRONT—INCHES	40.6	38.0	39.8
HEADROOM REAR—INCHES	40.0	38.0	39.3
LEG ROOM FRONT—INCHES MAX.	42.1	41.0	42.4
LEG ROOM REAR—INCHES MIN.	32.7	35.3	37.7
SHOULDER ROOM FRONT—INCHES	51.6	55.3	57.1
SHOULDER ROOM REAR—INCHES	51.2	55.3	56.0
HIP ROOM FRONT—INCHES	51.6	55.3	51.9
HIP ROOM REAR—INCHES	44.9	44.5	51.7
INTERIOR VOLUME FRONT—CU. FT.	51.0	50.3	55.9
INTERIOR VOLUME REAR—CU. FT.	38.2	42.8	48.0
INTERIOR VOLUME COMB.—CU. FT.	89.2	93.1	103.9
TRUNK VOLUME—CU. FT.	45.0	35.7*	42.6**
EPA MILEAGE—CITY—MPG	22	15	15
EPA MILEAGE—HIGHWAY—MPG	26	20	20
EPA MILEAGE—COMBINED—MPG	24	17	17

Cargo Volume—\*2d seat down-71.5 cu. ft./with \*\*2d seat down-81.6 cu. ft.

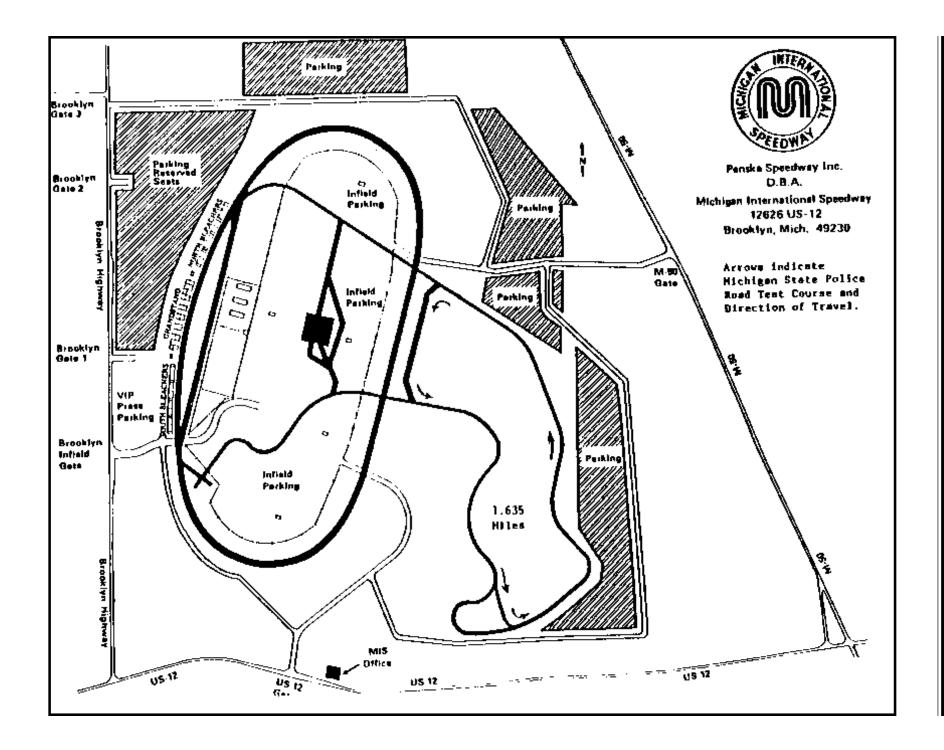
### **VEHICLE DYNAMICS TESTING**

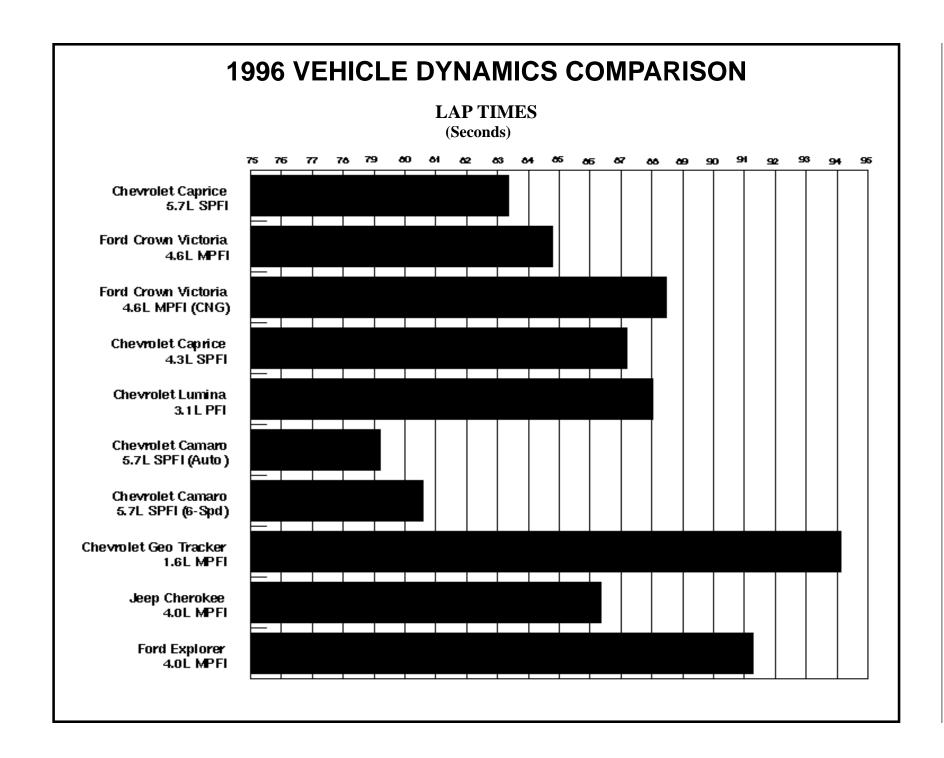
#### **TEST OBJECTIVE**

Determine each vehicle's high speed pursuit or emergency handling characteristics and performance in comparison to the other vehicles in the test group. The course used is a 1.635 mile road-racing type course, containing hills, curves, and corners. The course simulates actual conditions encountered in pursuit or emergency driving situations in the field, with the exception of other traffic. The evaluation will be a true test of the success or failure of the vehicle manufacturers to offer vehicles that provide the optimum balance between handling (suspension components), acceleration (usable horsepower), and braking characteristics.

#### **TEST METHODOLOGY**

Each vehicle will be driven over the course for at least 12 timed laps, using a minimum of 3 separate drivers. The final score for each vehicle will be the average of the fastest of at least 9 timed laps.





# **VEHICLE DYNAMICS TESTING**

VEHICLES	DRIVERS	LAP 1	LAP 2	LAP 3	LAP 4	AVERAGE
Chevrolet	Ring	1:23.67	1:23.73	1:23.63	1:23.21	
Caprice	Steendam	1:23.55	1:23.88	1:22.80	1:23.46	
5.7L - SPFI	Lubahn	1:24.14	1:24.05	1:23.96	1:23.93	
ABS Brakes	Reaves	1:22.97	1:23.04	1:22.92	1:23.30	
OVERALL AVERAGE						1:23.35
Ford	Ring	1:24.52	1:24.76	1:25.15	1:24.73	
Crown Victoria	Steendam	1:25.84	1:24.91	1:25.91	1:24.98	
4.6L - MPFI	Lubahn	1:24.59	1:25.29	1:24.52	1:23.97	
ABS Brakes	Reaves	1:24.98	1:25.40	1:25.19	1:25.14	
OVERALL AVERAGE						1:24.79
Ford	Ring	1:27.77	1:27.44	1:27.89	1:27.54	
Crown Victoria	Steendam	1:29.25	1:28.75	1:30.13	1:29.15	
4.6L - MPFI (CNG)	Lubahn	1:28.93	1:28.35	1:28.56	1:28.29	
ABS Brakes	Reaves	1:29.89	1:29.81	1:29.93	1:29.65	
OVERALL AVERAGE						1:28.46
Chevrolet	Steendam	1:27.15	1:27.10	1:27.43	1:28.05	
Caprice	Lubahn	1:27.43	1:26.64	1:26.69	1:26.71	
4.3L - SPFI	Reaves	1:28.30	1:28.41	1:27.95	1:27.72	
ABS Brakes						
OVERALL AVERAGE						1:27.20

# **VEHICLE DYNAMICS TESTING**

VEHICLES	DRIVERS	LAP 1	LAP 2	LAP 3	LAP 4	AVERAGE
Chevrolet	Steendam	1:28.72	1:28.14	1:27.53	1:28.65	
Lumina	Lubahn	1:27.96	1:27.95	1:27.12	1:27.48	
3.1L - SPFI	Reaves	1:29.85	1:28.97	1:28.70	1:29.01	
ABS Brakes						
OVERALL AVERAGE						1:28.03
Chevrolet	Ring	1:18.96	1:19.47	1:20.34	1:19.67	
Camaro (Automatic)	Steendam	1:20.06	1:19.81	1:20.15	1:19.77	
5.7L - SPFI	Lubahn	1:18.74	1:18.24	1:19.02	1:19.08	
ABS Brakes	Reaves	1:18.90	1:19.38	1:20.17	1:19.45	
OVERALL AVERAGE						1:19.21
Chevrolet	Steendam	1:21.17	1:21.22	1:23.18	1:20.59	
Camaro (6-Spd. Manual)	Lubahn	1:20.66	1:20.69	1:19.83	1:20.30	
5.7L - SPFI	Reaves	1:20.48	1:21.50	1:22.35	1:20.19	
ABS Brakes						
OVERALL AVERAGE						1:20.57
Chevrolet Geo	Steendam	1:33.49	1:33.47	1:33.97	1:33.86	
Tracker (2wd)	Lubahn	1:34.41	1:34.20	1:34.12	1:33.87	
1.6L - MPFI	Reaves	1:35.65	1:36.80	1:36.32	1:36.47	
ABS Brakes						
OVERALL AVERAGE						1:34.12
Chrysler Jeep	Steendam	1:26.39	1:26.55	1:26.45	1:26.59	
Cherokee (4x4)	Lubahn	1:26.48	1:26.04	1:26.34	1:25.91	
4.0L - MPFI	Reaves	1:26.42	1:27.29	1:26.95	1:26.58	
ABS Brakes						
OVERALL AVERAGE						1:26.35
Ford	Steendam	1:31.79	1:30.91	1:31.38	1:31.20	
Explorer (4x4)	Lubahn	1:31.34	1:30.94	1:31.24	1:31.41	
4.0L - MPFI	Reaves	1:31.48	1:32.17	1:31.64	1:31.74	
ABS Brakes						
OVERALL AVERAGE						1:31.28

### **ACCELERATION TEST OBJECTIVE**

**Qualification Test:** Determine the ability of each test vehicle to accelerate from a standing start to

60 mph, 80 mph, and 100 mph, within the time allowances contained in the patrol

vehicle specifications.

**Competitive Test:** Determine each test vehicle's acceleration time to 100 mph.

### **ACCELERATION TEST METHODOLOGY**

Using a DLS Smart Sensor - Optical non-contact Speed and Distance Sensor in conjunction with a lap top computer, each vehicle is driven through four (4) acceleration sequences, two (2) northbound and two (2) southbound, to allow for wind direction. The four (4) resulting times for each target speed are averaged and the average times used to derive scores on the competitive test for acceleration.

#### TOP SPEED TEST OBJECTIVE

**Qualification Test:** Determine each vehicle's ability to attain a speed of 110 mph within a distance of

one (1) mile, and 120 mph within a distance of two (2) miles.

**Competitive Test:** Determine the actual top speed attainable by each test vehicle within a distance of

14 miles from a standing start.

#### TOP SPEED TEST METHODOLOGY

Following the fourth acceleration run, each test vehicle will continue to accelerate to the top speed attainable within 14 miles from the start of the run. The highest speed attained within the 14-mile distance will be the vehicle's score on the competitive test for top speed.

