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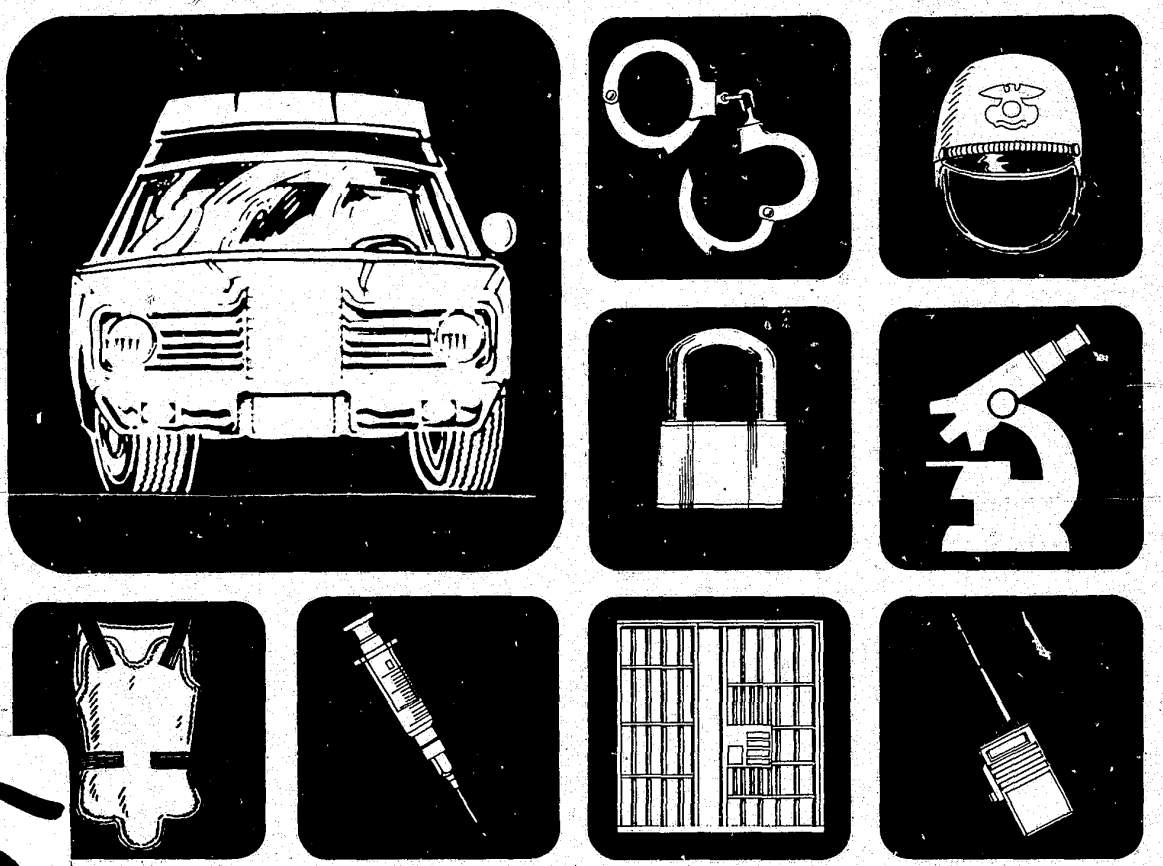
EQUIPMENT TECHNOLOGY CENTER
CONSUMER PRODUCT REPORT

Police Patrol Vehicle Testing



INTERNATIONAL ASSOCIATION OF CHIEFS OF POLICE

PUBLICATION DATE: JANUARY 1979

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POLICE PATROL VEHICLE TESTING

Prepared by the
EQUIPMENT TECHNOLOGY CENTER
TECHNICAL RESEARCH DIVISION
BUREAU OF OPERATIONS AND RESEARCH
INTERNATIONAL ASSOCIATION OF CHIEFS OF POLICE
Gaithersburg, Maryland 20760

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California Highway Patrol

Los Angeles County Fairgrounds Association

Los Angeles County Mechanical Department

Los Angeles County Sheriff's Department

Los Angeles Police Department

Michigan State Police

Ontario Motor Speedway

Shaffer Engineering

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THE NATIONAL LAW ENFORCEMENT

VEHICLE EVALUATION PROGRAM (NLEVEP)

Introduction

The National Law Enforcement Vehicle Evaluation Program is an evaluation program to provide data for the purchasers, users, manufacturers, and researchers of law enforcement vehicles.

The selection and procurement of law enforcement vehicles has traditionally been a major problem for law enforcement administrators. They have been forced to rely almost exclusively on manufacturer and/or local dealer specifications in their procurement, and have been frequently frustrated by the acquisition of vehicles that did not perform up to expectations. To remedy this situation the administrators have sought a method for the pre-purchase testing and evaluation of vehicles for police use. These administrators have stated that:

- The immediate establishment of a national law enforcement vehicle evaluation program is of paramount importance, particularly in light of recent developments in California and elsewhere to reduce local government spending.

- Testing and evaluation by individual departments is both costly and duplicative, although it is the only way, at this time, for them to obtain the vehicle performance data they need.

- Vehicle specifications must be broad enough to allow for at least two manufacturers to bid, and must be based on sound evaluation criteria.

The National Advisory Committee for Law Enforcement Equipment and Technology (NACLEET), which is advisory to the Equipment Technology Center (ETC) of the International Association of Chiefs of Police (IACP), has established the NLEVEP as its number one priority in the transportation area. The results of a recent "Survey of Equipment Needs," addressed to state and local law enforcement agency executives, has reaffirmed that priority.

The National Advisory Commission on Criminal Justice Standards and Goals arrived at the same recommendation:

> "The Federal Government should immediately provide for the testing of vehicles and aircraft that have potential for police application. The objective of this program should be to determine the transportation equipment that will satisfy police requirements, to inform police agencies of the results of these tests, and to promote the development of needed police transportation equipment.

Testing was initiated on November 13, 1978, and 95% completed by December 15, 1978. Several cars had to be retested for heat because they were not originally equipped with a particular external fluid cooler, i.e., power steering, engine oil or transmission fluid.

The ETC hopes that the test results will be of benefit to the law enforcement community in their purchasing decisions. If further explanation of test results are necessary, please contact the ETC on 800-638-4080 or write to:

Equipment Technology Center
NLEVEP
International Association of Chiefs of Police
Eleven Firstfield Road
Gaithersburg, Maryland 20760

INTERNATIONAL ASSOCIATION OF CHIEFS OF POLICE

Specifications for

LAW ENFORCEMENT PATROL VEHICLES
4-Door Sedan - V-8 Engine

TEST VEHICLE REQUIREMENTS:

All test vehicles shall be 1979 models which are equipped with the drive train, suspension, and brake components, as well as tires and interior appointments and instrumentation as called for in the specification requirements on all vehicles. Submitters of vehicles shall list any deviations from the specifications at the time of delivery of these test cars. Exterior color shall be the manufacturer's white. One extra set of four (4) wheels and tires shall be supplied with each car submitted for testing. Vehicles submitted shall have undergone sufficient break-in to permit extended periods of maximum acceleration and high speed driving.

Test cars shall be delivered to the Los Angeles County Sheriff's Department, Los Angeles County Mechanical Department, 1104 Eastern Avenue, Los Angeles, California 90063, no later than October 27, 1978.

These test vehicles will be subjected to a series of initial performance qualification tests. Each vehicle successfully completing these tests will then be subjected to seven (7) competitive performance and acceptability tests. The IACP 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 Los Angeles County Sheriff's Department.

Vehicles used for testing will be returned to the submitter as soon as practical.

SPECIFICATIONS:

Model - 1979 Current New

TO BE STANDARD FACTORY EQUIPPED INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING:

Air Conditioning: Standard nonautomatic temperature control model, factory installed. Tinted glass all windows. System to include air conditioning Shutoff Switch to enable rapid disengagement of A/C compressor during high speed pursuit driving and extended idling if necessary for compressor durability.

Alternator System: Transistorized regulator, 80 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 at 110 mph. Output ratings are for typical underhood ambient temperatures and not S.A.E. rating method.

Antenna: Standard AM type, externally mounted (radio not to be included). Manufacturer's option.

Battery: 12 Volt; 77 amp. hr., min. Manufacturer to specify cold crank rating at zero degrees.

Brakes: Power assisted, low pedal position. Disc type in front; drum type in rear. Four wheel disc brakes preferred, if available.

Chrome Strip: To be removed from doors if it interferes with law enforcement shield, but shall be furnished if standard. No holes to be on doors for mouldings. Manufacturer's option.

Cigarette Lighter and Ash Receiver: On instrument panel.

Cooling System: Vehicle to have maximum size cooling system available; incorporating "coolant recovery" system. Factory installed.

Differential: Heavy duty, limited slip required, 49 State cars; Heavy duty, non-limited slip required, California cars.

Engine: Cubic inch displacement to be at manufacturer's option. Largest cubic inch displacement available preferred.

Floor Mat: Heavy duty rubber, front and rear. Rubber trunk mat, full floor.

Front and Rear Armrests: Rear armrests to be of a style without ash tray or having ash tray that may be readily removed.

Front Seat Assembly: Split bench type, 60-40 preferable, or 50-50 acceptable, individually adjustable fore and aft, less center armrests, heavy duty interior construction designed for rugged police use, comfortably foam padded seat cushions and backs.

Gauges: To be equipped with ammeter or voltmeter, water temperature, and oil pressure gauges, preferably located in instrument cluster, or under dash convenient to driver.

Hoses: Heater and radiator hoses shall be preformed silicone type. All other underhood hoses: silicone type preferred.

Interior Light(s): Manufacturer's Option: may be to California Highway Patrol, Los Angeles County Sheriff's Department, Los Angeles Police Department or Michigan State Police specifications.

Light: Engine compartment, with mercury switch. Manufacturer's option.

Locks: All locks on a car to be keyed alike. All test vehicles from a manufacturer to be keyed alike.

Mirrors, Rearview, Outside: Installed on left-hand and right-hand doors. Left-hand mirror to be remote controlled type. Rectangular design approximate size 5" x 3"; minimum viewing area of 15 square inches.

Mirrors, Rearview, Inside: Day/night type.

Paint Color: White

Radio Speaker: Manufacturer's option: may be to California Highway Patrol, Los Angeles Police Department, Los Angeles County Sheriff's Department or Michigan State Police specifications.

Rear Window Defogger Unit: With control within convenient reach of driver, control switch to be clearly marked as to function.

Remote Control Rear Deck Lid Release: Control to be within convenient reach of the driver and labeled as to function. Electric system wired independently of ignition switch, preferred. Bowden cable system not acceptable.

Remote Hood Release: Clearly identified inside hood release located on the driver's side. There must be sufficient difference of the hood control from the brake release that there can be no confusion between the two under any circumstance or condition.

Roof Top Reinforcement and Special Wiring: At manufacturer's option: may be to California Highway Patrol, Los Angeles Police Department, Los Angeles County Sheriff's Department or Michigan State Police specifications.

Secondary Ignition Wiring: Resistance type for radio noise suppression.

Special Wiring and Radio Conduit: At manufacturer's option: may be to Los Angeles Police Department, Los Angeles County Sheriff's Department, Michigan State Police or California Highway Patrol specifications.

Speedometer: Shall be calibrated to within 3% accuracy. Preferred scale graduations to be linear and of 2 mph increments. 0-120 MPH scale.

Spotlights: At manufacturer's option: may be California Highway Patrol, Los Angeles Police Department, Los Angeles County Sheriff's Department or Michigan State Police specifications.

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: Round or oval with anti-slip surface. Full or half horn ring preferred. Tilt wheel on all vehicles.

Police Suspension System: To include heavy-duty springs, front and rear, in combination with heavy-duty shock absorbers, and front and rear heavy-duty stabilizer bars.

Tires: Fabric radial, certified to 125 mph, police special. Certified by vehicle manufacturer and tire manufacturer, full size spare necessary.

Tools: Wheel wrench and jack.

Transmission: To be 3-speed fully automatic, heaviest duty available. Must incorporate low gear lockout to prevent manual shifting.

Upholstery: Seats to be upholstered in heaviest duty cloth, or combination of heaviest-duty cloth and vinyl (blue). All vinyl acceptable for California vehicles (tan).

Wheels: Heavy duty, 15" x 6.5" minimum. Manufacturer may supply other size if wheel is heavy duty and is best for suspension.

Windshield Washers: Automatic type, electric.

Windshield Wipers: Multiple speed electric.

Oil Coolers: External heaviest duty oil coolers for transmission oil, power steering and engine oil shall be supplied.

QUALIFICATION TESTING

In order to qualify for further testing, all vehicles submitted by manufacturers must meet each of the following performance standards:

1. Must pass preliminary handling and performance test.

2. BRAKES

   a. Three stops from 90 mph with a constant deceleration rate of 22 ft. per sec./per sec. maintained from 90 to 0 mph. Actual brake application to be made at two-minute intervals followed immediately by a controlled impending skid stop from 60 mph at maximum deceleration rate attainable. (Vehicle to remain stationary between first, second, and third 90 mph stops, and before fourth stop from 60 mph.)

   b. Five minutes after test "a" has been completed, it will be repeated, followed immediately by a panic (all wheel lock) stop from 60 mph. Tendency for brake fade and ability of the vehicle to stop in a straight line will be evaluated.

FAILURE OF A VEHICLE TO MEET ANY PORTION OF THE FOREGOING PERFORMANCE STANDARDS WILL RESULT IN THAT VEHICLE'S DISQUALIFICATION FROM FURTHER TESTING.