### **BRAKE TEST OBJECTIVE**

**Qualification Test:** Determine the acceptability of each vehicle's braking performance for pursuit or

emergency service. The ability of a vehicle to make impending skid (threshold) stops at no less than 25.0 ft./sec.<sup>2</sup> average will be evaluated, as well as its ability to make a panic stop within its own lane without evidence of severe brake fade.

**Competitive Test:** Determine the deceleration rate attained by each test vehicle on two (2)

60–0 mph impending skid (threshold) stops. Each vehicle will be scored on the average deceleration rate it attains in comparison with the other vehicles in the

test group.

#### **BRAKE TEST METHODOLOGY**

Each vehicle will first be required to make four (4) decelerations from 90–0 mph at 22 ft./sec.², with the driver using a decelerometer to maintain the deceleration rate. The vehicle will then make one (1) measured 60–0 mph impending skid (threshold) stop. The exact initial velocity at the beginning of the deceleration, and the exact distance required to make the stop will be recorded by means of a fifth wheel in conjunction with electronic digital speed and distance meters. From the resulting figures, the average deceleration rate for the stop can be calculated. Following a four (4) minute cooling period, this sequence will be repeated. The second sequence will be followed immediately by a 60–0 mph "panic" stop to determine the ability of the vehicle to stop in a straight line within its own lane, and to detect evidence of brake fade.

### **DECELERATION RATE FORMULA**

Deceleration Rate (DR) = 
$$\frac{\text{Initial Velocity}^*(IV) \text{ squared}}{2 \text{ times Stopping Distance (SD)}} = \frac{(IV)^2}{2 \text{ (SD)}}$$

#### **EXAMPLE:**

Initial Velocity = 
$$89.175 \text{ ft./sec.}$$
 (60.8 mph x 1.4667\*)  
Stopping Distance =  $171.4 \text{ ft.}$ 

DR = 
$$\frac{(IV)^2}{2(SD)}$$
 =  $\frac{(89.175)^2}{2(171.4)}$  =  $\frac{7952.24}{342.8}$  = 23.198 ft./sec.<sup>2</sup>

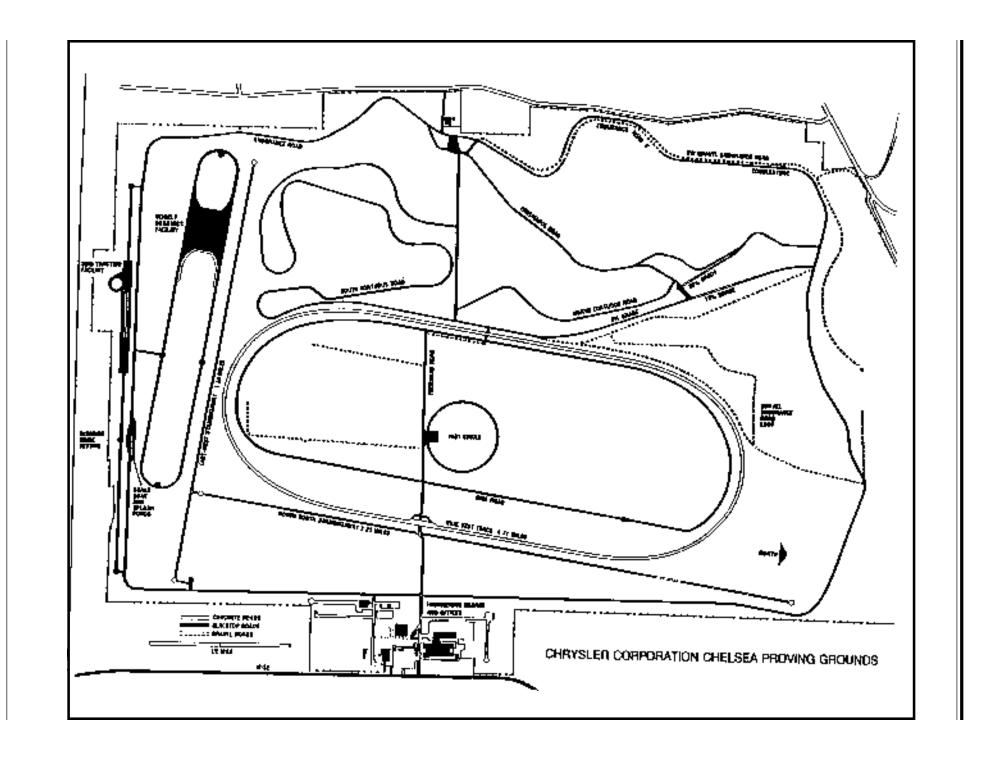
Once a vehicle's average deceleration rate has been determined, it is possible to calculate the stopping distance from any given speed by utilizing the following formula:

Select a speed; translate that speed into feet per second; square the feet per second figure by multiplying it by itself; divide the resultant figure by 2; divide the remaining figure by the average deceleration rate of the vehicle in question.

#### **EXAMPLE:**

 $60 \text{ mph} = 88.002 \text{ ft./sec.} \times 88.002 = 7744.352 / 2 = 3872.176 / 23.198 \text{ ft./sec.}^2 = 166.9 \text{ ft.}$ 

<sup>\*</sup>Initial velocity must be expressed in terms of feet per second, with 1 mile per hour being equal to 1.4667 feet per second.



# SUMMARY OF ACCELERATION, TOP SPEED, AND BRAKE TESTING

ACCELERATION*		Chevrolet Caprice 5.7L-SPFI	Ford Crown Vic. 4.6L- MPFI	Ford Crown Vic. 4.6L- MPFI	Ford Crown Vic. 4.6L- MPFI (CNG)
0–20 mph	(sec.)	1.80	1.88		2.67
0–30 mph	(sec.)	2.97	3.18		4.61
0–40 mph	(sec.)	4.27	4.72		6.54
0–50 mph	(sec.)	5.90	6.78		8.95
0–60 mph	(sec.)	8.02	9.10		12.07
0–70 mph	(sec.)	10.32	11.70		15.89
0-80 mph	(sec.)	13.10	15.19		20.34
0–90 mph	(sec.)	16.91	19.77		26.81
0–100 mph	(sec.)	21.47	25.18		37.59
TOP SPEED	(mph)	139	135**		107**
DISTANCE TO REACH					
110 mph	(miles)	.52	.62		_
120 mph	(miles)	.80	1.02		_
QUARTER MILE					
Time	(sec.)	16.14	16.89		18.93
Speed	(mph)	88.00	83.83		77.08
		ABS	ABS	NON-ABS	ABS
BRAKING-PHASE I					
Initial Speed	(mph)	60.50	60.80	60.70	60.70
Stopping Distance	(ft.)	134.50	135.10	154.00	145.90
Deceleration Rate	(ft./sec. <sup>2</sup> )	29.27	29.43	25.73	27.16
BRAKING-PHASE II					
Initial Speed	(mph)	60.20	60.00	60.00	60.10
Stopping Distance	(ft.)	134.80	135.40	148.50	146.50
Deceleration Rate	(ft./sec. <sup>2</sup> )	28.92	28.60	26.07	26.52
BRAKING- FINAL SCORE					
Deceleration Rate	(ft./sec. <sup>2</sup> )	29.10	29.02	25.90	26.84
Projected Stopping Distance from 60 mph	(ft.)	133.1	133.4	149.5	144.3

<sup>\*4</sup> Run Average.

<sup>\*\*</sup> Vehicle equipped with an electronic speed limiter.

# SUMMARY OF ACCELERATION, TOP SPEED, AND BRAKE TESTING

ACCELERATION*		Chevrolet Caprice 4.3L-SPFI	Chevrolet Lumina 3.1L-SPFI	Chevrolet Camaro(Auto) 5.7L-SPFI	Chevrolet Camaro(6-Spd) 5.7L-SPFI
0–20 mph	(sec.)	2.44	2.21	1.55	1.71
0–30 mph	(sec.)	4.00	3.64	2.52	2.66
0–40 mph	(sec.)	5.65	5.28	3.63	3.71
0–50 mph	(sec.)	7.90	7.77	4.88	5.07
0–60 mph	(sec.)	10.79	10.67	6.51	6.59
0–70 mph	(sec.)	14.00	13.91	8.33	8.28
0–80 mph	(sec.)	18.00	18.37	10.56	10.37
0–90 mph	(sec.)	24.43	24.62	13.46	13.09
0–100 mph	(sec.)	32.00	32.19	16.65	15.99
TOP SPEED	(mph)	120**	122	159	157
DISTANCE TO REACH					
110 mph	(miles)	.83	1.17	.40	.37
120 mph	(miles)	1.29	5.38	.54	.53
QUARTER MILE					
Time	(sec.)	18.05	17.90	14.98	14.99
Speed	(mph)	80.18	79.25	94.90	96.68
		ABS	ABS	ABS	
BRAKING-PHASE I					
Initial Speed	(mph)	60.50	60.40	60.30	
Stopping Distance	(ft.)	135.60	157.90	138.90	
Deceleration Rate	(ft./sec. <sup>2</sup> )	29.04	24.85	28.16	
BRAKING-PHASE II					
Initial Speed	(mph)	60.00	60.20	60.70	
Stopping Distance	(ft.)	139.40	154.70	141.40	
Deceleration Rate	(ft./sec. <sup>2</sup> )	27.78	25.20	28.03	
BRAKING-FINAL SCORE					
Deceleration Rate	(ft./sec. <sup>2</sup> )	28.41	25.03	28.10	
Projected Stopping Distance from 60 mph	(ft.)	136.3	154.7	137.8	

<sup>\*4</sup> Run Average.

<sup>\*\*</sup> Vehicle equipped with an electronic speed limiter.

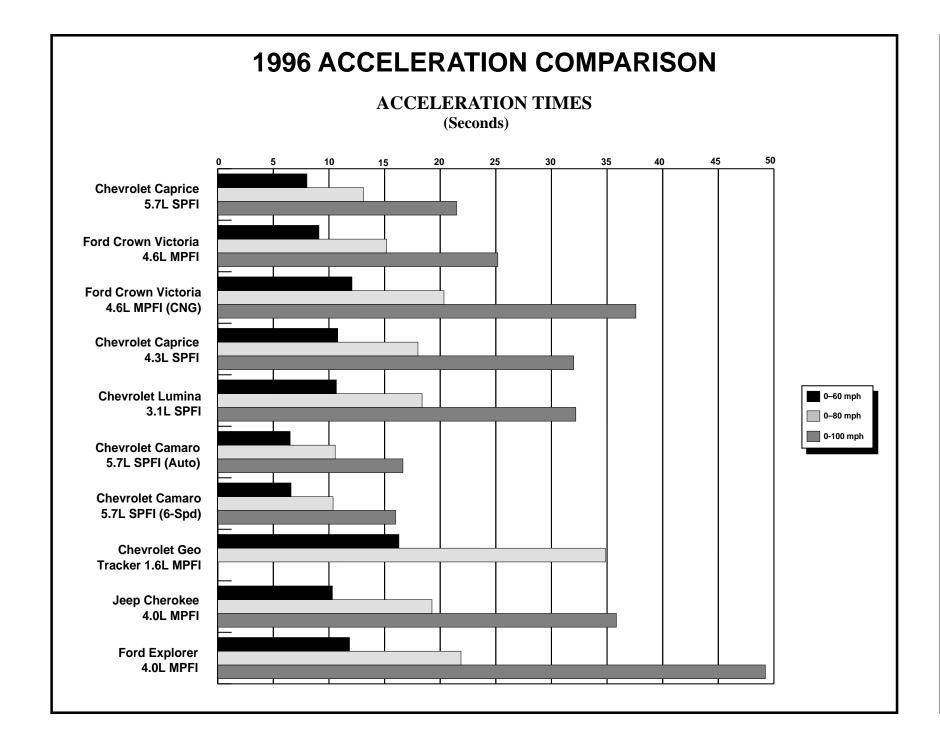
# SUMMARY OF ACCELERATION, TOP SPEED, AND BRAKE TESTING

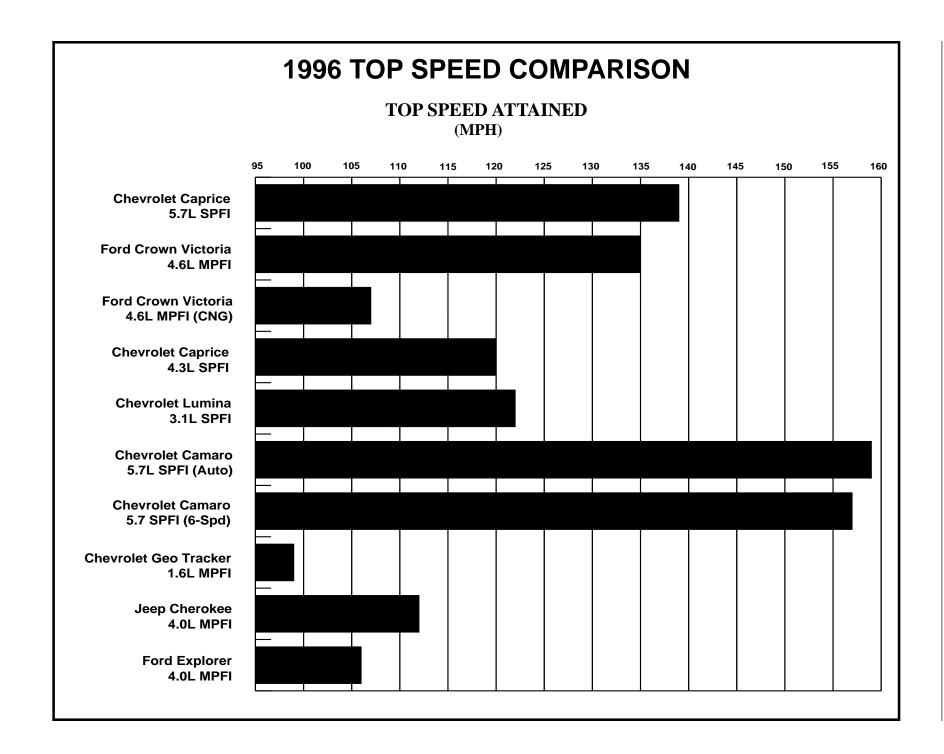
ACCELERATION*		Chevrolet Geo Tracker - (2wd) 1.6L-MPFI	Chrysler Jeep Cherokee - (4x4) 4.0L-MPFI	Ford Explorer - (4x4) 4.0L-MPFI
0–20 mph	(sec.)	3.55	2.10	2.18
0–30 mph	(sec.)	5.63	3.54	3.82
0–40 mph	(sec.)	8.53	5.13	5.91
0–50 mph	(sec.)	12.02	7.61	8.61
0–60 mph	(sec.)	16.29	10.31	11.85
0–70 mph	(sec.)	24.12	13.56	16.15
0–80 mph	(sec.)	34.85	19.26	21.87
0–90 mph	(sec.)	78.44***	26.24	29.56
0–100 mph	(sec.)		35.84	49.23
TOP SPEED	(mph)	99	112**	106**
DISTANCE TO REACH				
110 mph	(miles)	_	.99	_
120 mph	(miles)			
QUARTER MILE				
Time	(sec.)	21.21	17.78	18.64
Speed	(mph)	66.70	77.53	74.30
		ABS	ABS	ABS
BRAKING-PHASE I				
Initial Speed	(mph)	60.00	59.90	60.60
Stopping Distance	(ft.)	145.90	149.40	158.50
Deceleration Rate	(ft./sec. <sup>2</sup> )	26.54	25.83	24.92
BRAKING-PHASE II				
Initial Speed	(mph)	59.90	60.30	60.40
Stopping Distance	(ft.)	145.50	149.80	154.40
Deceleration Rate	(ft./sec. <sup>2</sup> )	26.52	26.11	25.42
BRAKING- FINAL SCORE				
Deceleration Rate	(ft./sec. <sup>2</sup> )	26.53	25.97	25.17
Projected Stopping Distance from 60 mph	(ft.)	146.0	149.1	153.8

<sup>\* 4</sup> Run Average.

<sup>\*\*</sup> Vehicle equipped with an electronic speed limiter.

<sup>\*\*\*</sup> Average of the two (2) runs on which the vehicle reached 90 mph.





**TEST LOCATION:** Chrysler Proving Grounds **DATE:** September 16, 1995

MAKE & MODEL: Chevrolet Caprice 5.7L-SPFI BEGINNING TIME: 10:15 AM

WIND VELOCITY: 4.7 mph WIND DIRECTION: 173° TEMPERATURE: 62.7°

### **ACCELERATION**

SPEEDS	TIME REQUIREMENTS*	RUN#1	RUN#2	RUN#3	RUN#4	AVERAGE
0–60	10.0 sec.	8.03	7.89	7.99	8.18	8.02
0-80	17.2 sec.	13.11	12.93	13.16	13.18	13.10
0–100	28.2 sec.	21.80	20.95	21.79	21.35	21.47

**DISTANCE TO REACH:** 110 MPH .52 mile 120 MPH .80 mile

TOP SPEED ATTAINED: 139 mph

MAKE & MODEL: Ford Crown Victoria 4.6L-MPFI BEGINNING TIME: 10:51 AM

WIND VELOCITY: 9.4 mph WIND DIRECTION: 152° TEMPERATURE: 67.6°

### **ACCELERATION**

SPEEDS	TIME REQUIREMENTS*	RUN#1	RUN#2	RUN#3	RUN#4	AVERAGE
0–60	10.0 sec.	9.26	8.96	9.21	8.95	9.10
0-80	17.2 sec.	15.61	14.91	15.35	14.89	15.19
0–100	28.2 sec.	26.46	24.33	25.75	24.18	25.18

DISTANCE TO REACH: 110 MPH .62 mile 120 MPH 1.02 mile

TOP SPEED ATTAINED: 135 mph

<sup>\*</sup>Michigan State Police minimum requirement.

TEST LOCATION: Chrysler Proving Grounds DATE: September 16, 1995

MAKE & MODEL: Ford Crown Vic. 4.6L-MPFI (CNG) BEGINNING TIME: 11:22 AM

WIND VELOCITY: 7.6 mph WIND DIRECTION: 162° TEMPERATURE: 71.0°

### **ACCELERATION**

SPEEDS	TIME REQUIREMENTS	RUN#1	RUN#2	RUN#3	RUN#4	AVERAGE
0–60	NA	12.18	11.96	12.13	11.99	12.07
0-80	NA	20.77	19.87	20.73	20.00	20.34
0–100	NA	39.63	35.47	39.76	35.48	37.59

DISTANCE TO REACH: 110 MPH -- 120 MPH --

TOP SPEED ATTAINED: 107 mph

MAKE & MODEL: Chevrolet Caprice 4.3L-SPFI BEGINNING TIME: 11:40 AM

WIND VELOCITY: 9.8 mph WIND DIRECTION: 201° TEMPERATURE: 73.6°

### **ACCELERATION**

SPEEDS	TIME REQUIREMENTS	RUN#1	RUN#2	RUN#3	RUN#4	AVERAGE
0-60	NA	10.95	10.66	10.80	10.73	10.79
0-80	NA	18.52	17.70	18.09	17.67	18.00
0–100	NA	33.97	30.73	32.74	30.55	32.00

**DISTANCE TO REACH:** 110 MPH .83 mile 120 MPH 1.29 mile

TOP SPEED ATTAINED: 120 mph

**TEST LOCATION:** Chrysler Proving Grounds **DATE:** September 16, 1995

MAKE & MODEL: Chevrolet Lumina 3.1L-SPFI BEGINNING TIME: 11:59 AM

WIND VELOCITY: 5.8 mph WIND DIRECTION: 157° TEMPERATURE: 75.7°

### **ACCELERATION**

SPEEDS	TIME REQUIREMENTS	RUN#1	RUN#2	RUN#3	RUN#4	AVERAGE
0–60	NA	10.72	10.52	10.82	10.61	10.67
0-80	NA	18.79	17.94	18.77	17.96	18.37
0–100	NA	33.86	30.70	33.62	30.59	32.19

**DISTANCE TO REACH:** 110 MPH 1.17 mile 120 MPH 5.38 mile

TOP SPEED ATTAINED: 122 mph

MAKE & MODEL: Chev. Camaro 5.7L-SPFI (Automatic) BEGINNING TIME: 12:51 PM

WIND VELOCITY: 5.3 mph WIND DIRECTION: 155° TEMPERATURE: 79.6°

### **ACCELERATION**

SPEEDS	TIME REQUIREMENTS*	RUN#1	RUN#2	RUN#3	RUN#4	AVERAGE
0–60	7.8 sec.	6.80	6.36	6.40	6.49	6.51
0-80	12.8 sec.	10.90	10.33	10.50	10.52	10.56
0–100	21.0 sec.	17.17	16.22	16.77	16.44	16.65

DISTANCE TO REACH: 110 MPH .40 mile 120 MPH .54 mile

**TOP SPEED ATTAINED:** 159 mph

<sup>\*</sup> Michigan State Police minimum requirement.

TEST LOCATION: Chrysler Proving Grounds DATE: September 16, 1995

MAKE & MODEL: Chev. Camaro 5.7L-SPFI (6-Speed) BEGINNING TIME: 3:27 PM

WIND VELOCITY: 7.3 mph WIND DIRECTION: 173° TEMPERATURE: 83.3°

### **ACCELERATION**

SPEEDS	TIME REQUIREMENTS	RUN#1	RUN#2	RUN#3	RUN#4	AVERAGE
0–60	NA	6.73	6.65	6.56	6.42	6.59
0-80	NA	11.05	9.33	10.68	10.41	10.37
0–100	NA	17.05	14.77	16.44	15.71	15.99

**DISTANCE TO REACH:** 110 MPH .37 mile 120 MPH .53 mile

TOP SPEED ATTAINED: 157 mph

MAKE & MODEL: Chev. Geo Tracker 1.6L-MPFI (2wd) BEGINNING TIME: 1:33 PM

WIND VELOCITY: 6.9 mph WIND DIRECTION: 175° TEMPERATURE: 82.7°

### **ACCELERATION**

SPEEDS	TIME REQUIREMENTS	RUN#1	RUN#2	RUN#3	RUN#4	AVERAGE
0-60	NA	16.94	16.08	16.46	15.66	16.29
0-80	NA	38.25	33.11	36.64	31.41	34.85
0–100	NA					

DISTANCE TO REACH: 110 MPH \_\_\_\_ 120 MPH \_\_\_

TOP SPEED ATTAINED: 99 mph

**TEST LOCATION:** Chrysler Proving Grounds **DATE:** September 16, 1995

MAKE & MODEL: Jeep Cherokee 4.0L-MPFI (4x4) BEGINNING TIME: 2:23 PM

WIND VELOCITY: 7.8 mph WIND DIRECTION: 211° TEMPERATURE: 83.0°

### **ACCELERATION**

SPEEDS	TIME REQUIREMENTS*	RUN#1	RUN#2	RUN#3	RUN#4	AVERAGE
0–60	12.3 sec.	10.60	10.15	10.39	10.09	10.31
0-80	23.1 sec.	20.53	18.38	19.78	18.35	19.26
0–100	44.0 sec.	41.16	32.50	37.73	31.95	35.84