VEHICLE SPECIFICATIONS SUMMARY

Federal (49 State) Vehicles

MODEL	V-8 ENGINE CUBIC INCHES	HORSE-POWER @ RPM	TORQUE FT. LBS. @ RPM	AXLE RATIO	OVERALL LENGTH	OVERALL HEIGHT	WEIGHT	WHEEL-BASE	HEAD ROOM FRONT	HEAD ROOM REAR	LEG ROOM FRONT	LEG ROOM REAR	SHOULDER ROOM FRONT	SHOULDER ROOM REAR	HIP ROOM FRONT	HIP ROOM REAR
Aspen	360	195 @ 4000	280 @ 2400	3.21	201.2"	55.3"	3830	112.7"	39.3"	37.7"	42.7"	37.8"	55.8"	55.6"	57.2"	57.0"
Fairmont	302	137 @ 3600	250 @ 1800	2.26	194.9"	53.5"	3240	105.5"	38.3"	37.5"	41.8"	35.4"	56.7"	56.7"	56.2"	56.7"
Impala	350	170 @ 3800	270 @ 2400	3.08	212.1"	56.0"	4010	116.0"	39.4"	38.2"	42.4"	39.0"	60.8"	60.8"	55.0"	55.3"
LTD	351	142 @ 3200	286 @ 1400	3.08	209.0"	54.5"	3960	114.4"	38.0"	37.4"	42.0"	40.5"	61.7"	61.7"	61.2"	58.0"
LTD II	351	151 @ 3600	270 @ 2200	2.47	219.5"	53.3"	4490	118.0"	38.0"	37.0"	42.3"	37.1"	58.6"	58.2"	58.8"	58.2"
Malibu	350	170 @ 3800	270 @ 2400	2.73	192.7"	54.2"	3540	108.1"	38.7"	37.7"	42.8"	38.0"	57.3"	57.1"	52.2"	55.6"
Newport	360	195 @ 4000	280 @ 2400	2.71	220.2"	54.5"	4110	118.5"	38.6"	37.4"	42.3"	38.2"	61.0"	61.0"	57.6"	57.4"
St. Regis	360	195 @ 4000	280 @ 2400	2.71	220.2"	54.5"	4140	118.5"	38.6"	37.4"	42.3"	38.2"	61.0"	61.0"	57.6"	57.4"
Volare	360	195 @ 4000	280 @ 2400	3.21	201.2"	55.3"	3840	112.7"	39.3"	37.7"	42.7"	37.8"	55.8"	55.6"	57.2"	57.0"

VEHICLE SPECIFICATIONS SUMMARY

California Vehicles

MODEL	V-8 ENGINE CUBIC INCHES	HORSE-POWER @ RPM	TORQUE FT. LBS. @ RPM	AXLE RATIO	OVERALL LENGTH	OVERALL HEIGHT	WEIGHT	WHEEL-BASE	HEAD ROOM FRONT	HEAD ROOM REAR	LEG ROOM FRONT	LEG ROOM REAR	SHOULDER ROOM FRONT	SHOULDER ROOM REAR	HIP ROOM FRONT	HIP ROOM REAR
Aspen	360	190 @ 4000	275 @ 2000	3.21	201.2"	55.3"	3920	112.7"	39.3"	37.7"	42.7"	38.8"	55.8"	55.6"	57.2"	57.0"
Fairmont	302	143 @ 3600	243 @ 2200	2.73	194.9"	53.5"	3250	105.5"	38.3"	37.5"	41.8"	35.4"	56.7"	56.7"	56.2"	56.7"
Impala	350	165 @ 3800	260 @ 2400	3.08	212.1"	56.0"	4010	116.0"	39.4"	38.2"	42.4"	39.0"	60.8"	60.8"	55.0"	55.3"
LTD	351	138 @ 3200	260 @ 2000	3.08	209.0"	54.5"	3950	114.4"	38.0"	37.4"	42.0"	40.5"	61.7"	61.7"	61.2"	58.0"
LTD II	351	149 @ 3800	258 @ 2200	2.47	219.5"	53.3"	4500	118.0"	38.0"	37.0"	42.3"	37.1"	58.6"	58.2"	58.8"	58.2"
Malibu	350	165 @ 3800	260 @ 2400	2.73	192.7"	54.2"	3560	108.1"	38.7"	37.7"	42.8"	38.0"	57.3"	57.1"	52.2"	55.6"
Newport	360	190 @ 4000	275 @ 2000	2.71	220.2"	54.5"	4150	118.5"	38.6"	37.4"	42.3"	38.2"	61.0"	61.0"	57.6"	57.4"
St. Regis	360	190 @ 4000	275 @ 2000	2.71	220.2"	54.5"	4160	118.5"	38.6"	37.4"	42.3"	38.2"	61.0"	61.0"	57.6"	57.4"
Volare	360	190 @ 4000	275 @ 2000	3.21	201.2"	55.3"	3930	112.7"	39.3"	37.7"	42.7"	37.8"	55.8"	55.6"	57.2"	57.0"

Excerpted from: Anthropometry of Law Enforcement Officers
Law Enforcement Standards Laboratory
LESP-RPT-0701.00 -- December 1976
National Bureau of Standards
Washington, D.C.

SITTING HEIGHT *

SITTING HEIGHT: Subject sits erect with head level and with feet resting on a surface adjusted so that his knees are bent at right angles. With the anthropometer arm firmly touching the scalp to compress the hair, the vertical distance from the sitting surface to the top of the head is measured. An anthropometer is used.

MILLIMETERS		INCHES
921.80	MEAN VALUE	36.29
0.63	SE (MEAN)	0.02
34.45	SD DEVIATION	1.36
0.45	SE (SD DEV)	0.02

* * * *

SYMMETRY - - - VETA I	=	0.08
KURTOSIS - - - VETA II	=	3.17
COEF. OF VARIATION	=	3.7%

* * * *

NUMBER OF SUBJECTS = 2984

* * * *

THE PERCENTILES

MILLIMETERS		INCHES
1002.85	99TH	39.48
992.16	98TH	39.06
986.75	97TH	38.85
978.59	95TH	38.53
966.07	90TH	38.03
956.92	85TH	37.67
949.64	80TH	37.39
944.02	75TH	37.17
939.16	70TH	36.97
934.70	65TH	36.80
930.48	60TH	36.63
926.20	55TH	36.46
922.36	50TH	36.31
918.48	45TH	36.16
914.36	40TH	36.00
909.80	35TH	35.82
904.51	30TH	35.61
898.91	25TH	35.39
892.62	20TH	35.14
886.37	15TH	34.90
877.17	10TH	34.53
865.25	5TH	34.06
855.60	3RD	33.68
848.94	2ND	33.42
837.94	1ST	32.99

*Sitting height data should be compared to head room data on the preceding pages. This data indicates that some officers will not have sufficient head room in some of the vehicles tested.

MEASUREMENT SITTING HEIGHT

	Number	Mean mm	Mean in	SD mm	SD in	Range mm	Range in
Total Sample	2984	921.80	36.29	34.96	1.36	789–1030	31.06–40.55
Experienced Officers	2030	925.14	36.42	34.96	1.38	789–1030	31.06–40.55
Recruits	954	914.70	36.01	32.24	1.27	804–1009	31.65–39.72
Agency							
Police	2052	922.64	36.32	33.87	1.33	789–1030	31.06–40.55
Sheriff	520	917.69	36.13	36.84	1.45	795–1028	31.30–40.47
Highway Patrol/State Police	176	926.76	36.49	31.65	1.25	835–1003	32.87–39.49
Prison/Penitentiary	236	919.85	36.21	35.23	1.39	830–1025	32.68–40.35
Region							
San Diego	383	936.18	36.86	31.65	1.25	837–1020	32.95–40.16
Los Angeles	142	922.65	36.32	27.10	1.07	858–999	33.78–39.33
Phoenix/Tucson	114	927.10	36.50	32.09	1.26	840–1005	33.07–39.57
Dallas/Fort Worth	156	938.99	36.97	28.76	1.13	854–1003	33.62–39.49
Houston/Galveston	329	902.86	35.55	34.37	1.35	806–1028	31.73–40.47
New Orleans/Baton Rouge	106	904.13	35.60	37.26	1.47	795–1012	31.30–39.84
Miami/Fort Lauderdale	173	920.67	36.25	32.31	1.27	833–1004	32.80–39.53
Atlanta	146	922.44	36.32	35.16	1.38	836–1025	32.91–40.35
Washington D.C.	241	902.39	35.53	36.33	1.43	789–1001	31.06–39.41
New York	304	915.77	36.05	30.45	1.20	819–1009	32.24–39.72
Detroit	80	927.15	36.50	31.46	1.24	860–1006	33.86–39.61
Minneapolis/St. Paul	209	926.79	36.49	28.93	1.14	853–1018	33.58–40.08
Kansas City	150	929.17	36.58	31.49	1.24	848–1030	33.39–40.55
Denver	177	922.75	36.33	32.99	1.30	840–1018	33.07–40.08
Helena/Butte	106	929.32	36.59	33.82	1.33	830–1014	32.68–39.92
Spokane	51	933.10	36.74	28.26	1.11	872–1005	34.33–39.57
Portland	117	936.25	36.86	32.10	1.26	869–1014	34.21–39.92
Ethnic Background							
Black	281	891.93	35.12	35.32	1.39	789–995	31.06–39.17
Mexican American	97	903.91	35.59	29.43	1.16	835–972	32.87–38.27
Puerto Rican/Cuban	27	903.22	35.56	25.39	1.00	854–957	33.62–37.68
American Indian	42	917.86	36.14	41.29	1.63	795–987	31.30–38.86
European, Northern	240	930.73	36.64	32.61	1.28	853–1028	33.58–40.47
European, Eastern	140	924.26	36.39	30.28	1.19	826–1006	32.52–39.61
European, Southern	205	912.86	35.94	28.67	1.13	814–1012	32.05–39.84
European, Western	1489	924.92	36.41	31.82	1.25	828–1025	32.60–40.35
White American	303	935.46	36.83	33.94	1.34	797–1020	31.38–40.16

SHOULDER BREADTH*

SHOULDER BREADTH: Subject sits erect with his arms bent to form right angles at the elbows and with the upper arms hanging freely. The forearms are extended straight ahead. The maximum breadth across the shoulders is measured at the level of the bulges of the deltoid muscles of the upper arms. A beam caliper is used.

THE PERCENTILES

MILLIMETERS		INCHES
573.67	99TH	22.59
560.62	98TH	22.07
552.70	97TH	21.76
543.95	95TH	21.42
532.36	90TH	20.96
524.21	85TH	20.64
517.27	80TH	20.36
512.19	75TH	20.16
507.75	70TH	19.99
503.83	65TH	19.84
500.44	60TH	19.70
497.06	55TH	19.57
493.65	50TH	19.43
490.21	45TH	19.30
486.77	40TH	19.16
483.07	35TH	19.02
479.22	30TH	18.87
475.34	25TH	18.71
470.40	20TH	18.52
465.44	15TH	18.32
458.09	10TH	18.03
447.82	5TH	17.63
440.51	3RD	17.34
435.61	2ND	17.15
427.83	1ST	16.84

MILLIMETERS		INCHES
494.72	MEAN VALUE	19.48
0.54	SE (MEAN)	0.02
29.42	SD DEVIATION	1.16
0.38	SE (SD DEV)	0.01

* * * *

SYMMETRY - - - VETA I	= 0.40
KURTOSIS - - - VETA II	= 4.23
COEF. OF VARIATION	= 5.9%

* * * *

NUMBER OF SUBJECTS = 2985

* * * *

*Shoulder breadth data should be compared to shoulder room data on the preceding pages. This data indicates that all vehicles tested have sufficient shoulder room for two officers.

MEASUREMENT SHOULDER BREADTH

	Number	Mean mm	Mean in	SD mm	SD in	Range mm	Range in
Total Sample	2985	494.72	19.48	29.43	1.16	406–685	15.98–26.97
Experienced Officers	2032	498.90	19.64	29.62	1.17	408–685	16.06–26.97
Recruits	953	485.79	19.13	26.91	1.06	406–584	15.98–22.99
Agency							
Police	2055	494.12	19.45	28.30	1.11	406–639	15.98–25.16
Sheriff	519	498.68	19.63	33.27	1.31	415–685	16.34–26.97
Highway Patrol/State Police	175	491.78	19.36	27.51	1.08	417–563	16.42–22.17
Prison/Penitentiary	236	493.34	19.42	30.59	1.20	428–644	16.85–25.35
Region							
San Diego	385	501.54	19.75	25.74	1.01	425–586	16.73–23.07
Los Angeles	142	482.35	18.99	21.71	0.85	426–540	16.77–21.26
Phoenix/Tucson	113	502.21	19.77	22.38	0.88	446–568	17.56–22.36
Dallas/Fort Worth	156	498.62	19.63	26.86	1.06	435–589	17.13–23.19
Houston/Galveston	328	495.32	19.50	35.97	1.42	415–604	16.34–23.78
New Orleans/Baton Rouge	106	478.52	18.84	28.64	1.13	412–556	16.22–21.89
Miami/Fort Lauderdale	174	497.56	19.59	27.18	1.07	431–584	16.97–22.99
Atlanta	146	491.99	19.37	31.33	1.23	421–644	16.57–25.35
Washington D.C.	240	491.78	19.36	25.19	0.99	418–576	16.46–22.68
New York	304	483.49	19.03	26.90	1.06	408–576	16.06–22.68
Detroit	80	491.85	19.36	30.45	1.20	406–555	15.98–21.85
Minneapolis/St. Paul	209	502.64	19.79	27.85	1.10	435–639	17.13–25.16
Kansas City	151	497.97	19.60	33.19	1.31	422–599	16.61–23.58
Denver	177	496.85	19.56	29.06	1.14	425–590	16.73–23.23
Helena/Butte	106	495.53	19.51	29.33	1.15	428–578	16.85–22.76
Spokane	51	500.18	19.69	36.80	1.45	441–685	17.36–26.97
Portland	117	499.50	19.67	27.14	1.07	432–568	17.01–22.36
Ethnic Background							
Black	280	495.31	19.50	30.18	1.19	406–596	15.98–23.46
Mexican American	98	499.55	19.67	30.31	1.19	431–639	16.97–25.16
Puerto Rican/Cuban	27	486.85	19.17	24.70	0.97	415–534	16.34–21.02
American Indian	42	498.69	19.63	42.99	1.69	415–604	16.34–23.78
European, Northern	240	497.49	19.59	28.32	1.11	428–685	16.85–26.97
European, Eastern	141	492.64	19.40	27.17	1.07	415–563	16.34–22.17
European, Southern	205	490.08	19.29	26.55	1.05	420–569	16.54–22.40
European, Western	1490	493.30	19.42	29.13	1.15	408–644	16.06–25.35
White American	304	499.79	19.68	28.92	1.14	416–586	16.38–23.07

PRELIMINARY HANDLING EVALUATION

(VEHICLE DYNAMICS TESTING)

PREMISE - Police patrol vehicles must have handling characteristics which are superior to standard vehicles. High speed cornering and handling ability are essential in pursuit situations and can offset losses in outright top speed capability. Accident avoidance characteristics can also be greatly increased with a vehicle designed for maximum handling.