DISTANCE TO REACH: 110 MPH .99 mile 120 MPH --

TOP SPEED ATTAINED: 112 mph

MAKE & MODEL: Ford Explorer 4.0L-MPFI (4x4) BEGINNING TIME: 2:49 PM

WIND VELOCITY: 5.0 mph WIND DIRECTION: 190° TEMPERATURE: 82.8°

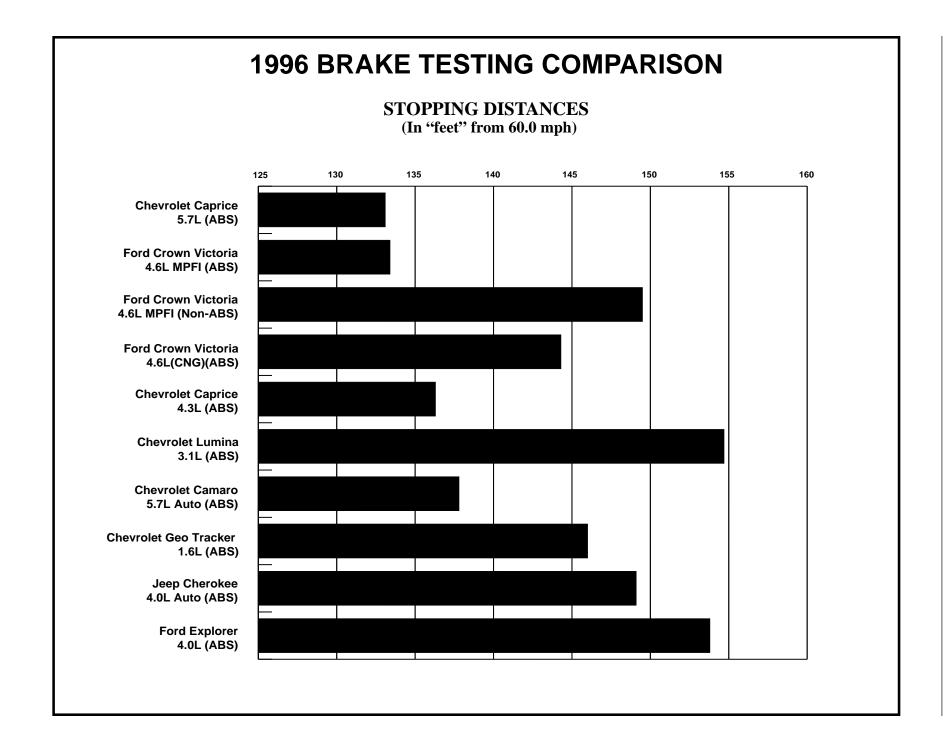
### **ACCELERATION**

SPEEDS	TIME REQUIREMENTS*	RUN#1	RUN#2	RUN#3	RUN#4	AVERAGE
0-60	12.3 sec.	12.11	11.70	11.99	11.60	11.85
0-80	23.1 sec.	21.42	21.51	23.20	21.34	21.87
0–100	44.0 sec.	57.89	41.87	56.04	41.10	49.23

DISTANCE TO REACH: 110 MPH \_\_\_\_ 120 MPH \_\_\_

TOP SPEED ATTAINED: 106 mph

<sup>\*</sup>Michigan State Police minimum requirement.



TEST LOCATION: _	Chrysler Proving Grounds	DATE: Septem	oer 16, 1995
BEGINNING TIME:	10:57 AM	TEMPERATURE:	68.1° F
MAKE AND MODEL	: Chevrolet Caprice 5.7L	BRAKE SYSTEM:	Antilock
	PH	ASE I	
BRAKE HEAT-UP	(90 mph - 22 ft./sec. <sup>2</sup> )		
TEST	(60 mph - impending sl	kid - maximum deceler	ation rate attainable)
Initial Speed	60.5 mph <b>Sto</b>	pping Distance134	I.5 ft.
Averag	ge Deceleration Rate—Phase I	29.27 ft./sec. <sup>2</sup>	-
	PHA	ASE II	
BRAKE HEAT-UP	(90 mph - 22 ft./sec.²)		
TEST	(60 mph - impending sl	kid - maximum deceler	ation rate attainable)
Initial Speed	60.2 mph Sto	pping Distance134	I.8 ft.
Averag	e Deceleration Rate—Phase I	28.92 ft./sec. <sup>2</sup>	
	РНА	SE III	
TEST	(60 mph - panic stop)		
		3	Yes/No
Eviden	ce of severe fading?		No
Vehicle	e stopped in straight line?		Yes
	11 6		
Vehicle	e stopped within correct lane?		Yes

TEST LOCATION: _	Chrysler Proving Grounds	DATE:	Septembe	er 16, 1995
<b>BEGINNING TIME:</b>	11:36 AM	TEMPERA	TURE:	73.0° F
MAKE AND MODEL	: Ford Crown Victoria 4.6L	BRAKE SY	STEM:	Antilock
	PHA	SE I		
BRAKE HEAT-UP	(90 mph - 22 ft./sec. <sup>2</sup> )			
TEST	(60 mph - impending skid	d - maximum	decelera	tion rate attainable)
Initial Speed	60.8 mph Stopp	oing Distance	135.	1 ft
Averag	ge Deceleration Rate—Phase I	29.43 ft./s	ec. <sup>2</sup>	
	PHAS	SE II		
BRAKE HEAT-UP	(90 mph - 22 ft./sec. <sup>2</sup> )			
TEST	(60 mph - impending skid	d - maximum	decelera	tion rate attainable)
TEST  Initial Speed	•	d - maximum		
Initial Speed	•	oing Distance	135.	
Initial Speed	60.0 mph Stopp	oing Distance 28.60 ft./s	135.	
Initial Speed	60.0 mph Stopp ge Deceleration Rate—Phase II	oing Distance 28.60 ft./s	135.	
Initial Speed Averaş	60.0 mph  Stopp  ge Deceleration Rate—Phase II  PHAS	oing Distance 28.60 ft./s	ec. <sup>2</sup>	
Initial SpeedAverag	60.0 mph  Stopp  ge Deceleration Rate—Phase II  PHAS	oing Distance 28.60 ft./s	135. ec.²	4 ft.
Initial SpeedAverag TEST	60.0 mph Stopp  ge Deceleration Rate—Phase II  PHAS  (60 mph - panic stop)	oing Distance 28.60 ft./s	2 135. ec. <sup>2</sup> Ye	4 ft.
Initial SpeedAverag  TEST  Evidente Vehicle	60.0 mph Stopp  ge Deceleration Rate—Phase II  PHAS  (60 mph - panic stop)  ce of severe fading?	oing Distance 28.60 ft./s	135. ec.² Ye	4 ft. es/No No

TEST LOCATION:	Chrysler Proving Grounds	DATE: Septem	nber 16, 1995
BEGINNING TIME:	8:34 AM	TEMPERATURE:	55.1° F
MAKE AND MODEI	: Ford Crown Victoria 4.6L	BRAKE SYSTEM	: Conventional (Non-ABS)
	РНА	SE I	
BRAKE HEAT-UP	(90 mph - 22 ft./sec. <sup>2</sup> )		
TEST	(60 mph - impending ski	d - maximum decele	eration rate attainable)
Initial Speed	60.7 mph Stop	oing Distance15	54.0 ft.
Average	Deceleration Rate—Phase I	25.73 ft./sec. <sup>2</sup>	_
	PHAS	SE II	
BRAKE HEAT-UP	(90 mph - 22 ft./sec. <sup>2</sup> )		
TEST	(60 mph - impending ski	d - maximum decele	eration rate attainable)
Initial Speed	60.0 mph Stop	oing Distance14	8.5 ft.
Average	Deceleration Rate—Phase II	26.07 ft./sec. <sup>2</sup>	
	PHAS	E III	
TEST	(60 mph - panic stop)		
			Yes/No
Evidence	of severe fading?		No
	ū		
Vehicle s	topped in straight line?		Yes
	topped in straight line?		Yes Yes

TEST LOCATION:	Chrysler Proving Grounds	DATE:	Septemb	er 16, 1995
<b>BEGINNING TIME:</b>	12:02 PM	TEMPERA	TURE: _	75.7° F
MAKE AND MODEI	Ford Crown Vic. 4.6L (CNG	B) BRAKE SY	YSTEM:_	Antilock
	PHA	SE I		
BRAKE HEAT-UP	(90 mph - 22 ft./sec. <sup>2</sup> )			
TEST	(60 mph - impending sk	id - maximun	n decelera	ation rate attainable)
Initial Speed	60.7 mph Stop	ping Distanc	e 145	.9 ft.
Average	Deceleration Rate—Phase I	27.16 ft./s	sec. <sup>2</sup>	
	РНА	SE II		
BRAKE HEAT-UP	(90 mph - 22 ft./sec. <sup>2</sup> )			
TEST	(60 mph - impending sk	id - maximun	n decelera	ation rate attainable)
Initial Speed	60.1 mph Stop	ping Distanc	e <u>146</u>	.5 ft.
Average	Deceleration Rate—Phase II _	26.52 ft./s	sec. <sup>2</sup>	
	PHAS	SE III		
TEST	(60 mph - panic stop)			
			Y	es/No
Evidence	of severe fading?			No
Vehicle st	copped in straight line?			Yes
Vehicle st	copped within correct lane?			Yes
Average	Deceleration Rate—Phase III	26	6.84 ft./se	C. <sup>2</sup>

TEST LOCATION: _	Chrysler Proving Gro	unds DA	TE:	Septemb	er 16, 1995
BEGINNING TIME:	12:26 PM	TE	MPERA	TURE: _	77.7° F
MAKE AND MODEL	: Chevrolet Caprice	e 4.3L BR	AKE SY	STEM:_	Antilock
		PHASE	I		
BRAKE HEAT-UP	(90 mph - 22 ft./s	sec.2)			
TEST	(60 mph - impen	ding skid - m	naximum	decelera	ation rate attainable)
Initial Speed	60.5 mph	Stopping	Distance	135.	.6 ft.
Averag	ge Deceleration Rate—l	Phase I 2	9.04 ft./s	ec. <sup>2</sup>	
		PHASE 1	I		
BRAKE HEAT-UP	(90 mph - 22 ft./s	sec.²)			
TEST	(60 mph - impen	ding skid - m	naximum	decelera	ntion rate attainable)
Initial Speed	60.0 mph	Stopping	Distance	139	.4 ft.
Averag	ge Deceleration Rate—	Phase II 2	7.78 ft./s	ec. <sup>2</sup>	
		PHASE I	II		
TEST	(60 mph - panic st	cop)			
				Y	es/No
Eviden					
Eviden	ce of severe fading?				No
	ce of severe fading?	)			No Yes
Vehicle	_				

TEST LOCATION: _	Chrysler Proving Grounds	DATE:	Septemb	er 16, 1995
<b>BEGINNING TIME:</b>	1:20 PM	TEMPERA'	TURE: _	81.9° F
MAKE AND MODEL	: Chevrolet Lumina 3.1L	BRAKE SY	STEM:_	Antilock
	PHA	SE I		
BRAKE HEAT-UP	(90 mph - 22 ft./sec.2)			
TEST	(60 mph - impending ski	d - maximum	decelera	ation rate attainable)
Initial Speed	60.4 mph Stop	ping Distance	157	.9 ft.
Average l	Deceleration Rate—Phase I	24.85 ft./s	ec. <sup>2</sup>	
	РНА	SE II		
BRAKE HEAT-UP	(90 mph - 22 ft./sec. <sup>2</sup> )			
TEST	(60 mph - impending ski	d - maximum	decelera	ation rate attainable)
Initial Speed	60.2 mph Stop	ping Distance	154	.7 ft.
Average l	Deceleration Rate—Phase II _	25.20 ft./s	ec. <sup>2</sup>	
	PHAS	SE III		
TEST	(60 mph - panic stop)			
			Y	es/No
Evidence	of severe fading?			No
Vehicle st	opped in straight line?		,	Yes
Vehicle st	opped within correct lane?		,	Yes
Average l	Deceleration Rate—Phase III	25.	.03 ft./se	C. <sup>2</sup>

TEST LOCATION: _	Chrysler Proving Grounds	DATE: S	eptemb	er 16, 1995
BEGINNING TIME:	2:49 PM	TEMPERAT	URE: _	82.8° F
MAKE AND MODEL:	Chevrolet Camaro 5.7L (Automatic Trans)	BRAKE SYS	TEM:_	Antilock
	PH	ASE I		
BRAKE HEAT-UP	(90 mph - 22 ft./sec.²)			
TEST	(60 mph - impending sl	kid - maximum o	decelera	ation rate attainable)
Initial Speed	60.3 mph Sto	pping Distance	138	.9 ft.
Average D	Deceleration Rate—Phase I	28.16 ft./se	C. <sup>2</sup>	
	PHA	ASE II		
BRAKE HEAT-UP	(90 mph - 22 ft./sec. <sup>2</sup> )			
TEST	(60 mph - impending sl	kid - maximum o	decelera	ation rate attainable)
Initial Speed	60.7 mph Sto	pping Distance	141	.4 ft.
Average I	Deceleration Rate—Phase II	28.03 ft./se	C. <sup>2</sup>	
	РНА	SE III		
TEST	(60 mph - panic stop)			
			Y	es/No
Evidence of	of severe fading?			No
Vehicle sto	opped in straight line?			Yes
Vehicle sto	opped within correct lane?			Yes
Average D	Deceleration Rate—Phase III	28.1	0 ft./se	C. <sup>2</sup>

TEST LOCATI	ON: Chrysler Proving Ground	nds DATE:	September	16, 1995
BEGINNING T	<b>IME:</b> 2:23 PM	TEMPER	ATURE: 83	3.0° F
MAKE AND M	ODEL: Chev. Geo Tracker 1.6	L(2wd) BRAKE SY	YSTEM: Ar	ntilock
		PHASE I		
BRAKE HEAT-	-UP (80 mph* - 22 ft./s	ec. <sup>2</sup> )		
TEST	(60 mph - impend	ing skid - maximuı	n deceleratio	n rate attainable)
Initial Sp	eed 60.0 mph	<b>Stopping Distance</b>	ce 145.9 f	t
Av	erage Deceleration Rate—Phas	e I 26.54 ft./	sec.2	
		PHASE II		
BRAKE HEAT-	-UP (80 mph* - 22 ft./s	ec. <sup>2</sup> )		
MPCM				
TEST	(60 mph - impend	ing skid - maximur	n deceleration	n rate attainable)
Initial Sp	, , , , , ,	ing skid - maximur Stopping Distand		,
Initial Sp	, , , , , ,	Stopping Distance	ce <u>145.5 f</u>	,
Initial Sp	eed 59.9 mph erage Deceleration Rate—Phas	Stopping Distance	ce <u>145.5 f</u>	,
Initial Sp	eed 59.9 mph erage Deceleration Rate—Phas	Stopping Distance II26.52 ft./	ce <u>145.5 f</u>	,
Initial Sp Av	eed 59.9 mph erage Deceleration Rate—Phas	Stopping Distance II26.52 ft./	ce <u>145.5 f</u>	<u>t.</u>
Initial Sp Av TEST	eed 59.9 mph erage Deceleration Rate—Phas	Stopping Distance II26.52 ft./	ee <u>145.5 f</u> /sec.²	<u>t.</u>
Initial Sp Av TEST	reed 59.9 mph  erage Deceleration Rate—Phase  [ (60 mph - panic sto	Stopping Distance II26.52 ft./	ee145.5 f	No
Initial Sp Av TEST Evi	reed 59.9 mph  erage Deceleration Rate—Phase  (60 mph - panic stortidence of severe fading?	Stopping Distance II 26.52 ft./	Yes/N	No
Initial Sp Av TEST Evi Vel Vel	rerage Deceleration Rate—Phase  (60 mph - panic stortidence of severe fading?  thicle stopped in straight line?	Stopping Distance II 26.52 ft./ PHASE III  p)	Yes/N Yes	No

<sup>\*</sup>Vehicle was unable to reach 90 mph for the brake heat-ups within the available distance.

TEST LOCATION:	Chrysler Proving Grounds	DATE: S	eptemb	er 16, 1995	
BEGINNING TIME:	1:58 PM	_ TEMPERAT	URE: _	81.1° F	
MAKE AND MODEI	: Chrysler Jeep Cherokee 4.0 (4-Wheel Drive)	L BRAKE SYS	STEM:_	Antilock	
	PHA	ASE I			
BRAKE HEAT-UP	(90 mph - 22 ft./sec.2)				
TEST	(60 mph - impending sk	kid - maximum (	decelera	ation rate attaina	ıble)
Initial Speed	59.9 mph Stop	pping Distance	149.	.4 ft.	
Average	Deceleration Rate—Phase I	25.83 ft./se	C. <sup>2</sup>		
	PHA	SE II			
BRAKE HEAT-UP	(90 mph - 22 ft./sec.2)				
TEST	(60 mph - impending sk	kid - maximum d	decelera	ntion rate attaina	ble)
Initial Speed	60.3 mph Sto	pping Distance	149.	.8 ft.	
Average	Deceleration Rate—Phase II _	26.11 ft./se	C. <sup>2</sup>		
	РНА	SE III			
TEST	(60 mph - panic stop)				
			Y	es/No	
Evidence	of severe fading?			No	
Vehicle st	topped in straight line?			Yes	
Vehicle st	topped within correct lane?			Yes	
Average	Deceleration Rate—Phase III	25.9	97 ft./se	C. <sup>2</sup>	

TEST LOCATION:	Chrysler Proving Grounds	DATE: Se	ptember 16, 1995	
<b>BEGINNING TIME:</b>	10:15 AM	TEMPERATU	<b>RE:</b> 62.7° F	
MAKE AND MODEL	: Ford Explorer 4.0L (4-Wheel Drive)	BRAKE SYST	EM: Antilock	
	PHA	SE I		
BRAKE HEAT-UP	(90 mph - 22 ft./sec. <sup>2</sup> )			
TEST	(60 mph - impending ski	d - maximum de	eceleration rate attainab	le)
Initial Speed	60.6 mph Stop	ping Distance _	158.5 ft.	
Average 1	Deceleration Rate—Phase I	24.92 ft./sec.	2	
	PHA	SE II		
BRAKE HEAT-UP	(90 mph - 22 ft./sec. <sup>2</sup> )			
TEST	(60 mph - impending ski	d - maximum de	eceleration rate attainab	le)
Initial Speed	60.4 mph Stop	ping Distance _	154.4 ft.	
Average I	Deceleration Rate—Phase II	25.42 ft./sec.	2	
	PHAS	SE III		
TEST	(60 mph - panic stop)			
			Yes/No	
Evidence	of severe fading?	-	No	
Vehicle st	copped in straight line?	-	Yes	
Vehicle st	copped within correct lane?		Yes	
		-		

### **ERGONOMICS AND COMMUNICATIONS**

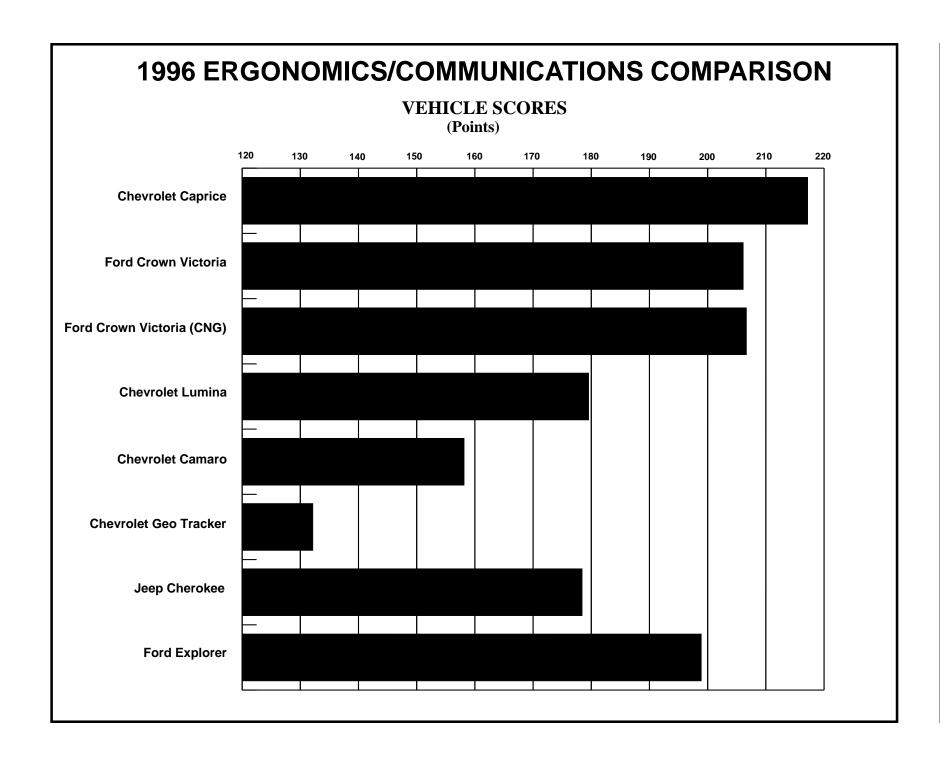
#### **TEST OBJECTIVE**

Rate each test vehicle's ability to:

- 1. Provide a suitable environment for the patrol officer in the performance of his/her assigned tasks.
- 2. Accommodate the required communications and emergency warning equipment and assess the relative difficulty of such installations.

#### **TEST METHODOLOGY**

Utilizing the ergonomics portion of the form, a minimum of four officers will individually and independently compare and score each test vehicle on the various comfort, instrumentation, and visibility items. The installation and communications portion of the evaluation will be conducted by personnel from the Michigan State Police Communications Division and the Motor Transport Division, Police Car Prep Section, based upon the relative difficulty of the necessary installations. Each factor will be graded on a 1 to 10 scale, with 1 representing "totally unacceptable," 5 representing "average," and 10 representing "superior." The scores will be averaged to minimize personal prejudice for or against any given vehicle.



# **ERGONOMICS AND COMMUNICATIONS**

ERGONOMICS	Chevrolet Caprice	Ford Crown Vic.	Ford Crown Vic. (CNG)	Chevrolet Lumina
FRONT SEAT	•			
Padding	7.71	6.86	6.86	4.43
Depth of Bucket Seat	7.43	6.57	6.57	4.71
Adjustability - Front to Rear	8.43	7.86	7.86	6.57
Upholstery	7.57	7.00	7.00	5.14
Bucket Seat Design	7.71	7.00	7.00	5.14
Headroom	8.00	8.43	8.43	6.86
Seatbelts	7.71	7.14	7.14	6.43
Ease of Entry and Exit	8.00	7.71	7.71	6.43
Overall Comfort Rating	7.83	7.67	7.67	5.33
REAR SEAT				
Leg room - Front seat back	7.29	6.29	6.29	6.00
Ease of Entry and Exit	7.71	6.00	6.00	5.57
INSTRUMENTATION				
Clarity	8.14	7.86	7.86	7.29
Placement	8.14	8.00	8.00	7.43
VEHICLE CONTROLS				
Pedals, Size and Position	8.00	7.43	7.43	7.14
Power Window Switch	8.29	8.14	8.14	8.00
Inside Door Release	8.29	7.86	7.86	7.71
Automatic Door Lock Switch	7.29	8.00	8.00	7.29
Outside Mirror Controls	7.57	8.14	8.14	6.43
Steering Wheel, Size, Tilt Release, and Surface	8.14	8.14	8.14	6.71
Heat/AC Vent Placement and Adjustability	8.14	8.14	8.14	8.00
VISIBILITY				
Front (Windshield)	8.29	8.29	8.29	8.14
Rear (Back Window)	7.57	7.57	7.57	6.86
Left Rear Quarter	7.57	7.57	7.57	6.71
Right Rear Quarter	7.71	7.71	7.71	6.71
Outside Rear View Mirrors	7.86	7.86	7.86	7.14
COMMUNICATIONS				
Dashboard Accessibility	6.84	5.86	6.19	5.33
Trunk Accessibility	6.92	5.42	5.34	4.65
Engine Compartment	7.04	5.60	5.90	5.40
TOTAL SCORES	217.19	206.12	206.67	179.55