TEST OBJECTIVE - Determine each vehicle's high speed pursuit handling characteristics and performance in comparison to the other vehicles in the test group. The course used is a road-racing type course 1.84 miles in length. The course simulates actual conditions encountered in pursuit 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 in offering balanced packages in terms of their blending of suspension components, acceleration capabilities, and braking characteristics of their cars. Serious deficiencies in handling, acceleration, or braking will result in a relatively poor score on this test.

METHODOLOGY - Each vehicle will be driven over the course for at least 16 timed laps, using at least four separate drivers. Each vehicle's lap times will be averaged to derive the final score on this test.

PRELIMINARY HANDLING EVALUATION*

(VEHICLE DYNAMICS TESTING)

Federal (49 State) Vehicles

VEHICLE	LAP #	DRIVER 1	DRIVER 2	DRIVER 3	DRIVER 4	AVERAGE
DODGE ASPEN	1	1.36.13	1.35.14	1.34.70	1.34.03	1.34.96
	2	1.35.80	1.35.28	1.34.84	1.33.67	
	3	1.35.80	1.35.47	1.34.72	1.33.29	
	4	1.35.09	1.36.03	1.35.55	1.33.77	
FORD FAIRMONT	1	1.37.34	1.36.56	1.34.68	1.34.60	1.35.65
	2	1.36.75	1.36.14	1.35.03	1.34.20	
	3	1.36.55	1.36.72	1.34.73	1.34.28	
	4	1.36.50	1.36.38	1.35.32	1.34.61	
CHEVROLET IMPALA	1	1.37.03	1.36.01	1.35.98	1.34.97	1.35.92
	2	1.37.21	1.36.83	1.36.18	1.34.89	
	3	1.36.29	1.36.39	1.35.79	1.34.45	
	4	1.36.15	1.36.54	1.35.56	1.34.42	
FORD LTD	1	1.38.95	1.37.79	1.38.06	1.39.18	1.38.48
	2	1.39.00	1.37.71	1.38.04	1.39.38	
	3	1.38.49	1.38.13	1.37.87	1.39.04	
	4	1.38.14	1.38.33	1.38.35	1.39.19	
FORD LTD II	1	1.41.41	1.40.02	1.40.50	1.39.66	1.40.13
	2	1.40.47	1.40.14	1.40.78	1.39.55	
	3	1.39.68	1.40.07	1.40.64	1.39.67	
	4	1.39.79	1.39.69	1.40.45	1.39.58	
CHEVROLET MALIBU	1	1.33.88	1.35.36	1.36.29	1.33.41	1.34.78
	2	1.34.51	1.35.16	1.34.93	1.33.49	
	3	1.33.94	1.35.44	1.36.07	1.33.49	
	4	1.35.45	1.35.38	1.36.34	1.33.23	
CHRYSLER NEWPORT	1	1.35.09	1.35.13	1.34.04	1.33.97	1.34.55
	2	1.34.91	1.35.17	1.33.91	1.33.46	
	3	1.35.03	1.35.34	1.34.01	1.34.02	
	4	1.34.62	1.35.55	1.34.48	1.34.12	
DODGE ST. REGIS	1	1.35.68	1.34.84	1.33.82	1.34.18	1.34.99
	2	1.35.93	1.34.98	1.33.84	1.34.46	
	3	1.36.04	1.36.02	1.34.12	1.34.75	
	4	1.36.32	1.35.55	1.34.38	1.35.03	
PLYMOUTH VOLARE	1	1.35.51	1.36.31	1.35.00	1.35.52	1.35.62
	2	1.35.13	1.36.48	1.34.91	1.34.88	
	3	1.35.75	1.36.38	1.35.50	1.35.15	
	4	1.36.17	1.36.52	1.35.49	1.35.13	

*All times in minutes, seconds, and hundredths of a second, i.e., 1.34.96 = 1 minute, 34 seconds, and 96/100 of a second.

PRELIMINARY HANDLING EVALUATION*

(VEHICLE DYNAMICS TESTING)

California Vehicles

VEHICLE	LAP #	DRIVER 1	DRIVER 2	DRIVER 3	DRIVER 4	AVERAGE
DODGE ASPEN	1	1.34.42	1.35.16	1.35.57	1.35.70	1.35.29
	2	1.34.83	1.36.17	1.35.44	1.35.08	
	3	1.34.65	1.34.94	1.36.36	1.35.58	
	4	1.34.88	1.34.91	1.35.42	1.35.41	
FORD FAIRMONT	1	1.34.67	1.34.87	1.35.63	1.36.51	1.35.31
	2	1.34.77	1.34.69	1.35.38	1.35.66	
	3	1.34.37	1.34.83	1.35.81	1.35.88	
	4	1.34.91	1.34.67	1.35.09	1.36.29	
CHEVROLET IMPALA	1	1.35.51	1.36.07	1.35.92	1.37.04	1.36.11
	2	1.35.77	1.35.90	1.35.84	1.37.55	
	3	1.35.48	1.35.86	1.35.09	1.37.27	
	4	1.35.19	1.35.28	1.36.39	1.37.52	
FORD LTD	1	1.40.46	1.40.23	1.38.89	1.38.56	1.39.54
	2	1.40.42	1.39.96	1.39.03	1.38.82	
	3	1.39.99	1.40.58	1.39.29	1.38.64	
	4	1.39.71	1.40.43	1.39.01	1.38.58	
FORD LTD II	1	1.42.56	1.41.63	1.41.80	1.42.00	1.41.96
	2	1.42.41	1.40.79	1.41.44	1.42.22	
	3	1.42.95	1.41.17	1.41.27	1.42.75	
	4	1.42.21	1.41.49	1.41.98	1.42.63	
CHEVROLET MALIBU	1	1.36.01	1.35.99	1.35.80	1.35.69	1.36.09
	2	1.36.39	1.36.05	1.36.98	1.36.27	
	3	1.35.83	1.34.88	1.37.20	1.36.01	
	4	1.37.07	1.35.35	1.36.42	1.35.46	
CHRYSLER NEWPORT	1	1.35.10	1.34.76	1.35.57	1.35.67	1.35.55
	2	1.36.03	1.35.02	1.36.02	1.35.82	
	3	1.35.91	1.34.82	1.36.30	1.35.66	
	4	1.35.57	1.34.76	1.36.33	1.35.41	
DODGE ST. REGIS	1	1.35.97	1.34.25	1.36.71	1.36.25	1.35.76
	2	1.35.50	1.34.63	1.36.36	1.36.16	
	3	1.35.70	1.35.46	1.36.01	1.36.08	
	4	1.35.73	1.34.93	1.36.36	1.35.95	
PLYMOUTH VOLARE	1	1.35.92	1.37.38	1.36.80	1.37.10	1.36.66
	2	1.36.27	1.36.22	1.36.78	1.37.16	
	3	1.35.71	1.36.17	1.37.46	1.37.10	
	4	1.36.06	1.35.94	1.37.20	1.37.29	

*All times in minutes, seconds, and hundredths of a second, i.e., 1.35.29 = 1 minute, 35 seconds, and 29/100 of a second.

BRAKE TESTING

PREMISE - Police patrol vehicles must be equipped with brakes which are capable of decelerating the vehicle as quickly as possible under extreme conditions, while allowing a high level of control to be maintained.

TEST OBJECTIVE - Qualification Test: Determine the acceptability of each vehicle's braking performance for patrol and high speed pursuit service. The test will include evaluation of each vehicle's ability to maintain a constant deceleration rate of 22 ft/sec^2 on two sequences of three 90 - 0 mph stops, tendency for brake fade, ability to lock up evenly once heated up, and ability to maintain a straight line stop on the four-wheel lockup. Failure eliminates the vehicle from further testing.

METHODOLOGY - Each vehicle will first be required to make three 90 - 0 mph decelerations at 22 ft/sec^2, with the driver using a decelerometer to determine the deceleration rate. Following, the vehicle will make one impending skid type 60 - 0 mph deceleration on which 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 these figures, the average deceleration rate for the stop can be calculated. Following a 5 minute cooling period, this sequence will be repeated. This second sequence will be followed by one 60 - 0 mph full four-wheel lock stop, both to determine ability of the brakes to lock and ability of the vehicle to stop in a straight line within its lane.

DECELERATION RATE FORMULA -

$$\frac{*\text{Initial Velocity}^2}{2 \times \text{Stopping Distance}} = \text{Deceleration rate in ft/sec}^2$$

EXAMPLE:

60.8 MPH = 89.1733 ft/sec $(89.1733 \times 89.1733) = (89.1733)^2 =$

$$\frac{7951.8774}{342.8} = 23.1968 \text{ ft/sec}^2$$

171.4 ft. X 2

*Initial velocity in miles per hour (MPH) = $\frac{\text{MPH} \times 5280 \text{ ft.}}{3600 \text{ sec.}}$ = ft/sec

The brake test summary report shows the average feet per second squared that each vehicle stopped during brake tests. Actual stopping distance and speed are recorded on the detail sheets that follow the summary. Since all speeds at brake application were not identical, a computed stopping distance from 60 mph appears in the second column. This distance was computed using the average feet per second squared recorded in the actual tests. Using the same formula, a 90 mph stopping distance has also been computed. We believe that stopping distance more graphically illustrated the braking performance than just the average feet per second squared. To find any stopping distance when the average feet per second squared is known use the following calculations.

$$\left(\frac{\text{MPH X 5280}}{3600}\right)^2 \div 2 = \frac{}{}* \div \text{ft/sec}^2 = \text{Stopping Distance}$$

*Use the answer from above and divide by the average feet per second squared to arrive at the distance for a particular MPH.

EXAMPLES: "A" vehicle is capable of stopping at 23.00 ft/sec^2.
How fast can it stop from 30 mph?

1. 30 X 5280 = 158,400

   158,400 ÷ 3600 = 44.00

   $(44.00)^2$ = 44.00 X 44.00 = 1936 ÷ 2 = 968

   968 ÷ 23.00 = 42.09 ft. at 30 mph

2. "B" vehicle - 22.00 ft/sec^2

   968 ÷ 22.00 = 44.00 ft. at 30 mph

All vehicles tested passed the brake test. The two Chevrolet Malibus had their braking systems rebuilt during testing as both exhibited premature rear wheel lockups and/or unpredictable rear wheel lockups. After the brake systems were rebuilt, the cars passed the brake test. Also, the Chevrolet Impala had the master cylinder replaced after the brake test because the vehicle exhibited some low pedal problems, but not consistently.

Following is a summary of the brake testing reports. See Appendix A for complete data.

BRAKE TEST SUMMARY

49 State (Federal) Vehicles

Vehicle	Average Ft/Sec^2	Computed Distance for 60 MPH Stop in Feet	Computed Distance for 90 MPH Stop in Feet
Aspen	23.2	167.1	376.0
Fairmont	23.0	168.6	379.3
Impala	21.0	184.6	415.3
LTD	21.8	177.6	399.6
LTD II	22.0	175.8	395.6
Malibu	22.5	172.3	387.7
Newport	20.6	187.6	422.1
St. Regis	23.1	168.0	378.0
Volare	21.9	177.0	398.2

California Vehicles

Vehicle	Average Ft/Sec^2	Computed Distance for 60 MPH Stop in Feet	Computed Distance for 90 MPH Stop in Feet
Aspen	23.9	161.8	364.1
Fairmont	20.8	186.5	491.7
Impala	21.2	183.0	411.7
LTD	22.2	174.8	393.3
LTD II	23.2	166.8	375.2
Malibu	22.1	175.3	394.4
Newport	23.1	167.6	377.1
St. Regis	19.2	201.9	454.2
Volare	23.2	166.8	375.4

FUEL ECONOMY

Each vehicle was subjected to a fuel economy test. The test was conducted over a prescribed 72.125 mile loop used by the Los Angeles County Sheriff's Department. The loop contains a mixture of urban, suburban, and freeway surfaces. Each vehicle was driven for two loops using two different drivers and the results were averaged.

The chart on the next page shows the fuel economy results. Both loops are reported and then the average. The "60% of average column" is a figure computed by taking 60% of the average miles per gallon of each car. In the past, this figure has been the actual figure the Los Angeles County Sheriff's Department got from their fleet of automobiles based on the test figure.

Also reported for users' information are the EPA figures for each car. These figures are city, highway and combined. The combined figures equal 55% city and 45% highway.

FUEL ECONOMY

Federal (49 State) Vehicles

(All figures in miles per gallons)

MODEL	LOOP 1	LOOP 2	AVERAGE	60% OF AVERAGE	EPA CITY	EPA HIGHWAY	EPA COMBINED
Aspen	13.61	12.44	13.03	7.82	13	21	16
Fairmont	16.77	16.03	16.40	9.84	16	23	18
Impala	14.72	15.03	14.88	8.93	16	21	18
LTD	13.87	13.61	13.74	8.24	14	20	16
LTD II	13.61	12.65	13.13	7.88	13	19	15
Malibu	16.21	14.72	15.47	9.28	16	21	18
Newport	15.35	15.03	15.19	9.11	12	17	14
St. Regis	15.68	14.43	15.06	9.04	12	17	14
Volare	13.87	13.61	13.74	8.24	13	21	16

California Vehicles

MODEL	LOOP 1	LOOP 2	AVERAGE	60% OF AVERAGE	EPA CITY	EPA HIGHWAY	EPA COMBINED
Aspen	12.65	12.02	12.34	7.40	13	20	16
Fairmont	14.43	14.43	14.43	8.66	15	20	17
Impala	16.21	12.88	14.55	8.73	13	17	15
LTD	12.65	12.22	12.44	7.46	14	21	17
LTD II	12.88	12.44	12.66	7.60	11	17	13
Malibu	14.00	12.77	13.39	8.03	13	17	15
Newport	15.03	14.14	14.59	8.75	13	20	16
St. Regis	14.72	13.87	14.30	8.58	13	20	16
Volare	12.22	11.10	11.66	7.00	13	20	16

ACCELERATION AND TOP SPEED TESTING

ACCELERATION

PREMISE - Police patrol vehicles must be capable of accelerating to highway speeds and greater as quickly as possible in order to minimize the delay between violation and apprehension.

TEST OBJECTIVE - Determine the ability of each test vehicle to accelerate from a standing start to 60 mph, 80 mph, and 100 mph.

METHODOLOGY - Using a fifth wheel in conjunction with an electronic digital speed meter and an electronic multi-function timer, each vehicle is driven through four acceleration sequences; two westbound and two eastbound to allow for wind direction. The four resulting times for each target speed are averaged.

TOP SPEED

PREMISE - State police patrol vehicles must be capable of attaining a minimum top speed of 110 mph within a distance of three miles or less in order to successfully pursue, overtake, and apprehend violators on freeways and interstate highways. (Due to OMS track design and wind conditions the maximum top speed for two laps (5 miles) was measured).

Competitive Test: Determine the actual top speed attainable within a distance of five miles from a standing start.

METHODOLOGY - Following the fourth acceleration to 100 mph, the vehicle shall continue to accelerate to the top speed attainable within five miles from the start of the run.

Acceleration and top speed tests were conducted at the Ontario Motor Speedway (OMS). The weather conditions at OMS were not ideal. Strong gusty winds were prevalent throughout the two test days, December 7-8, 1978. Times recorded are slower than those comparable times obtained at the Los Angeles County Fairgrounds and previous tests done by the Michigan State Police on some 49 state (Federal) vehicles. For comparison purposes we have included the Michigan State Police results along with the OMS results for those cars tested at both Michigan and OMS.

It should be noted that the Chrysler Newport and Dodge St. Regis had 3.21 rear end ratios in the Michigan tests and 2.71 rear end ratios in the OMS tests, which will account for some discrepancies in times between the two tests.

The Chrysler Newport experienced mechanical problems during the OMS testing. Repairs were attempted at track-side, but the vehicle got slower as it ran and the problem could not be diagnosed at the time.

Acceleration and top speed data are summarized on the following page. Appendix B contains the full test data.

SUMMARY OF ACCELERATION AND TOP SPEED TESTS CONDUCTED AT ONTARIO MOTOR SPEEDWAY

Model (Federal)	Average 0-60 (Seconds)	Average 0-80 (Seconds)	Average 0-100 (Seconds)	Quarter Mile Speed MPH	Quarter Mile Time (Seconds)	Top Speed MPH
Dodge Aspen	9.98	18.07	34.19	79.25	17.25	112.5
Ford Fairmont	11.31	21.07	48.09	75.75	17.75	108.2
Chevrolet Impala	12.37	22.29	42.61	76.40	18.43	110.4
Ford LTD	11.99	23.87	N/A	72.25	18.19	104.0
Ford LTD II	14.02	27.25	*	71.2	19.45	102.4
Chevrolet Malibu	11.00	20.58	41.87	76.2	N/A	109.3
Chrysler Newport	12.77	23.90	48.58	N/A	N/A	108.4
Chrysler Newport (Retest)	11.11	20.54	41.95	81.6	17.08	111.5
Dodge St. Regis	10.79	18.88	37.15	79.2	18.04	115.2
Dodge St. Regis (Retest)	9.69	17.06	34.05	80.45	17.18	117.0
Plymouth Volare	10.00	18.33	34.64	77.7	17.32	112.1

SUMMARY OF ACCELERATION AND TOP SPEED TESTS CONDUCTED AT ONTARIO MOTOR SPEEDWAY

Model (California)	Average 0-60 (Seconds)	Average 0-80 (Seconds)	Average 0-100 (Seconds)	Quarter Mile Speed MPH	Quarter Mile Time (Seconds)	Top Speed MPH
Dodge Aspen	10.83	19.51	37.51	77.3	17.97	110.6
Ford Fairmont	11.12	21.66	44.26	76.1	18.13	108.1
Chevrolet Impala	12.40	23.51	44.61	75.25	18.43	109.2
Ford LTD	12.25	24.73	*	73.15	18.76	102.4
Ford LTD II	14.94	29.21	*	69.85	20.27	99.4
Chevrolet Malibu	11.03	20.97	41.59	75.85	N/A	108.2
Chrysler Newport	11.23	19.38	37.43	78.65	18.94	114.4
Dodge St. Regis	11.23	19.48	40.62	79.15	18.26	116.1
Plymouth Volare	12.18	22.43	44.56	74.25	18.70	107.2

*Unable to attain speed due to wind and lack of engine power.

INSTRUMENTED PERFORMANCE TEST DESCRIPTION

The instrumented performance tests were conducted at the Los Angeles County Fairgrounds (LACFG).

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

Submitted cars are run through two subtests designed to measure their resistance to side force or skidding. The first of these is a series of increasing-severity lane changes with recovery to the first lane between each change. Measurements in terms of g-force are made for each change as well as for the recovery. This test relates directly to the ability of the car in the field to not only perform an evasive maneuver successfully but to recover from the maneuver safely. The greater the g-force scores in this test are, the better the ability is of the car to perform safely in an emergency situation. The second subtest is a steady-state turn around a 200 ft. diameter circle, a standard industry test. This test shows the balance of the car as well as its ability to remain stable in a long turn or curve. The higher the g-force generated in this test, the better the suspension is balanced and therefore the more neutral with less tendency to extremes of oversteer or understeer.

Acceleration times shown will be faster than those recorded at the Ontario Motor Speedway. Wind conditions at Ontario slowed all cars. However, Ontario had to be used because the LACFG facility was not designed for top end measurement.

INSTRUMENTED PERFORMANCE TEST

Federal (49 State) Vehicles

TEST RESULTS (Time/Speed/g's)	DODGE ASPEN	FORD FAIRMONT	CHEVROLET IMPALA	FORD LTD	FORD LTD II	CHEVROLET MALIBU	CHRYSLER NEWPORT	DODGE ST. REGIS	PLYMOUTH VOLARE
Acceleration									
0 - 30 mph (sec.)	3.50	3.93	3.76	3.97	4.93	3.53	3.53	3.56	3.37
0 - 45 mph (sec.)	5.98	6.53	6.13	6.73	8.63	5.80	6.13	6.00	5.80
0 - 60 mph (sec.)	9.35	10.30	9.73	11.23	14.03	9.03	9.33	9.30	8.86
¼ mile standing start	78.00 mph	77.30 mph	79.60 mph	73.40 mph	70.00 mph	81.23 mph	81.50 mph	80.73 mph	79.30 mph
Maximum force (g's)	0.44 g	0.345 g	0.48 g	0.38 g	0.32 g	0.42 g	0.42 g	0.42 g	0.442 g
30 - 50 mph (sec.)	3.53	3.97	3.70	3.97	5.10	3.23	3.67	3.43	3.57
30 - 65 mph (sec.)	7.50	8.20	7.63	8.90	11.77	6.83	7.57	7.33	6.93
60 - 80 mph (sec.)	6.95	8.00	7.36	8.60	12.03	7.36	7.27	6.56	6.43
60 - 95 mph (sec.)	15.375	20.10	15.83	N/A	Incomplete	16.00	15.47	15.03	13.93
Braking									
30 - 0 mph	0.923 g	0.851 g	0.90 g	0.791 g	1.00 g	0.953 g	0.799 g	0.88 g	0.865 g
60 - 0 mph	0.879 g	0.884 g	0.93 g	0.763 g	0.94 g	0.848 g	0.802 g	0.90 g	0.817 g
Handling & Recovery									
One lane change	0.683 g	0.800 g	0.695 g	0.692 g	0.770 g	0.759 g	0.680 g	0.760 g	0.772 g
Two lane change	0.888 g	0.900 g	0.875 g	0.800 g	0.831 g	0.840 g	0.815 g	0.800 g	0.820 g
Three lane change	0.789 g	0.800 g	0.738 g	0.590 g	0.737 g	0.772 g	0.660 g	0.720 g	0.738 g
Recovery	0.751 g	0.739 g	0.761 g	0.756 g	0.680 g	0.810 g	0.760 g	0.660 g	0.719 g
Left Circle (200' DIA)	0.800 g	0.800 g	0.780 g	0.800 g	0.780 g	0.783 g	0.760 g	0.800 g	0.800 g
Right Circle (200' DIA)	0.771 g	0.760 g	0.778 g	0.760 g	0.710 g	0.800 g	0.780 g	0.759 g	0.740 g

INSTRUMENTED PERFORMANCE TEST

California Vehicles

TEST RESULTS (Time/Speed/g's)	DODGE ASPEN	FORD FAIRMONT	CHEVROLET IMPALA	FORD LTD	FORD LTD II	CHEVROLET MALIBU	CHRYSLER NEWPORT	DODGE ST. REGIS	PLYMOUTH VOLARE
Acceleration									
0 - 30 mph (sec.)	3.46	3.73	3.86	3.93	5.10	3.73	3.83	3.83	3.90
0 - 45 mph (sec.)	6.00	6.67	6.46	6.86	8.70	6.20	6.23	6.36	6.70
0 - 60 mph (sec.)	9.90	10.13	10.26	11.20	14.03	9.73	9.77	9.90	10.30
¼ mile standing start	78.40 mph	77.40 mph	78.06 mph	74.00 mph	71.07 mph	79.00 mph	81.80 mph	81.16 mph	79.30 mph
Maximum force (g's)	0.423 g	0.44 g	0.44 g	0.379 g	0.341 g	0.38 g	0.375 g	0.457 g	0.42 g
30 - 50 mph (sec.)	3.63	3.83	3.76	4.23	5.40	3.40	3.43	3.60	3.80
30 - 65 mph (sec.)	7.86	8.00	7.83	9.20	11.50	7.27	7.30	7.60	7.90
60 - 80 mph (sec.)	7.36	7.90	8.00	9.47	11.17	7.67	6.63	6.80	7.35
60 - 95 mph (sec.)	16.73	19.50	17.80	Incomplete	N/A	17.47	15.07	15.96	16.65
Braking									
30 - 0 mph	0.92 g	0.739 g	0.856 g	0.826 g	0.784 g	0.88 g	0.820 g	0.78 g	0.798 g
60 - 0 mph	0.85 g	0.763 g	0.867 g	0.780 g	0.838 g	0.88 g	0.838 g	0.76 g	0.784 g
Handling & Recovery									
One lane change	0.709 g	0.738 g	0.809 g	0.807 g	0.780 g	0.732 g	0.860 g	0.700 g	0.760 g
Two lane change	0.862 g	0.840 g	0.828 g	0.820 g	0.749 g	0.872 g	0.890 g	0.800 g	0.840 g
Three lane change	0.759 g	0.788 g	0.729 g	0.775 g	0.791 g	0.680 g	0.852 g	0.671 g	0.679 g
Recovery	0.720 g	0.797 g	0.813 g	0.730 g	0.768 g	0.726 g	0.731 g	0.813 g	0.751 g
Left Circle (200' DIA)	0.789 g	0.740 g	0.740 g	0.812 g	0.780 g	0.818 g	0.840 g	0.791 g	0.780 g
Right Circle (200' DIA)	0.780 g	0.799 g	0.764 g	0.680 g	0.779 g	0.800 g	0.779 g	0.818 g	0.809 g

ERGONOMICS

PREMISE - Police patrol vehicles are used for extended periods of time each day by individual officers, and consequently must afford a reasonable degree of comfort; have vehicle instruments and controls placed conveniently; and have adequate available space for carrying personal patrol equipment.

TEST OBJECTIVE - Rate each vehicle's ability to provide a suitable environment for the patrol officer in the performance of his assigned tasks.

METHODOLOGY - Utilizing an ergonomics form developed by the Los Angeles County Sheriff's Department, a minimum of four officers shall independently and individually score each vehicle. The scores will be averaged to minimize personal prejudice for or against any given vehicle.

Each area to be rated will be rated in the terms of poor (1 point), fair (2 points), good (3 points), and excellent (4 points). In this year's test, 24 officers from 20 different departments rated each vehicle. Their numerical scores appear in Appendix C. A 2.50 score would mean the vehicle was rated fair to good in the particular area.

All 27 rating areas are added together to give a total rating of the vehicle. A department can then compare one vehicle to another for purchasing discussions. The Michigan State Police and Los Angeles County Sheriff's Department consider this area of evaluation as 10% of the total evaluation.

Total Ergonomics Score Summary

Aspen	72.20
Fairmont	60.49
Impala	76.93
LTD	77.30
LTD II	66.08
Malibu	75.62
Newport	72.16
St. Regis	76.93
Volare	72.26

MECHANICAL EVALUATION

Each test vehicle was subjected to a mechanical evaluation by mechanics of the Los Angeles County Mechanical Department, and the Los Angeles Police Department. The vehicles were rated on a scale of 1 to 4 with 1 being poor, 2-fair, 3-good, and 4-excellent. A copy of the evaluation form and the average scores for each vehicle are contained in Appendix D. A summary of total scores appears below.

MECHANICAL EVALUATION RATING SUMMARY

	California		Federal	
	Total	Average	Total	Average
Aspen	123.02	2.56	119.18	2.48
Fairmont	115.15	2.40	117.74	2.45
Impala	126.24	2.63	127.73	2.66
LTD	117.00	2.44	116.40	2.47
LTD II	118.50	2.47	119.76	2.50
Malibu	125.23	2.61	127.01	2.65
Newport	119.92	2.50	118.99	2.48
St. Regis	120.67	2.51	116.50	2.43
Volare	120.68	2.51	121.10	2.52

It should be noted that although in overall ratings the vehicles may vary only slightly, substantial variation may occur in one or more of the 48 mechanical items evaluated. Refer to Appendix D for specifics of the mechanical evaluations.

COMMUNICATIONS EVALUATION

PREMISE - Police patrol vehicles must be outfitted with an array of communications and emergency warning equipment. Vehicles must have available space to install the equipment and should be engineered to allow installation in a minimum amount of time.