### **ERGONOMICS AND COMMUNICATIONS**

ERGONOMICS	Chevrolet Camaro	Chevrolet Geo Tracker	Chrysler Jeep Cherokee	Ford Explorer
FRONT SEAT			•	<u>*</u>
Padding	5.83	4.43	6.57	6.43
Depth of Bucket Seat	5.00	3.57	5.86	6.43
Adjustability - Front to Rear	5.86	5.43	7.14	7.29
Upholstery	7.00	5.00	6.43	6.00
Bucket Seat Design	6.00	4.43	6.71	6.14
Headroom	4.86	7.86	7.00	7.71
Seatbelts	4.67	5.14	7.14	7.00
Ease of Entry and Exit	3.43	6.43	6.29	8.29
Overall Comfort Rating	5.33	4.67	6.60	7.67
REAR SEAT				
Leg room - Front seat back	2.29	3.43	4.71	7.14
Ease of Entry and Exit	1.71	4.71	3.71	6.86
INSTRUMENTATION				
Clarity	6.86	5.43	7.14	8.00
Placement	7.00	6.14	6.43	7.86
VEHICLE CONTROLS				
Pedals, Size and Position	7.14	5.71	7.43	6.43
Power Window Switch	7.33		5.29	8.00
Inside Door Release	7.71	4.86	6.14	6.43
Automatic Door Lock Switch	6.00		5.57	7.29
Outside Mirror Controls	7.57		4.71	7.14
Steering Wheel, Size, Tilt Release, and Surface	8.29	4.86	7.43	7.29
Heat/AC Vent Placement and Adjustability	8.71	6.29	7.00	7.57
VISIBILITY				
Front (Windshield)	7.71	7.43	7.86	8.14
Rear (Back Window)	5.57	4.86	7.57	8.00
Left Rear Quarter	5.00	6.86	7.43	8.14
Right Rear Quarter	5.14	6.86	7.57	8.14
Outside Rear View Mirrors	5.57	6.57	6.57	8.00
COMMUNICATIONS				
Dashboard Accessibility	3.39	4.14	6.01	5.59
Trunk Accessibility	2.90	3.05	4.70	5.76
Engine Compartment	4.28	4.00	5.42	4.17
TOTAL SCORES	158.15	132.16	178.43	198.91

### **FUEL ECONOMY**

### **TEST OBJECTIVE**

Determine the fuel economy potential of all vehicles being evaluated. The data used for scoring are both valid and reliable in a comparison sense, while not necessarily being an accurate predictor of actual fuel economy in police patrol service.

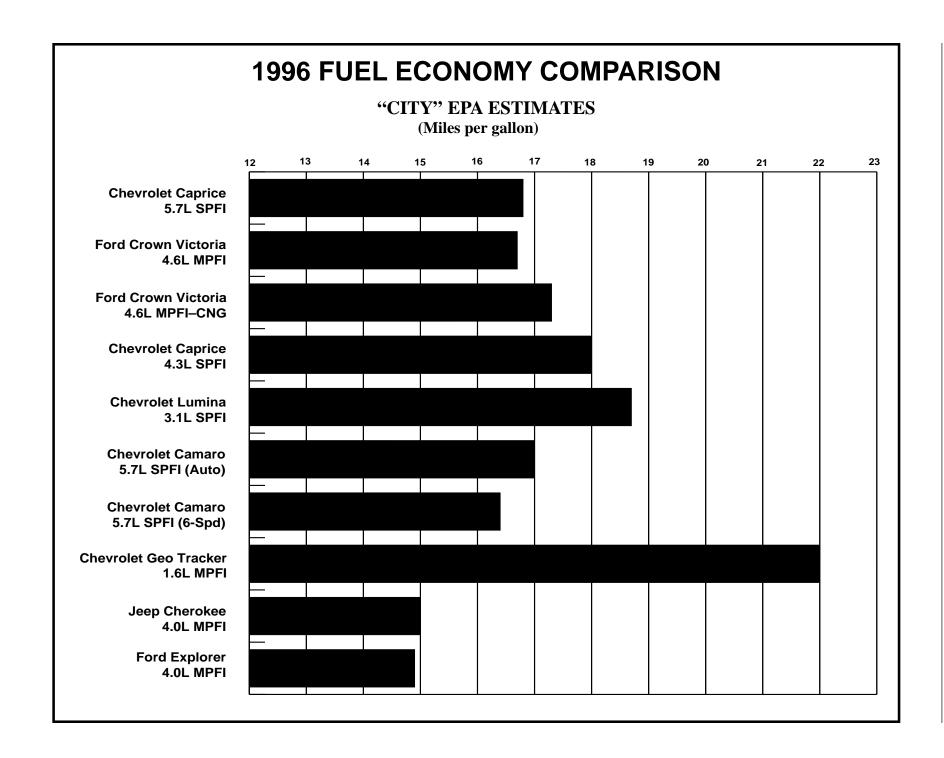
### **TEST METHODOLOGY**

The vehicles will be scored based on estimates for city fuel economy to the nearest 1/10th mile per gallon (mpg) developed from data supplied by the vehicle manufacturer and certified by the Environmental Protection Agency.

Vehic	les	<b>EPA Miles Per Gallon</b>					
Make/Mode	l/Engine	City*	Highway	Combined			
Chevrolet Caprice	5.7L-SPFI	17 (16.8)	26	20			
Ford Crown Victoria	4.6L-MPFI	17 (16.7)	23	19			
Ford Crown Victoria	4.6L-MPFI (CNG)	17 (17.3)**	26**	20**			
Chevrolet Caprice	4.3L-SPFI	18 (18.0)	26	21			
Chevrolet Lumina	3.1L-SPFI	19 (18.7)	29	22			
Chevrolet Camaro	5.7L-SPFi (Automatic)	17 (17.0)	25	20			
Chevrolet Camaro	5.7L-SPFI (6-Speed Manual)	16 (16.4)	27	20			
Chevrolet Geo Tracker	1.6L-MPFI (2-Wheel Drive)	22 (22.0)	26	24			
Chrysler Jeep Cherokee	4.0L-MPFI (4-Wheel Drive)	15 (15.0)	20	17			
Ford Explorer	4.0L-MPFI (4-Wheel Drive)	15 (14.9)	20	17			

<sup>\*</sup> Scored on city mileage only to the nearest 1/10 mpg.

<sup>\*\*</sup> EPA Mileage Estimates are in gasoline equivalent.



### MICHIGAN STATE POLICE SCORING AND BID ADJUSTMENT METHODOLOGY\*

#### STEP I: RAW SCORES

Raw scores are developed, through testing, for each vehicle in each of six evaluation categories. The raw scores are expressed in terms of seconds, feet per second<sup>2</sup>, miles per hour, points, and miles per gallon.

VEHICLE DYNAM. (seconds)	ACCEL. (seconds)	BRAKING RATE (ft./sec.²)	TOP SPEED (mph)	ERGONOMICS & COMMUN. (points)	FUEL ECONOMY (mpg)
92.210	45.790	26.380	115.000	173.900	14.300

#### STEP II: DEVIATION FACTOR

In each evaluation category, the best scoring vehicle's score is used as the benchmark against which each of the other vehicles' scores are compared. (In the Vehicle Dynamics and Acceleration categories the lowest score is best, while in the remainder of the categories the highest score is best.) The best scoring vehicle in a given category received a deviation factor of "0." The "deviation factor" is then calculated by determining the absolute difference between each vehicle's raw score and the best score in that category. The absolute difference is then divided by the best score, with the result being the "deviation factor."

CAR MAKE MODEL	TOP SPEED
CAR "A"	115.000 <b>.042</b>
CAR "B"	118.800 <b>.010</b>
CAR "C"	117.900 <b>.018</b>
CAR "D"	120.000 <b>0</b>

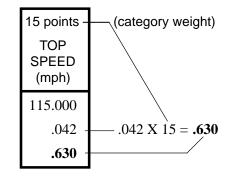
#### **EXAMPLE:**

Best Score		Other Vehicle		Absolute		Best		<b>Deviation Factor</b>
(Car "D")		Score (Car "A")		Difference		Score		(Car "A")
120.000	_	115.000	=	5	/	120.000	=	.042

### STEP III: WEIGHTED CATEGORY SCORE

Each vehicle's weighted category score is determined by multiplying the deviation factor (as determined in Step II) by the category weight.

RAW SCORE
DEVIATION FACTOR
WEIGHTED CATEGORY SCORE



<sup>\*</sup>All mathematical computations are to be rounded to the third decimal place.

### STEP IV: TOTAL WEIGHTED SCORE

The total weighted score for each vehicle is derived by adding together the six (6) weighted category scores for that vehicle.

#### **EXAMPLE:**

CAR	30 pts. VEH. DYN. (seconds)	20 pts. ACCEL. (seconds)	20 pts. BRAKE DECEL. (ft./sec.²)	15 pts. TOP SPEED (mph)	10 pts. ERGO/ COMM. (points)	5 pts. FUEL ECON. (mpg)	TOTAL WEIGHTED SCORE
Car "A"	92.210 .018 .540	45.790 .163 3.260	26.380 0 0	115.000 .042 .630	173.900 .184 1.840	14.300 0 0	6.270

#### STEP V: BID ADJUSTMENT FIGURE

The bid adjustment figure that we have chosen to use is one percent (1%) of the lowest bid price received. As an example, in this and the following two steps, the lowest bid price received was \$15,238.00, which results in a bid adjustment figure of \$152.38.

### STEP VI: ACTUAL DOLLAR ADJUSTMENT

The actual dollar adjustment for a vehicle is determined by multiplying that vehicle's total weighted score by the bid adjustment figure as shown at right.

TOTAL WTD. SCORE	BID ADJ. FIGURE	ACTUAL DOLLAR ADJ.							
)	<b>X</b> =								
6.270	\$152.38	\$955.42							

#### STEP VII: ADJUSTED BID PRICE

The actual dollar adjustment amount arrived at for each vehicle is added to that vehicle's bid price. Provided other necessary approvals are received, the vehicle with the lowest adjusted bid price will be the vehicle purchased. (The amount paid for the purchased vehicles will be the actual bid price.)

ACTUAL DOLLAR ADJ.	ACTUAL BID PRICE	ADJ. BID PRICE
-1	=	=
\$955.42	\$15,473.00	\$16,428.42

# MICHIGAN STATE POLICE RAW SCORES

CAR MAKE MODEL	30 POINTS VEHICLE DYNAMICS (seconds)	20 POINTS ACCELERATION 0–100 MPH (seconds)	20 POINTS BRAKING DECEL. RATE (ft./sec.²)	15 POINTS TOP SPEED (mph)	10 POINTS ERGONOMICS/ COMMUN. (points)	5 POINTS FUEL ECONOMY (mpg)
CHEVROLET CAPRICE 5.7L-SPFI	83.35	21.47	29.10	139	217.19	16.8
FORD CROWN VIC. 4.6L-MPFI	84.79	25.18	29.02	135	206.12	16.7

# MICHIGAN STATE POLICE COMPETITIVE PATROL VEHICLE EVALUATION RESULTS

CAR MAKE MODEL	30 POINTS VEHICLE DYN.		20 POINTS BRAKING DECEL.		10 POINTS ERGO/ COMMUN.	5 POINTS FUEL ECON.	TOTAL WTD. SCORE	BID ADJ. FIGURE	ACTUAL DOLLAR ADJ.	BID	BID
	(seconds)	(seconds)	(ft./sec. <sup>2</sup> )	(mph)	(points)	(mpg)	2	X I	=	+ :	=
CHEVROLET	83.35	21.47	29.10	139	217.19	16.8					
CAPRICE	0	0	0	0	0	0					
5.7L-SPFI	0	0	0	0	0	0					
FORD	84.79	25.18	29.02	135	206.12	16.7					
CROWN VIC.	.017	.173	.003	.029	.051	.006					
4.6L-MPFI	.510	3.460	.060	.435	.510	.030					