TEST OBJECTIVE - Determine each vehicle's ability to accommodate the required communications and emergency warning equipment and assess the relative difficulty of such installations. This evaluation will represent five percent of each vehicle's total score.

METHODOLOGY - Personnel of the departmental radio installation unit will compare all vehicles being evaluated and score them based on the relative difficulty of the necessary installations.

The communications evaluations are based on equipment used by the Los Angeles County Sheriff's Department and the California Highway Patrol. The California Highway Patrol also evaluated the use of concealed mechanical sirens for those departments that may still have some older mechanical sirens.

Equipment needs vary from department to department. We would encourage you to use the communications evaluation form and make your own evaluation at your local dealer. While the results give some indication of ease of communication equipment installation, the results should not be considered absolute as this is a subjective evaluation.

LOS ANGELES COUNTY SHERIFF'S DEPARTMENT

AUTOMOTIVE TEST UNIT

COMMUNICATIONS EVALUATION FORM

Grade each factor on a 1 to 10 scale with 1 representing "Totally Unacceptable", 5 representing "Average" and 10 representing "Superior".

A. Glove Compartment Accessibility (undercover use)

Head Control _____

Speaker _____

Microphone _____

Electronic Siren _____

B. Dash Accessibility

Microphone Mountings _____

Speaker _____

Radio-Siren Console (Unitrol-Federal) _____

C. Trunk Accessibility

One Radio Installation _____

Two Radio Installations _____

Antenna Installations _____

D. Engine Accessibility

Battery Terminal Connection _____

Accommodation for Cables _____

Hidden-Siren Installation _____

E. Ignition Fuse Terminal Block

Clip-on Connections for Accessories _____

Please comment on any subject rated high or excessively low.

COMMUNICATIONS EVALUATION

(Los Angeles County Sheriff's Department)

		DODGE ASPEN	FORD FAIRMONT	CHEVROLET IMPALA	FORD LTD	FORD LTD II	CHEVROLET MALIBU	CHRYSLER NEWPORT	DODGE ST. REGIS	PLYMOUTH VOLARE
GLOVE COMPARTMENT ACCESSIBILITY (undercover use)	HEAD CONTROL	1	5	5	5	7	5	1	1	1
	SPEAKER	1	2	5	2	7	1	1	1	1
	MICROPHONE	1	3	5	2	7	5	1	1	1
	ELECTRONIC SIREN	1	2	2	2	2	1	1	1	1
DASH ACCESSIBILITY	MICROPHONE MOUNTINGS	2	4	5	4	6	1	2	2	2
	SPEAKER	2	3	5	3	5	1	2	2	2
	RADIO-SIREN CONSOLE (Unitrol-Federal)	3	2	1	2	4	1	4	4	3
TRUNK ACCESSIBILITY	ONE RADIO INSTALLATION	4	8	10	5	8	10	5	5	4
	TWO RADIO INSTALLATIONS	4	8	10	5	8	10	5	5	4
	ANTENNA INSTALLATIONS	5	7	3	4	8	4	5	5	5
ENGINE ACCESSIBILITY	BATTERY TERMINAL CONNECTION	5	9	5	10	8	5	5	5	5
	ACCOMMODATION FOR CABLES	4	5	1	2	2	4	5	5	4
	HIDDEN-SIREN INSTALLATION	1	1	5	5	10	1	5	5	1
IGNITION FUSE TERMINAL BLOCK	CLIP-ON CONNECTIONS FOR ACCESSORIES	1	2	5	2	2	5	1	1	1
	TOTAL	35	61	67	53	84	54	43	43	35

COMMUNICATIONS EVALUATION

(California Highway Patrol)

		DODGE ASPEN	CHEVROLET IMPALA	FORD LTD	FORD LTD II	CHRYSLER NEWPORT	DODGE ST. REGIS	PLYMOUTH VOLARE
GLOVE COMPARTMENT ACCESSIBILITY (undercover use)	HEAD CONTROL	1	7	3	8	3	3	1
	SPEAKER	8	6	4	8	8	8	8
	MICROPHONE	8	7	3	8	3	3	8
	ELECTRONIC SIREN	8	7	6	7	3	3	8
DASH ACCESSIBILITY	MICROPHONE MOUNTINGS	7	2	3	7	3	3	7
	SPEAKER	8	6	4	8	8	8	8
	RADIO-SIREN CONSOLE (Unitrol-Federal)	6	5	4	7	7	7	6
TRUNK ACCESSIBILITY	ONE RADIO INSTALLATION	5	7	6	8	8	8	5
	TWO RADIO INSTALLATIONS	3	7	6	2	5	5	3
	ANTENNA INSTALLATIONS	4	4	4	9	5	5	4
ENGINE ACCESSIBILITY	BATTERY TERMINAL CONNECTION	7	8	9	10	9	9	7
	ACCOMMODATION FOR CABLES	8	5	4	9	8	8	8
	HIDDEN-SIREN INSTALLATION MECHANICAL	1	2	1	2	4	4	1
IGNITION FUSE TERMINAL BLOCK	CLIP-ON CONNECTIONS FOR ACCESSORIES	6	5	3	7	4	4	6
	TOTAL	80	78	60	100	78	78	80

HEAT TEST

The 18 test vehicles were subjected to a heat measurement test. The testing instrument was a Fluke 2190A Digital Thermometer equipped with a multi-point thermocouples selector and copper-constantan Type T thermocouples.

The following temperatures were measured: ambient, radiator intake, underhood, transmission oil, power steering oil, engine oil and engine coolant.

Test Procedures

Warm Up — There were two to three warm up laps on the handling course to bring the vehicle up to normal operating temperature. A reading was taken at the end of the warm up.

Hard Laps — Each vehicle was driven for three hard laps at about 90% of the maximum attainable speed on the handling course. Measurements were taken for each of the three laps and a final reading was taken in the straightaway as the car was slowing down after the last lap.*

Static Test (In Drive) — After the three hard laps, the test vehicle was driven to the static idle area. The car was allowed to idle for five minutes in drive and temperature readings were taken at one minute intervals.

Static Test (In Park) — After the five minute "In Drive" test, the vehicle was shifted into park and idled an additional fifteen minutes. Readings were taken every three minutes.

Scoring

Using the bell graphs on the following pages, a score for each vehicle can be computed for the four major areas of concern, i.e., transmission oil, power steering oil, engine oil, and engine coolant.

Transmission Oil (Fluid) — A range of 196°F to 242°F for transmission oil would score a vehicle within three points or less of the maximum score, i.e., 23 to 25 points. All vehicles tested were within the above range with the exception of the California Chevrolet Impala (258.8°F - five minutes into the static test in drive) and the California Chevrolet Malibu (247.9°F - three minutes into the 15 minute static test in park).

Power Steering Oil (Fluid) — A range of 196°F to 244°F for power steering oil would score a vehicle within three points or less of the maximum score, i.e.,

*With the use of the digital thermometer, temperatures could be monitored at all points on the track.

13 to 15 points. All vehicles were equipped with external power steering oil cooler with the exception of the California Ford Fairmont. The temperature readings for the Federal Ford Fairmont power steering oil should be used for scoring purposes as time did not permit retest of the California Ford Fairmont with a power steering cooler.

Engine Oil — A range of 215°F to 270°F for engine oil would score a vehicle within three points, i.e., 28 to 30 points. An average of the final reading and the maximum reading should be used to score a vehicle. All vehicles were equipped with external oil coolers except for the Federal Ford LTD. The temperature readings for the California Ford LTD engine oil should be used for scoring purposes as time did not permit a retest of the federal version with an oil cooler.

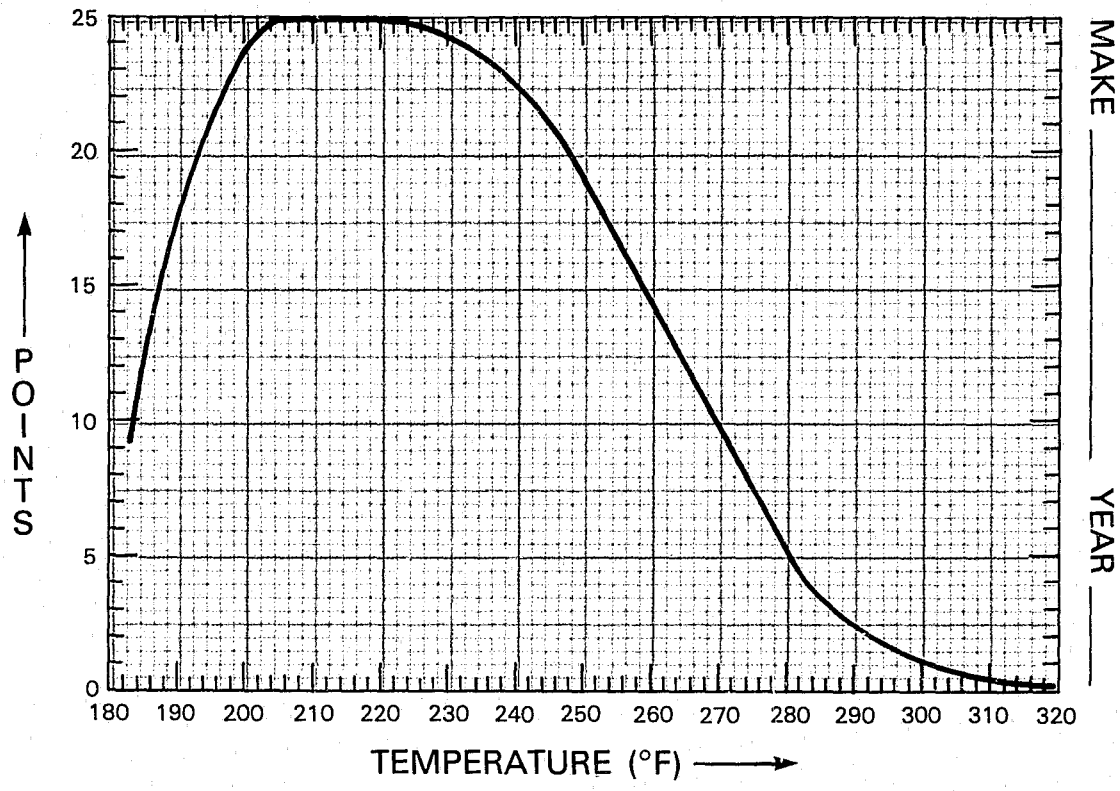
Engine Coolant (Water Temperature) — A range of 205°F to 226°F for engine coolant would score a vehicle within three points or less of the maximum score, i.e., 28 to 30 points. All vehicles tested had heavy duty cooling packages as part of the police package. None of the vehicles "boiled over" during the heat testing. The maximum temperature reading during the test should be used for scoring purposes.

Conclusion

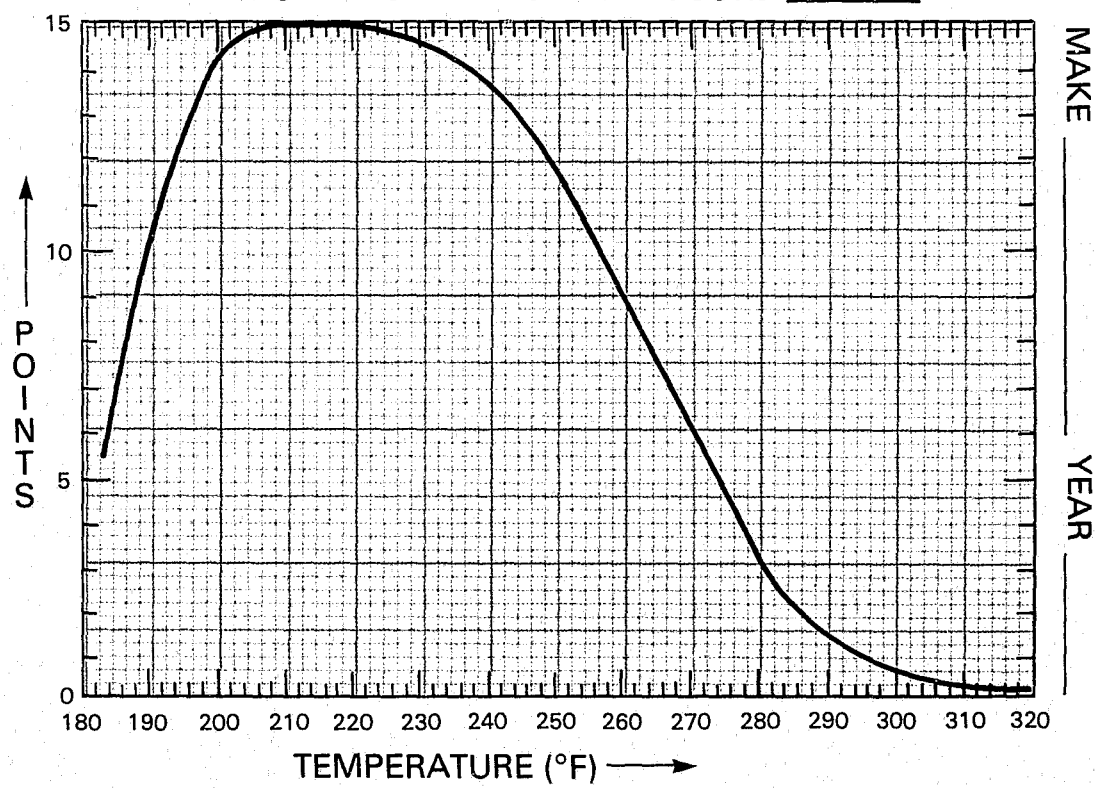
Police package vehicles should be ordered with external coolers for transmission, power steering and engine oil. A heavy duty radiator is a must. Generally speaking, all the vehicles passed the heat test and the majority fell within the "three point" range from the top score with the notable exception being engine oil. Due to the more accurate and precise instrumentation used, we were able to find the maximum engine oil temperatures on the track. This resulted in engine oil termperature measurements at the upper end of the scale for maximum readings. The engine oil temperatures did drop to acceptable levels during the idle tests.

It must be remembered that oil/fluid deterioration is based on time and temperature. The hotter the temperature the sooner the lubricant deteriorates. On the other hand, fluids must reach hot enough temperatures to boil off any water condensation present in the system or fluid.