# APPENDIX I PERFORMANCE COMPARISONS OF 1995 AND 1996 TEST VEHICLES

The following charts graphically illustrate the scores achieved by each make and model of vehicle tested for model years 1995 and 1996. The charts presented are for the following performance categories:

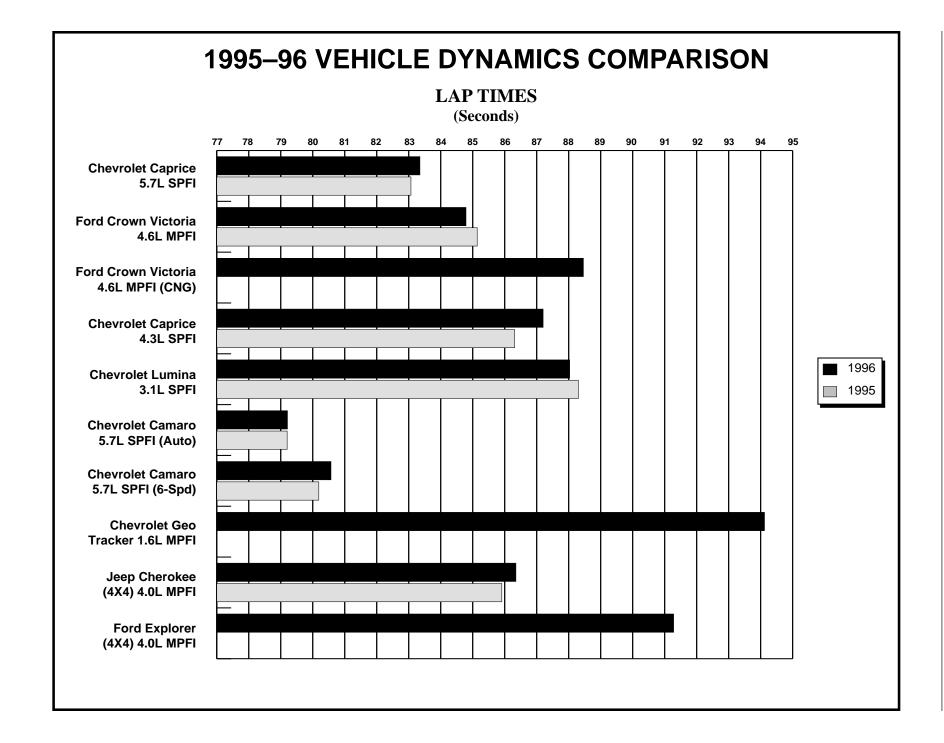
Vehicle Dynamics Acceleration 0–60 mph Acceleration 0–80 mph Acceleration 0–100 mph Top Speed Braking (Calculated 60–0 mph Stopping Distance)

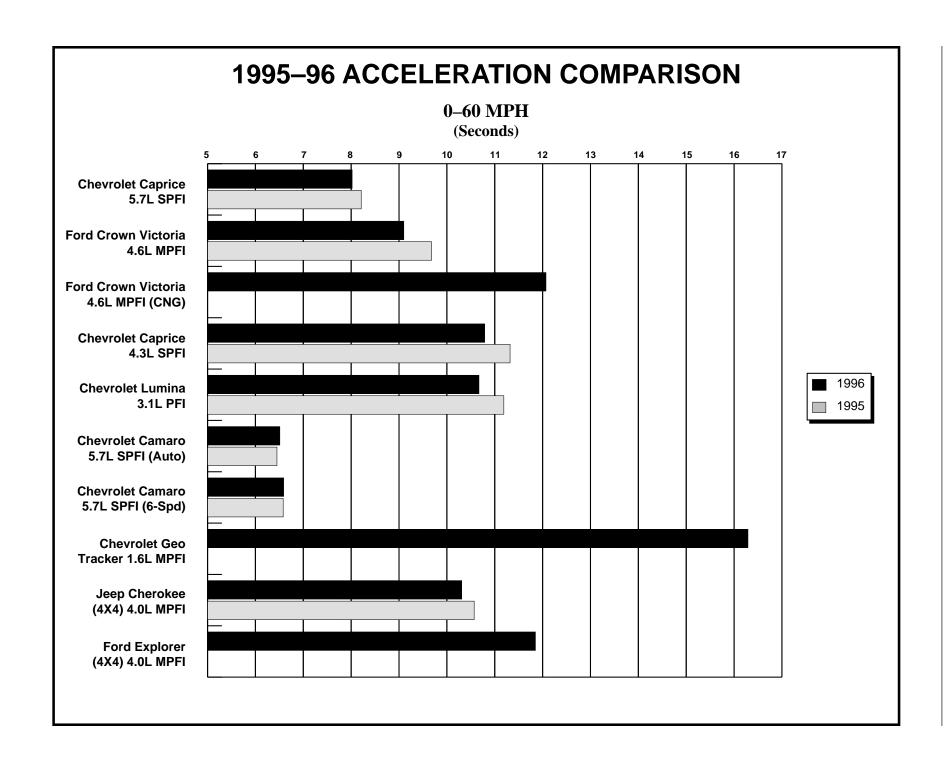
The reader should bear in mind the following information regarding variables when reviewing the 1995–96 performance comparison charts in Appendix I. While as many variables as possible are eliminated from a given year's testing, those that occur over the span of a full year are sometimes impossible to eliminate.

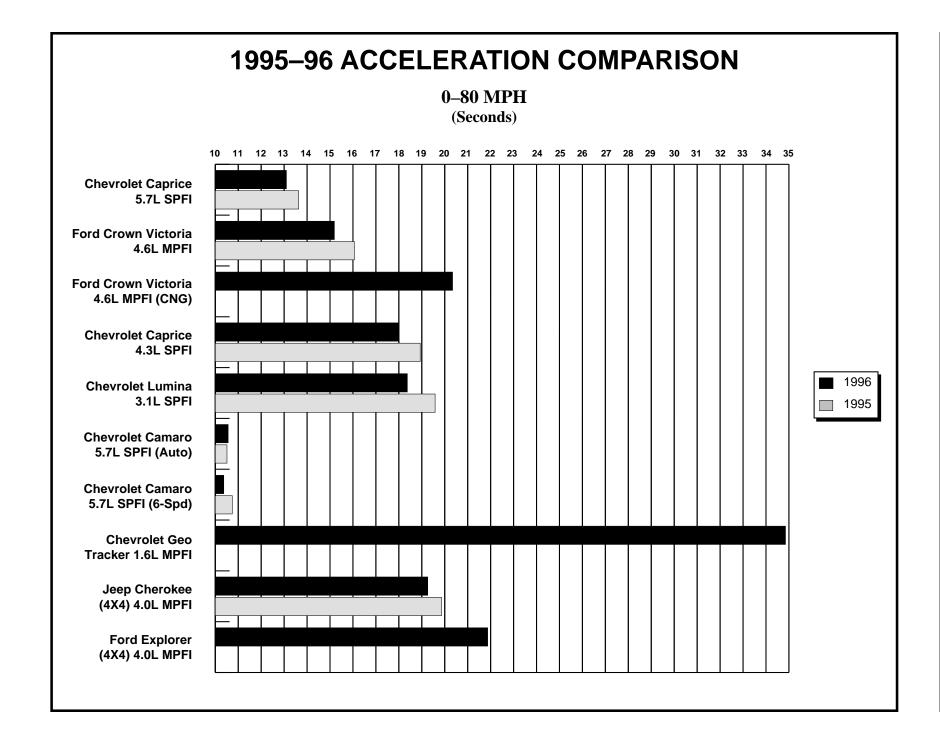
The acceleration, top speed, and brake testing of 1995 model year cars was conducted in late August 1994 with relatively warm temperatures that ranged from 66°F at the start of testing to a high of approximately 83°F during the afternoon. Testing of 1996 model cars was conducted in the middle of September 1995, with temperatures ranging between 55°F and 83°F. Clearly, such things as temperature, humidity, and barometric pressure do have an effect on the performance of internal combustion engines and brake components, and may be the cause of minor differences from one year's evaluation to the next.

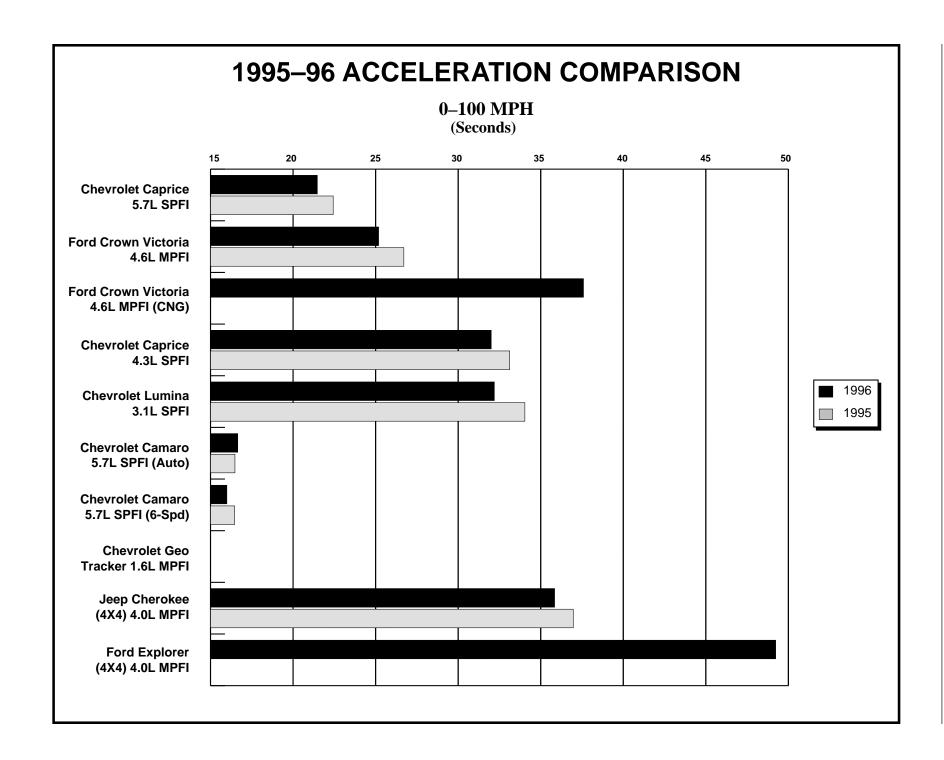
Another factor to be considered is the individual differences between two cars of the same make and model. The test cars that we evaluate are representative of their given make and model. Other cars of the same make and model will not, however, be exactly the same, particularly when it comes to performance, just as two consecutive cars off the same assembly line will perform slightly differently from each other. Consequently, minor differences in performance from year to year within the same make and model are not only possible but to be expected.

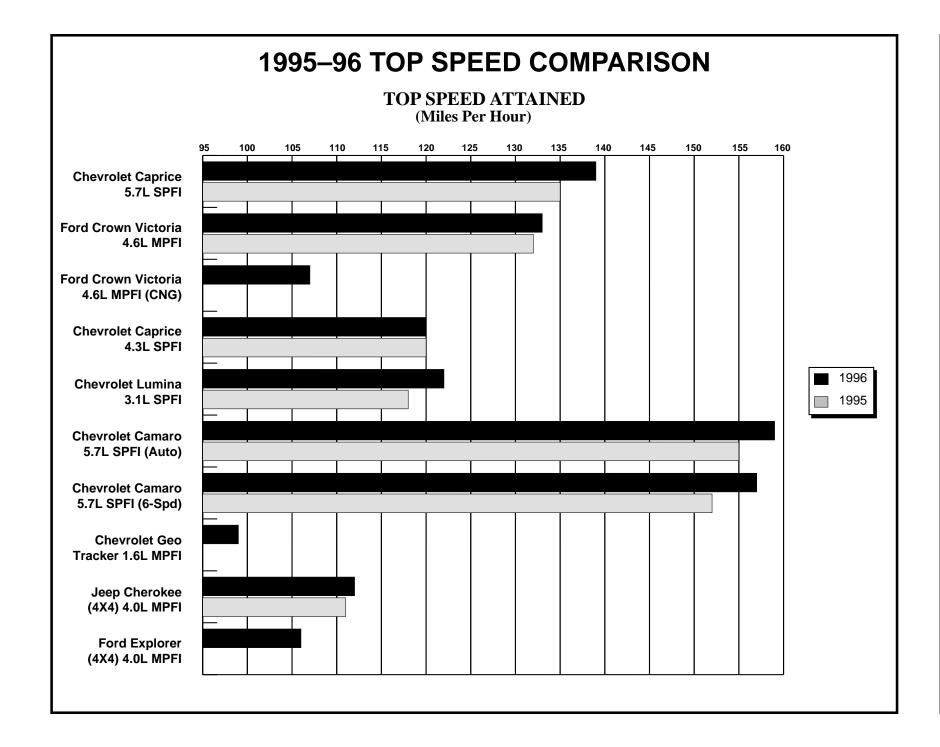
Finally, from year to year we must sometimes make changes in drivers or observers used in the testing process. Obviously, when a different driver or observer is used, it represents a variable that can affect the test data when compared to data from other years and/or other drivers. Once again, minor differences between the same make and model vehicle in consecutive years are both possible and likely.

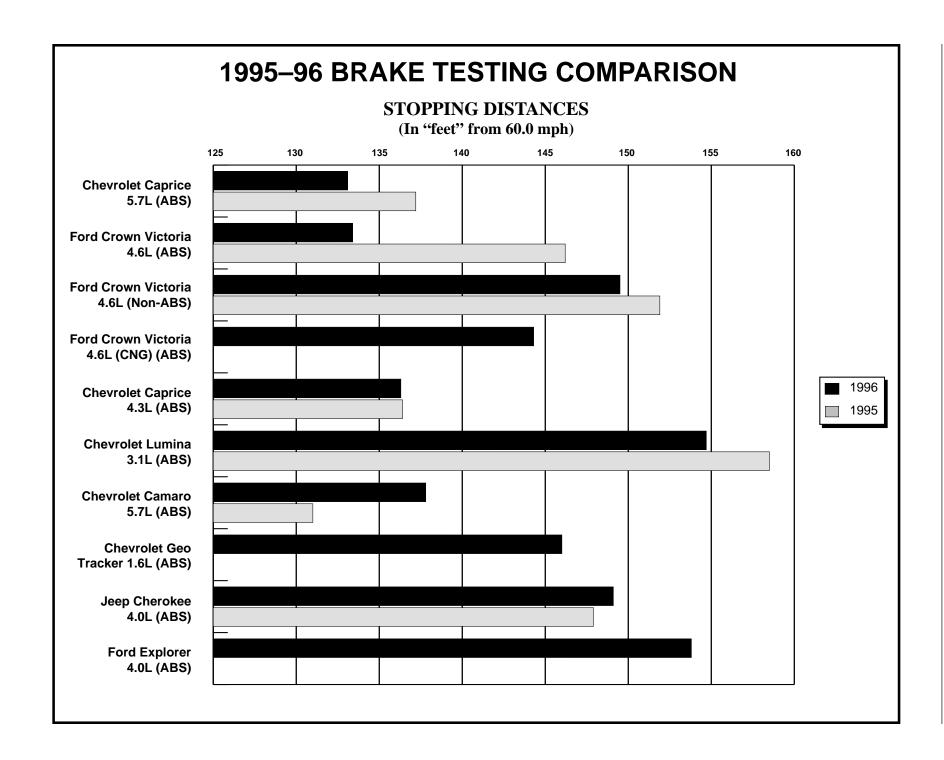












# APPENDIX II OUT-OF-STATE PARTICIPANTS

In response to a number of requests, we are once again providing a listing of those persons who were present during the testing and evaluation process. This will, hopefully, serve two purposes: first, those people who were in attendance during the testing will be able to contact others who they met during the testing; and second, those who were unable to attend will be able to contact people who were at the evaluation.

#### **ALABAMA**

ALABAMA DEPT. OF PUBLIC SAFETY

Johnny Hartley (334) 242–4137

#### **COLORADO**

BOULDER COUNTY SHERIFFS DEPT.

Randall Fahrenbach (303) 441–3628 COLORADO SPRINGS POLICE DEPT.

James Younie (719) 444–7421

#### **CONNECTICUT**

WHELEN ENGINEERING CO.

Keith Nelson (203) 526–9504

#### DISTRICT OF COLUMBIA

U.S. CAPITOL POLICE

Gerald Mutter (202) 226–3030 James Proctor (202) 226–3016 U.S. IMMIGRATION & NATURALIZATION

Michael Manuel (202) 616–7788

#### **FLORIDA**

U.S. CUSTOMS SERVICE

Robert Richter (305) 356–7238

**VOLUSIA COUNTY SHERIFFS OFFICE** 

Richard Eastman (904) 736–5961

Robert Westfall (904) 736–5961

WHELEN ENGINEERING CO.

Thomas White (813) 653–4405

#### **GEORGIA**

FEDERAL LAW ENF. TRAINING CENTER

George Graves (912) 267–2480 Joe McDowell (912) 267–2334

Russ Stevens (912) 267–2480

#### **IDAHO**

GARDEN CITY POLICE DEPT.

James Bensley (208) 377–2018

**IDAHO STATE POLICE** 

Fred Becker (208) 884–7200

#### **ILLINOIS**

COOK COUNTY SHERIFF'S DEPT.

Paul Barclay (708) 865–4704 Jerald Janosz (708) 865–4704

ILLINOIS STATE POLICE

Larry Ball (217) 785–0384

Dennis Tucker (217) 785–0384

LISLE POLICE DEPT.

Steven Arp (708) 271–4200

MORTON GROVE POLICE DEPT.

Ken Hogan (708) 470–5208

Gil Santiago (708) 470–5208

MOTOR VEHICLE MAINTENANCE

Robert Draves (708) 361–1800

OAK PARK ADVISORY COMMITTEE

Len Dunlop (708) 848–6605

# **OUT-OF-STATE PARTICIPANTS**

#### **ILLINOIS** (Continued)

OAK PARK POLICE DEPT.

Ron Fantetti (708) 858–0066 Thomas Glenn (708) 858–0066 Jeff Glenn (708) 858–0066 Doug Watterson (708) 858–0066

PARK RIDGE POLICE DEPT.

Robert Kaderabek (708) 318–5252 Chris Lekan (708) 318–5252

VETO ENTERPRISES, INC.

Ralph Grau (815) 895–9755

Mark Lewellen (815) 895–9755

Paul Lundberg (815) 895–9755

Mark Lundberg (815) 895–9755

Dan Tsgo (815) 895–9755

Harry White (815) 895–9755

WINFIELD POLICE DEPT.

John McNamara (708) 668–2685

#### **INDIANA**

INDIANAPOLIS POLICE DEPT.

Dan Chappell (317) 327–5383 Scott Wilkins (317) 327–5383

#### **KENTUCKY**

LEXINGTON-FAYETTE URBAN COUNTY POLICE DEPT.

L.C. Richardson (606) 258–3532 L.E. Walsh (606) 258–3621

#### **MAINE**

BIDDEFORD POLICE DEPT

Stephen Dodd (207) 282–5127 CUMBERLAND COUNTY SHERIFFS DEPT.

Tom Beyea (207) 774–1444

#### **MARYLAND**

MONTGOMERY COUNTY POLICE DEPT.

Robin Crown (301) 279–1832
James Helton (301) 279–1426
James Price (301) 279–1832
Maggie Orsini (301) 279–1832
NATIONAL LAW ENF. & CORR. TECH. CTR.

Wendy Howe (800) 248–2742

#### **NEW JERSEY**

PARAMUS MECHANICAL MAINTENANCE

Guilio Pigoncelli (201) 843–8793

PARAMUS POLICE DEPT.

Bruce Singer (201) 262–3400

WEST WINDSOR POLICE DEPT.

Ed Davis (609) 799–1222 Al Swingle (609) 799–1222

#### **NEW YORK**

NEW YORK STATE POLICE

Taren Cummings (518) 457–5996

#### **NORTH CAROLINA**

N.C. CRIME CONTROL & PUBLIC SAFETY

Bill Bayless (919) 733–7956 Ronnie Faison (919) 733–7956 Bill Funderud (919) 733–4015

GREENSBORO POLICE DEPT.

Larry James (910) 373–2840

#### OHIO

BROADVIEW HEIGHTS POLICE DEPT.

Jeff Money (216) 526–5400 Clay Tober (216) 526–5400

BRYAN POLICE DEPT.

Larry Altman (419) 636–4232 Rick Mock (419) 636–4232

CINCINNATI POLICE DIVISION

H. Michael Hendrick (513) 352–1586 Victoria Hendrick (513) 352–1586

# **OUT-OF-STATE PARTICIPANTS**

#### **OHIO** (Continued)

GOODYEAR TIRE & RUBBER CO.

(216) 796-7709 Jerry Buenger John Eagleburger (216) 796-3726 Andy Kunos (216) 796-1644

Don Luebben (216) 796-4352

GREEN COUNTY SHERIFFS OFFICE

Gary Heeg (513) 376-5011

OHIO STATE HIGHWAY PATROL

**Neil Grooms** (614) 728-2717 Joseph Price (614) 466-4141

PARMA POLICE DEPT.

Thomas Decker (216) 888–3211

David Ogle (216) 888-3211

#### ONTARIO – CANADA

ONTARIO FLEET & SUPPLY

**Rob Harris** (905) 688-4111 (905) 688-4111 Harry Lewis

FORD MOTOR CO. OF CANADA, LTD.

John Carey (905) 845-2511

HALTON REGIONAL POLICE

Bill Sefton (905) 825-4777

METRO TORONTO POLICE FLEET MGT.

Ken Goldthorpe (416) 324-0854

METRO TORONTO POLICE SERVICE

Graham Austin (416) 808–6985

Eldon Howard (416) 808-4900

(705) 424–9900

Jeffrey Moore (416) 808–6985

Jeffry Pearson (416) 808-4900

**Bob Shirlow** (416) 808–6985

Dave Wilson (416) 808-4900

ONTARIO PROVINCIAL POLICE

Robert MacDonald

Bill Dmytrenko (705) 329–6925

John Sanders (705) 329–6925

#### **ONTARIO - CANADA (Continued)**

OTTAWA CARLETON REGIONAL POLICE

Allan Carroll (613) 829-2211

Terry Scissons (613) 236-0311

ROYAL CANADIAN MOUNTED POLICE

Michael Connolly (613) 993-3219

#### **PENNSYLVANIA**

HARRISBURG POLICE DEPT.

George Schwarz (717) 236-4728

PHILADELPHIA POLICE DEPT., 3RD DIST.

Joseph Gavula (215) 686-3030

#### **SOUTH DAKOTA**

SIOUX FALLS POLICE DEPT.

Ralph Brown (605) 367–7272

Thomas Olsen (605) 367–7229

#### **TEXAS**

HOUSTON POLICE DEPT.

Don Springer (713) 247-8193

TEXAS DEPT. OF PUBLIC SAFETY

Bert Christian (409) 898-0770 Kenneth Lee (512) 465-2041

(512) 465-2042 Jerry Newbury

#### VERMONT

VERMONT STATE POLICE

Michaele Cook (802) 244-8789

Dana Shappy (802) 244-8789

#### VIRGINIA

AUTOMOTIVE ENGINEERING

Bob Ullrich (703) 560-0964

U.S. MARSHALS SERVICE

Martha Martschenko (703) 603-7610

VIRGINIA ALCOHOL & BEVERAGE BOARD

Jon Holland II (703) 518-8090

# **OUT-OF-STATE PARTICIPANTS**

## **WEST VIRGINIA**

WEST VIRGINIA STATE POLICE

Chuck Starcher (304) 746–2135

## **WISCONSIN**

KENOSHA COUNTY SHERIFF'S DEPT.

C. Mielke (414) 656–7312

QUADGRAPHICS, INC.

Tom Utech (414) 332–1903