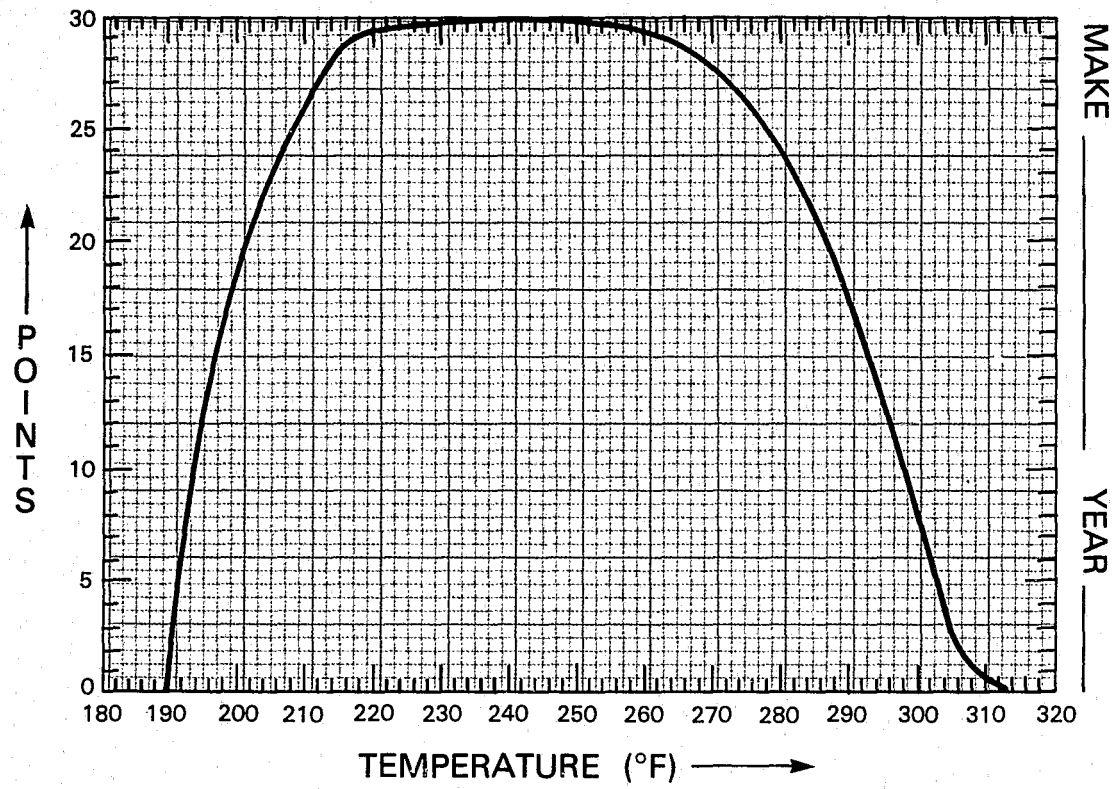
TRANSMISSION FLUID SCORE _____



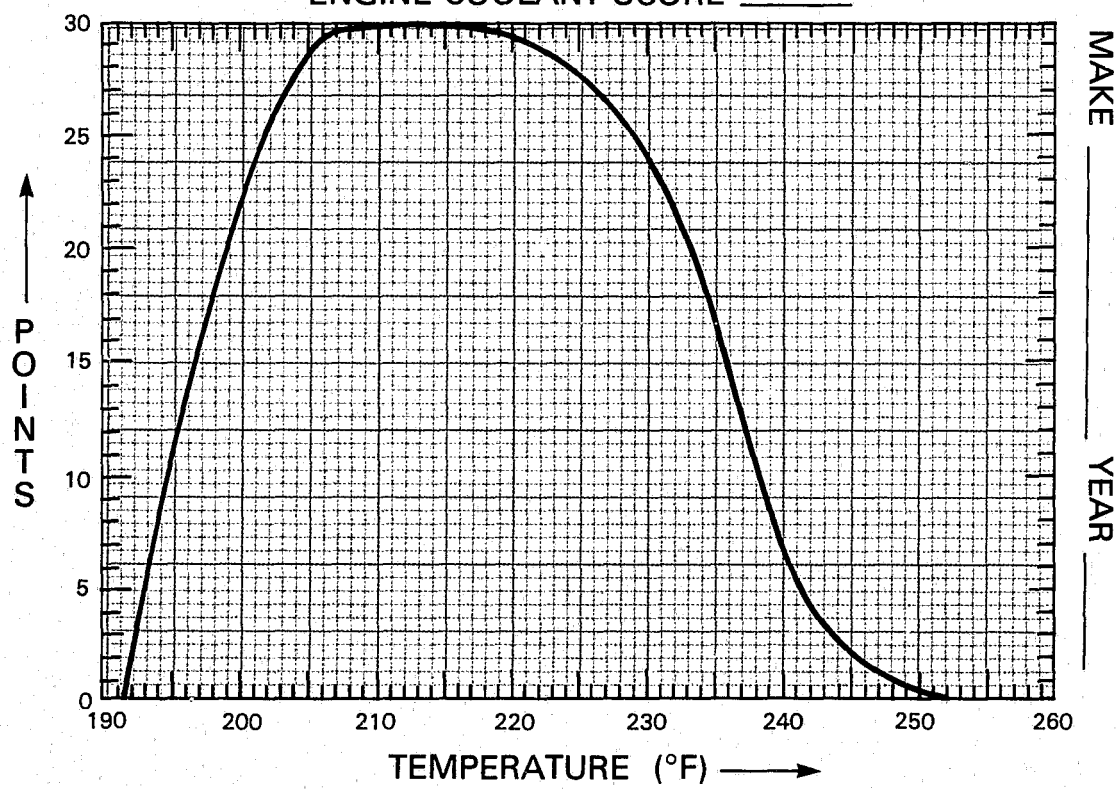
POWER STEERING FLUID SCORE _____



ENGINE OIL SCORE _____



ENGINE COOLANT SCORE _____



HEAT TEST

VEHICLE Dodge Aspen (Federal)

DATE December 12, 1978

TEST LOCATION Los Angeles County Fairgrounds

TIME 11:30a

AMBIENT TEMP. 71.8

VEHICLE TEMPERATURES

	1	2	3	4	5	6	7
TEST PHASE	AMBIENT	RADIATOR INTAKE TEMP.	UNDER HOOD TEMPERATURE	TRANS. OIL TEMP.	P/S OIL TEMP.	OIL TEMP.	WATER TEMP.
WARM UP	71.3	71.5	115.6	181.8	239.4	239.1	220.8
LAP #1	71.2	71.3	114.7	192.6	240.3	250.9	226.4
LAP #2	71.7	71.9	116.2	198.0	249.3	270.0	227.1
LAP #3	71.6	72.1	124.8	206.3	255.1	280.0	225.9
FINAL READING	71.4	71.3	133.3	210.5	256.4	251.6	220.6
MAX. READING	76.5	81.1	160.0	210.5	256.4	280.0	227.1
5 MIN. STATIC IN DRIVE 1	75.0	75.1	143.4	199.4	223.5	254.1	218.9
2	74.8	76.9	147.0	198.6	221.4	251.6	219.7
3	75.4	80.3	150.5	197.8	219.9	249.0	219.8
4	74.1	80.6	153.9	196.9	218.8	247.1	219.7
5	73.7	72.3	155.6	196.6	218.1	245.7	218.6
15 MIN. IDLE IN PARK 3	76.5	81.1	159.4	198.9	214.7	236.8	213.4
6	74.7	78.7	160.0	199.5	211.7	230.2	212.3
9	73.5	75.8	159.8	199.8	209.0	225.4	211.9
12	74.8	77.8	158.7	200.2	206.6	223.2	211.5
15	75.0	77.1	158.5	200.0	204.5	221.7	212.2

HEAT TEST

VEHICLE Ford Fairmont (Federal)

DATE November 29, 1978

TEST LOCATION Los Angeles County Fairgrounds

TIME 2:45p

AMBIENT TEMP. 78.0

VEHICLE TEMPERATURES

	1	2	3	4	5	6	7
TEST PHASE	AMBIENT	RADIATOR INTAKE TEMP.	UNDER HOOD TEMPERATURE	TRANS. OIL TEMP.	P/S OIL TEMP.	OIL TEMP.	WATER TEMP.
WARM UP	72.8	72.5	124.3	194.8	233.6	261.7	215.6
LAP #1	71.9	72.2	120.0	205.6	248.6	273.9	214.7
LAP #2	71.4	71.5	120.9	211.3	260.7	281.5	216.4
LAP #3	71.0	70.5	123.7	214.9	267.6	284.0	216.7
FINAL READING	70.4	70.5	125.0	213.2	255.0	274.1	215.3
MAX. READING	72.8	103.1	197.7	217.0	267.6	284.0	240.7
5 MIN. STATIC IN DRIVE 1	69.9	85.3	165.9	206.7	205.2	253.9	226.4
2	69.6	88.5	172.4	208.1	203.7	252.9	230.7
3	69.6	92.2	177.3	209.3	203.2	252.5	235.1
4	69.5	87.8	182.4	212.1	202.8	252.5	238.0
5	71.0	91.9	187.1	214.5	202.8	252.8	240.7
15 MIN. IDLE IN PARK 3	70.8	91.1	197.1	217.0	208.0	254.1	226.6
6	70.4	95.2	197.7	214.0	210.9	250.8	223.1
9	71.6	92.5	195.9	209.5	213.7	248.9	221.8
12	71.8	95.0	194.3	206.3	215.4	247.2	221.5
15	72.8	103.1	191.7	204.1	214.4	246.0	220.4

HEAT TEST

VEHICLE Chevrolet Impala (Federal)

DATE November 30, 1978

TEST LOCATION Los Angeles County Fairgrounds

TIME 2:00p

AMBIENT TEMP. 74.6

VEHICLE TEMPERATURES

	1	2	3	4	5	6	7
TEST PHASE	AMBIENT	RADIATOR INTAKE TEMP.	UNDER HOOD TEMPERATURE	TRANS. OIL TEMP.	P/S OIL TEMP.	OIL TEMP.	WATER TEMP.
WARM UP	75.9	75.6	111.2	157.5	205.1	259.1	218.8
LAP #1	75.3	74.2	116.6	180.1	213.5	273.9	226.6
LAP #2	75.3	74.3	125.6	195.9	229.5	281.4	226.6
LAP #3	75.4	74.9	129.0	210.4	239.2	284.3	226.1
FINAL READING	76.1	75.7	119.3	209.5	238.1	275.5	217.2
MAX. READING	77.7	126.7	161.7	235.6	239.2	284.3	226.6
5 MIN. STATIC IN DRIVE 1	77.7	111.9	144.9	223.2	203.2	245.0	219.5
2	75.9	122.0	150.7	228.6	200.4	241.6	220.1
3	73.6	122.8	155.0	231.6	197.6	237.8	221.0
4	76.1	125.3	158.2	234.4	195.6	233.4	220.8
5	75.8	126.7	161.7	235.6	194.2	231.1	220.9
15 MIN. IDLE IN PARK 3	76.5	114.7	154.4	231.8	189.8	223.9	214.4
6	76.6	114.5	149.4	224.8	186.3	219.9	213.0
9	74.2	124.3	150.2	218.6	184.6	217.0	213.1
12	74.6	123.5	149.4	215.2	183.4	216.0	214.1
15	75.5	119.6	150.3	211.2	182.4	214.8	213.8

HEAT TEST

VEHICLE Ford LTD (Federal)

DATE December 11, 1978

TEST LOCATION Los Angeles County Fairgrounds

TIME 10:25a

AMBIENT TEMP. 72.0

VEHICLE TEMPERATURES

	1	2	3	4	5	6	7
TEST PHASE	AMBIENT	RADIATOR INTAKE TEMP.	UNDER HOOD TEMPERATURE	TRANS. OIL TEMP.	P/S OIL TEMP.	OIL* TEMP.	WATER TEMP.
WARM UP	74.3	74.4	132.2	188.6	198.5	282.2	221.0
LAP #1	73.6	73.2	125.0	191.9	223.1	302.0	223.3
LAP #2	73.9	73.0	128.7	198.3	227.4	309.1	223.6
LAP #3	74.0	73.7	127.9	204.1	230.3	308.6	223.2
FINAL READING	75.1	73.8	134.4	205.3	219.5	296.8	222.1
MAX. READING	87.6	163.0	175.8	205.8	230.3	309.1*	236.0
5 MIN. STATIC IN DRIVE 1	80.6	116.3	156.4	194.6	187.7	274.4	223.9
2	82.3	139.1	161.9	194.8	186.8	270.3	228.5
3	82.9	147.1	165.5	196.6	186.9	268.4	231.0
4	82.7	154.5	168.9	198.0	187.2	266.4	233.0
5	87.6	163.0	171.4	200.1	188.4	265.0	236.0
15 MIN. IDLE IN PARK 3	85.6	150.0	175.8	205.5	192.8	258.4	223.1
6	87.3	149.7	173.6	205.8	193.3	254.0	220.1
9	83.9	155.4	175.1	204.1	192.4	250.0	218.6
12	80.5	150.3	169.0	201.2	190.6	246.8	216.4
15	83.2	151.1	170.9	198.9	189.0	244.7	216.5

*The Federal Ford LTD was not equipped with an external engine oil cooler. Refer to California Ford LTD for test data on vehicle equipped with external engine oil cooler.

HEAT TEST

VEHICLE Ford LTD II (Federal)

DATE November 30, 1978

TEST LOCATION Los Angeles County Fairgrounds

TIME 4:05p

AMBIENT TEMP. 72.0

VEHICLE TEMPERATURES

	1	2	3	4	5	6	7
TEST PHASE	AMBIENT	RADIATOR INTAKE TEMP.	UNDER HOOD TEMPERATURE	TRANS. OIL TEMP.	P/S OIL TEMP.	OIL TEMP.	WATER TEMP.
WARM UP	71.8	71.8	115.7	157.5	193.2	234.9	213.3
LAP #1	72.5	72.2	120.8	192.9	222.0	281.1	216.4
LAP #2	71.5	71.9	120.4	195.2	229.8	287.1	216.4
LAP #3	71.8	70.8	121.5	200.5	235.7	287.6	217.3
FINAL READING	71.4	71.5	117.9	193.4	219.8	268.3	212.6
MAX. READING	72.5	129.2	181.6	229.0	235.7	287.6	239.3
5 MIN. STATIC IN DRIVE 1	70.4	98.6	156.9	205.3	199.4	266.9	224.8
2	69.9	106.8	165.1	210.7	197.5	264.9	229.5
3	69.4	115.2	172.3	215.7	196.5	263.5	233.5
4	69.9	116.1	176.2	218.1	196.0	263.8	236.6
5	69.4	120.2	180.1	219.8	196.3	262.5	239.3
15 MIN. IDLE IN PARK 3	69.5	108.1	179.9	229.0	198.3	262.5	230.9
6	69.1	129.2	181.6	217.4	200.6	259.8	227.2
9	69.4	126.2	181.6	211.6	201.8	258.1	225.6
12	69.8	116.8	179.3	206.8	202.6	255.9	223.4
15	68.2	124.5	175.5	201.1	202.6	253.9	224.0

HEAT TEST

VEHICLE Chevrolet Malibu (Federal)

DATE November 30, 1978

TEST LOCATION Los Angeles County Fairgrounds

TIME 12:15p

AMBIENT TEMP. 78.0

VEHICLE TEMPERATURES

	1	2	3	4	5	6	7
TEST PHASE	AMBIENT	RADIATOR INTAKE TEMP.	UNDER HOOD TEMPERATURE	TRANS. OIL TEMP.	P/S OIL TEMP.	OIL* TEMP.	WATER TEMP.
WARM UP	77.8	77.8	109.4	154.5	202.6	270.8	223.7
LAP #1	77.1	76.4	112.9	205.6	232.7	300.2	229.8
LAP #2	77.2	76.3	116.8	216.0	240.0	305.0	228.6
LAP #3	76.5	76.0	119.2	227.4	249.3	307.2	230.8
FINAL READING	77.1	76.2	120.0	214.1	241.2	301.0	224.6
MAX. READING	84.5	126.1	163.4	237.8	249.3	307.2*	230.8
5 MIN. STATIC IN DRIVE 1	83.2	106.7	146.2	232.5	207.2	273.7	225.8
2	84.5	106.4	149.0	234.1	205.3	270.7	226.0
3	82.8	114.8	152.5	236.3	203.4	267.4	226.7
4	82.6	113.2	156.1	237.2	201.8	264.3	227.3
5	79.5	126.1	159.1	237.8	200.9	262.1	228.7
15 MIN. IDLE IN PARK 3	78.7	115.2	163.4	233.8	197.9	253.3	220.8
6	78.5	114.6	162.9	228.2	196.5	248.2	219.0
9	78.5	124.1	162.5	222.9	195.0	244.2	218.3
12	79.9	113.2	161.2	218.0	193.6	241.4	218.5
15	79.3	122.8	160.4	214.1	192.2	239.2	216.9

*The Federal Malibu was not equipped with external engine oil cooler. Refer to California Malibu for test data on Malibu equipped with engine oil cooler.

HEAT TEST

VEHICLE Chrysler Newport (Federal)

DATE December 11, 1978

TEST LOCATION Los Angeles County Fairgrounds

TIME 12:08p

AMBIENT TEMP. 77.0

VEHICLE TEMPERATURES

	1	2	3	4	5	6	7
TEST PHASE	AMBIENT	RADIATOR INTAKE TEMP.	UNDER HOOD TEMPERATURE	TRANS. OIL TEMP.	P/S OIL TEMP.	OIL TEMP.	WATER TEMP.
WARM UP	79.0	78.6	136.6	163.0	213.7	240.1	221.1
LAP #1	78.9	78.5	128.0	178.9	227.2	265.5	227.4
LAP #2	78.9	78.3	133.9	198.2	240.8	273.5	225.1
LAP #3	78.8	78.2	130.2	207.4	244.4	268.9	224.6
FINAL READING	77.6	77.4	137.3	209.1	241.5	259.8	222.7
MAX. READING	79.0	90.5	180.5	209.1	244.4	273.5	227.4
5 MIN. STATIC IN DRIVE 1	76.4	80.5	170.6	206.0	215.3	250.2	221.6
2	76.6	88.8	174.5	202.6	213.0	248.7	222.8
3	77.1	88.3	173.4	200.5	211.9	246.5	223.4
4	76.3	87.9	178.2	198.4	210.9	244.5	223.9
5	75.9	88.0	177.1	196.2	209.9	241.9	223.8
15 MIN. IDLE IN PARK 3	74.3	90.5	178.3	189.0	207.9	235.5	223.1
6	74.1	88.5	176.2	185.5	206.4	232.8	220.7
9	75.2	82.8	180.5	186.9	204.8	228.4	213.1
12	75.3	89.0	178.2	187.0	203.1	224.7	210.6
15	78.2	81.6	176.1	186.4	201.1	222.2	209.0

HEAT TEST

VEHICLE Dodge St. Regis (Federal)

DATE December 11, 1978

TEST LOCATION Los Angeles County Fairgrounds

TIME 11:23a

AMBIENT TEMP. 77.1

VEHICLE TEMPERATURES

	1	2	3	4	5	6	7
TEST PHASE	AMBIENT	RADIATOR INTAKE TEMP.	UNDER HOOD TEMPERATURE	TRANS. OIL TEMP.	P/S OIL TEMP.	OIL TEMP.	WATER TEMP.
WARM UP	77.1	77.0	126.7	180.9	225.3	244.2	218.1
LAP #1	77.4	76.9	126.3	194.0	229.3	262.7	227.4
LAP #2	77.2	76.9	127.7	202.5	235.7	266.1	227.9
LAP #3	77.0	76.3	128.0	207.9	241.9	274.1	224.1
FINAL READING	77.5	77.1	131.5	204.7	244.6	252.5	223.2
MAX. READING	79.8	100.3	161.7	207.9	244.6	274.1	227.9
5 MIN. STATIC IN DRIVE 1	79.1	94.1	152.6	204.0	212.4	245.4	216.6
2	78.2	90.7	156.4	203.3	210.5	244.2	216.5
3	77.6	96.2	159.2	202.0	208.9	242.2	215.9
4	78.0	85.1	160.6	200.9	208.0	240.3	214.9
5	79.8	97.1	161.7	201.0	207.0	237.3	213.4
15 MIN. IDLE IN PARK 3	76.3	92.7	155.5	204.4	202.7	232.2	212.5
6	78.3	97.6	152.0	204.4	196.8	227.1	210.3
9	78.9	95.0	149.9	203.3	193.0	224.1	210.4
12	79.3	100.3	149.2	203.3	190.4	221.7	210.1
15	77.8	96.3	148.5	202.3	188.8	220.0	210.3

HEAT TEST

VEHICLE Plymouth Volare (Federal)

DATE November 18, 1978

TEST LOCATION Los Angeles County Fairgrounds

TIME 12:00p

AMBIENT TEMP. 74.5

VEHICLE TEMPERATURES

	1	2	3	4	5	6	7
TEST PHASE	AMBIENT	RADIATOR INTAKE TEMP.	UNDER HOOD TEMPERATURE	TRANS. OIL TEMP.	P/S OIL TEMP.	OIL TEMP.	WATER TEMP.
WARM UP	72.1	71.4	128.9	190.1	254.1	240.2	222.1
LAP #1	73.1	72.6	108.2	201.8	258.2	262.3	218.9
LAP #2	71.8	72.4	124.1	208.7	266.4	259.5	218.3
LAP #3	72.8	72.6	131.2	207.7	269.6	259.0	221.1
FINAL READING	72.7	72.9	130.9	210.5	272.5	255.9	223.2
MAX. READING	82.9	88.4	167.6	210.5	272.5	262.3	223.3
5 MIN. STATIC IN DRIVE 1	81.2	75.3	151.3	202.1	240.1	245.9	220.8
2	82.9	80.8	158.6	201.4	234.9	247.1	222.6
3	82.1	80.2	162.0	201.0	232.7	246.2	222.7
4	81.3	78.4	164.1	200.7	231.5	245.1	222.9
5	81.4	84.9	167.2	201.6	229.9	242.7	223.3
15 MIN. IDLE IN PARK 3	80.7	86.1	168.7	203.9	227.6	239.7	217.5
6	74.7	88.4	167.6	205.1	224.4	236.5	216.2
9	77.0	81.6	166.7	206.1	221.5	233.6	215.0
12	76.3	86.6	166.8	206.7	219.3	231.9	216.1
15	76.1	87.3	166.9	207.3	218.1	230.9	216.9

HEAT TEST

VEHICLE Dodge Aspen (CA)

DATE December 11, 1978

TEST LOCATION Los Angeles County Fairgrounds

TIME 2:20p

AMBIENT TEMP. 80.0

VEHICLE TEMPERATURES

	1	2	3	4	5	6	7
TEST PHASE	AMBIENT	RADIATOR INTAKE TEMP.	UNDER HOOD TEMPERATURE	TRANS. OIL TEMP.	P/S OIL TEMP.	OIL TEMP.	WATER TEMP.
WARM UP	81.0	80.5	124.8	191.6	236.7	267.3	224.4
LAP #1	81.0	80.8	128.4	195.6	248.9	284.5	227.8
LAP #2	80.8	80.3	133.2	205.3	258.1	290.6	228.0
LAP #3	80.5	80.1	135.0	210.3	265.3	293.1	226.6
FINAL READING	79.9	80.1	132.2	216.7	265.3	282.0	223.5
MAX. READING	83.3	93.6	170.8	216.7	265.3	293.1	228.0
5 MIN. STATIC IN DRIVE 1	82.2	87.2	155.5	205.4	229.7	261.0	222.7
2	81.4	85.9	160.9	205.0	228.1	258.1	223.6
3	81.0	88.7	164.9	204.9	227.0	255.8	223.8
4	79.5	90.1	168.7	204.4	226.3	253.8	224.1
5	79.8	93.6	170.8	205.1	225.8	252.1	222.3
15 MIN. IDLE IN PARK 3	81.8	88.3	168.8	207.3	223.5	247.1	217.8
6	81.2	91.0	166.1	208.4	220.1	243.5	216.7
9	83.3	92.9	164.0	209.7	217.0	240.7	216.5
12	82.9	89.7	162.5	211.1	214.6	238.5	215.5
15	82.6	88.4	162.1	212.1	212.5	237.0	217.2

HEAT TEST

VEHICLE Ford Fairmont (CA)

DATE November 29, 1978

TEST LOCATION Los Angeles County Fairgrounds

TIME 1:30p

AMBIENT TEMP. 74.7

VEHICLE TEMPERATURES

	1	2	3	4	5	6	7
TEST PHASE	AMBIENT	RADIATOR INTAKE TEMP.	UNDER HOOD TEMPERATURE	TRANS. OIL TEMP.	P/S OIL* TEMP.	OIL TEMP.	WATER TEMP.
WARM UP	70.9	70.8	116.6	182.7	251.5	262.4	208.7
LAP #1	71.3	71.5	113.6	195.7	289.6	280.1	217.0
LAP #2	71.2	70.9	115.0	201.1	296.5	285.0	217.0
LAP #3	71.1	71.0	116.4	205.0	304.7	288.1	217.2
FINAL READING	71.8	71.5	126.1	206.6	284.8	278.9	216.0
MAX. READING	77.5	99.6	188.7	214.9	304.7*	288.1	239.2
5 MIN. STATIC IN DRIVE 1	75.1	91.4	154.3	201.9	235.5	262.1	221.8
2	73.7	85.9	165.2	203.4	228.7	259.5	228.1
3	75.7	87.1	171.2	205.3	228.3	257.7	233.2
4	77.3	87.1	174.4	206.7	224.1	256.9	235.8
5	77.5	99.6	178.9	208.6	222.6	256.2	239.2
15 MIN. IDLE IN PARK 3	76.8	95.2	185.8	214.9	225.4	256.3	233.9
6	74.0	96.9	185.0	213.9	225.6	254.3	228.0
9	74.2	97.3	184.8	210.5	224.2	251.6	226.3
12	74.1	94.8	187.4	208.7	225.0	250.0	230.1
15	73.2	92.3	188.7	208.5	227.3	250.9	230.1

*The California Fairmont was not equipped with external power steering oil cooler. Refer to Federal Fairmont for test data on Fairmont equipped with power steering oil cooler.

HEAT TEST

VEHICLE Chevrolet Impala (CA)

DATE November 30, 1978

TEST LOCATION Los Angeles County Fairgrounds

TIME 1:15p

AMBIENT TEMP. 78.7

VEHICLE TEMPERATURES

TEST PHASE		AMBIENT	RADIATOR INTAKE TEMP.	UNDER HOOD TEMPERATURE	TRANS. OIL TEMP.	P/S OIL TEMP.	OIL TEMP.	WATER TEMP.
WARM UP		74.3	73.8	124.4	172.2	210.9	254.6	221.9
LAP #1		73.8	72.9	130.4	194.2	220.2	267.6	226.7
LAP #2		73.7	72.7	132.5	211.4	235.1	274.0	227.0
LAP #3		73.1	72.7	135.7	224.1	243.8	275.6	225.3
FINAL READING		73.0	72.3	130.8	216.7	237.3	266.9	222.5
MAX. READING		82.4	113.3	169.8	258.8	243.8	275.6	227.0
5 MIN. STATIC IN DRIVE	1	74.7	105.0	155.5	239.3	208.7	243.3	221.5
	2	74.9	107.3	159.2	246.2	206.0	239.6	222.8
	3	75.4	105.9	163.6	250.1	203.4	236.5	224.6
	4	75.0	112.5	168.1	254.2	202.3	233.5	226.0
	5	75.2	113.3	169.8	258.8	201.5	231.9	225.7
15 MIN. IDLE IN PARK	3	75.9	108.6	158.7	247.8	199.5	226.1	214.8
	6	77.2	107.1	152.8	237.8	196.6	223.6	213.4
	9	80.3	107.2	152.1	229.2	194.3	222.6	214.7
	12	79.7	105.0	151.7	223.8	193.3	221.9	214.4
	15	82.4	103.9	149.2	218.8	192.4	221.1	213.8

HEAT TEST

VEHICLE Ford LTD (CA)

DATE December 12, 1978

TEST LOCATION Los Angeles County Fairgrounds

TIME 11:45a

AMBIENT TEMP. 71.9

VEHICLE TEMPERATURES

	1	2	3	4	5	6	7
TEST PHASE	AMBIENT	RADIATOR INTAKE TEMP.	UNDER HOOD TEMPERATURE	TRANS. OIL TEMP.	P/S OIL TEMP.	OIL TEMP.	WATER TEMP.
WARM UP	71.1	70.2	116.9	188.3	213.6	279.2	221.6
LAP #1	70.8	70.6	115.9	188.0	214.2	284.1	222.6
LAP #2	71.0	70.9	116.1	197.6	217.0	292.4	222.1
LAP #3	70.8	70.2	116.9	201.1	220.8	295.0	221.7
FINAL READING	71.0	70.6	117.8	201.3	217.1	286.6	221.5
MAX. READING	78.3	139.7	173.3	203.2	220.8	295.0	231.1
5 MIN. STATIC IN DRIVE 1	74.1	98.9	147.9	200.0	186.5	271.2	226.1
2	77.0	122.5	154.3	201.4	184.1	268.3	228.2
3	76.3	118.4	157.7	201.0	182.9	265.7	229.7
4	78.3	128.6	161.0	201.1	182.2	263.3	230.9
5	75.5	133.9	164.0	202.0	182.0	261.0	231.1
15 MIN. IDLE IN PARK 3	73.7	130.0	169.2	203.2	182.2	254.2	221.0
6	77.6	136.7	172.4	200.5	181.7	250.1	218.8
9	75.6	139.7	173.3	197.7	180.9	246.7	217.3
12	73.1	127.0	171.6	194.6	179.4	243.5	215.4
15	74.0	130.0	172.5	191.3	178.4	241.4	215.6

HEAT TEST

VEHICLE Ford LTD II (CA)

DATE December 11, 1978

TEST LOCATION Los Angeles County Fairgrounds

TIME 1:32p

AMBIENT TEMP. 77.0

VEHICLE TEMPERATURES

	1	2	3	4	5	6	7
TEST PHASE	AMBIENT	RADIATOR INTAKE TEMP.	UNDER HOOD TEMPERATURE	TRANS. OIL TEMP.	P/S OIL TEMP.	OIL TEMP.	WATER TEMP.
WARM UP	76.1	75.9	137.8	195.9	228.2	274.1	220.0
LAP #1	76.2	75.6	137.2	199.4	233.4	284.4	221.8
LAP #2	76.5	75.7	138.5	206.6	238.3	285.2	222.3
LAP #3	76.8	76.1	139.9	209.1	241.6	289.3	224.0
FINAL READING	77.7	77.1	139.6	219.0	231.1	283.0	228.1
MAX. READING	84.5	156.2	197.1	234.7	241.6	289.3	249.3
5 MIN. STATIC IN DRIVE 1	81.1	115.7	184.9	212.9	212.8	273.5	240.4
2	84.5	128.3	195.1	214.5	212.3	272.3	245.1
3	80.8	137.2	189.1	216.4	212.4	271.4	247.2
4	80.4	132.9	192.5	220.3	213.0	271.2	249.3
5	79.7	148.2	197.1	226.0	214.1	271.9	249.3
15 MIN. IDLE IN PARK 3	80.2	137.4	192.5	234.7	216.0	270.7	241.3
6	79.8	155.8	191.8	228.3	220.1	268.6	240.7
9	80.2	146.0	193.7	221.7	223.6	266.7	239.3
12	81.1	150.5	195.4	219.1	223.0	266.4	239.6
15	80.2	156.2	197.1	217.1	223.3	266.5	240.3

HEAT TEST

VEHICLE Chevrolet Malibu (CA)

DATE November 30, 1978

TEST LOCATION Los Angeles County Fairgrounds

TIME 11:30a

AMBIENT TEMP. 71.2

VEHICLE TEMPERATURES

	1	2	3	4	5	6	7
TEST PHASE	AMBIENT	RADIATOR INTAKE TEMP.	UNDER HOOD TEMPERATURE	TRANS. OIL TEMP.	P/S OIL TEMP.	OIL TEMP.	WATER TEMP.
WARM UP	68.4	68.3	123.5	172.4	218.6	255.0	222.2
LAP #1	68.1	67.7	128.9	188.7	237.1	266.8	223.8
LAP #2	68.6	67.9	125.8	208.8	250.9	276.6	226.7
LAP #3	68.8	67.7	134.8	225.9	262.1	281.8	229.2
FINAL READING	69.8	68.7	137.2	226.0	264.0	277.4	223.3
MAX. READING	77.4	149.9	199.4	247.9	264.0	281.8	248.2
5 MIN. STATIC IN DRIVE 1	71.7	115.9	169.1	238.6	226.4	248.9	230.3
2	71.9	126.1	172.6	241.1	222.8	247.3	234.3
3	71.3	131.4	176.3	243.8	219.8	245.5	237.6
4	70.9	134.0	179.5	245.3	218.1	244.1	240.9
5	71.3	127.2	182.6	246.5	216.4	242.8	242.8
15 MIN. IDLE IN PARK 3	71.4	132.9	186.6	247.9	213.2	239.6	241.0
6	71.5	141.7	191.6	244.6	213.9	239.5	244.0
9	74.3	145.6	194.2	242.2	215.5	240.2	244.9
12	73.1	145.8	198.3	240.6	218.0	241.6	248.2
15	77.4	149.9	199.4	240.3	220.0	243.1	247.9

HEAT TEST

VEHICLE Chrysler Newport (CA)

DATE November 18, 1978

TEST LOCATION Los Angeles County Fairgrounds

TIME 2:15p

AMBIENT TEMP. 74.4

VEHICLE TEMPERATURES

TEST PHASE		AMBIENT	RADIATOR INTAKE TEMP.	UNDER HOOD TEMPERATURE	TRANS. OIL TEMP.	P/S OIL TEMP.	OIL TEMP.	WATER TEMP.
WARM UP		70.6	70.5	115.4	182.1	224.1	244.3	214.5
LAP #1		70.8	70.6	122.1	197.3	236.9	265.1	217.1
LAP #2		70.2	70.4	117.1	206.3	243.4	269.2	222.4
LAP #3		70.6	70.5	121.7	224.0	248.3	257.1	221.7
FINAL READING		71.3	71.2	123.1	230.1	252.7	270.2	221.6
MAX. READING		73.1	86.3	153.5	230.1	252.7	270.2	222.4
5 MIN. STATIC IN DRIVE	1	73.1	77.8	142.9	213.8	218.7	242.6	213.3
	2	70.5	80.4	144.5	211.1	216.5	240.5	213.8
	3	71.2	80.5	145.1	209.0	215.4	239.2	213.6
	4	72.2	78.6	148.8	207.9	214.4	237.6	213.1
	5	71.3	79.8	153.5	206.6	213.5	235.9	212.5
15 MIN. IDLE IN PARK	3	70.8	86.3	153.0	205.8	209.8	234.8	208.0
	6	69.9	80.7	149.2	206.7	203.9	228.0	207.4
	9	70.1	80.9	148.3	207.0	198.8	227.3	207.1
	12	70.4	82.6	146.2	205.8	195.5	222.5	207.6
	15	70.7	81.8	144.1	205.5	194.0	221.8	207.5

HEAT TEST

VEHICLE Dodge St. Regis (CA)

DATE December 11, 1978

TEST LOCATION Los Angeles County Fairgrounds

TIME 3:06p

AMBIENT TEMP. 78.0

VEHICLE TEMPERATURES

	1	2	3	4	5	6	7
TEST PHASE	AMBIENT	RADIATOR INTAKE TEMP.	UNDER HOOD TEMPERATURE	TRANS. OIL TEMP.	P/S OIL TEMP.	OIL TEMP.	WATER TEMP.
WARM UP	79.7	79.2	135.8	190.9	230.1	235.7	216.9
LAP #1	79.3	77.4	129.3	197.2	233.5	255.1	224.0
LAP #2	79.1	77.5	137.4	208.7	240.1	253.8	223.7
LAP #3	79.0	78.0	135.1	214.2	241.5	260.1	225.6
FINAL READING	79.2	78.7	114.8	203.4	222.0	243.4	224.7
MAX. READING	82.1	91.5	152.3	214.2	241.5	260.1	225.6
5 MIN. STATIC IN DRIVE 1	80.4	74.0	150.5	209.0	218.2	246.3	220.2
2	78.6	74.2	152.3	205.4	216.8	243.9	219.7
3	77.5	76.4	151.3	202.3	215.8	241.4	219.4
4	77.0	85.3	149.3	198.8	214.6	238.0	219.6
5	76.4	91.5	148.3	198.5	213.3	236.1	217.8
15 MIN. IDLE IN PARK 3	82.1	85.4	142.9	202.9	208.6	230.5	213.1
6	79.4	84.4	139.4	203.3	202.5	226.4	212.1
9	78.7	86.6	137.5	202.0	197.6	222.8	212.1
12	76.5	87.2	138.1	199.9	194.0	220.8	213.4
15	75.9	85.3	136.3	199.0	191.2	219.0	212.1

HEAT TEST

VEHICLE Plymouth Volare (CA)

DATE November 30, 1978

TEST LOCATION Los Angeles County Fairgrounds

TIME 2:45p

AMBIENT TEMP. 74.3

VEHICLE TEMPERATURES

	1	2	3	4	5	6	7
TEST PHASE	AMBIENT	RADIATOR INTAKE TEMP.	UNDER HOOD TEMPERATURE	TRANS. OIL TEMP.	P/S OIL TEMP.	OIL TEMP.	WATER TEMP.
WARM UP	76.5	76.6	118.1	171.0	219.1	257.7	216.6
LAP #1	76.0	75.5	122.1	182.7	241.1	276.7	226.2
LAP #2	75.7	75.5	129.3	196.0	256.2	287.9	225.6
LAP #3	75.4	75.5	134.0	207.0	266.8	290.1	223.2
FINAL READING	76.3	76.2	122.8	210.7	256.4	280.3	219.8
MAX. READING	76.6	87.8	175.7	211.1	266.8	290.1	230.9
5 MIN. STATIC IN DRIVE 1	75.2	80.9	151.4	202.6	234.0	271.5	225.9
2	75.6	82.8	156.9	202.7	233.0	268.0	226.8
3	75.2	82.9	161.9	202.6	232.3	265.2	228.2
4	75.0	84.4	165.9	202.6	231.9	263.3	229.4
5	75.4	87.1	169.2	202.5	231.8	261.8	230.9
15 MIN. IDLE IN PARK 3	75.5	86.2	174.6	206.3	232.2	258.0	225.8
6	76.1	87.4	175.3	207.5	231.9	254.7	223.0
9	75.2	84.3	175.6	208.8	231.6	252.9	222.4
12	76.5	87.8	175.5	210.0	231.3	251.3	221.3
15	76.6	85.1	175.7	211.1	231.0	249.9	221.1

APPENDIX A

BRAKE TESTING

BRAKE TESTING

DATE November 16, 1978 LOCATION LACFG MAKE & MODEL ASPEN (Fed.)

PHASE I

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #1 COMPLETED

Stop #2 COMPLETED

Stop #3 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop #4 Initial Speed 60.5 mph Stopping distance 166.5 ft.

AVERAGE FT/SEC.^{2} = 23.64

WAIT 5 MINUTES BEFORE PROCEEDING TO PHASE II

PHASE II

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #5 COMPLETED

Stop #6 COMPLETED

Stop #7 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop # 8 Initial speed 60.5 mph Stopping distance 173.5 ft.

AVERAGE FT/SEC.^{2} = 22.69

PHASE III

TEST (60 mph - full wheel lock-up)

		YES	NO
Stop #9	Evidence of severe fading prior to locking?		X
	Brakes would lock?	X	
	Vehicle stopped in straight line?	X	
	Vehicle stopped within correct lane?	X	

FINAL AVERAGE : 23.17 FT/SEC.^{2}

BRAKE TESTING

DATE November 29, 1978 LOCATION LACFG MAKE & MODEL FAIRMONT (Fed.)

PHASE I

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #1 COMPLETED

Stop #2 COMPLETED

Stop #3 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop #4 Initial Speed 60.7 mph Stopping distance 179.5 ft.

AVERAGE FT/SEC.^{2} = 22.08

WAIT 5 MINUTES BEFORE PROCEEDING TO PHASE II

PHASE II

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #5 COMPLETED

Stop #6 COMPLETED

Stop #7 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop # 8 Initial speed 59.9 mph Stopping distance 161.8 ft.

AVERAGE FT/SEC.^{2} = 23.85

PHASE III

TEST (60 mph - full wheel lock-up)

		YES	NO
Stop #9	Evidence of severe fading prior to locking?		X
	Brakes would lock?	X	
	Vehicle stopped in straight line?	X	
	Vehicle stopped within correct lane?	X	

FINAL AVERAGE: 22.97 FT/SEC.^{2}

BRAKE TESTING

DATE November 15, 1978 LOCATION LACFG MAKE & MODEL IMPALA (Fed.)

PHASE I

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #1 COMPLETED

Stop #2 COMPLETED

Stop #3 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop #4 Initial Speed 58.7 mph Stopping distance 172.7 ft.

AVERAGE FT/SEC.^{2} = 21.46

WAIT 5 MINUTES BEFORE PROCEEDING TO PHASE II

PHASE II

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #5 COMPLETED

Stop #6 COMPLETED

Stop #7 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop # 8 Initial speed 59.3 mph Stopping distance 184.6 ft.

AVERAGE FT/SEC.^{2} = 20.49

PHASE III

TEST (60 mph - full wheel lock-up)

		YES	NO
Stop #9	Evidence of severe fading prior to locking?		X
	Brakes would lock?	X	
	Vehicle stopped in straight line?	X	
	Vehicle stopped within correct lane?	X	

FINAL AVERAGE: 20.98 FT/SEC.^{2}

BRAKE TESTING

DATE November 25, 1978 LOCATION LACFG MAKE & MODEL FORD LTD (Fed.)

PHASE I

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #1 COMPLETED

Stop #2 COMPLETED

Stop #3 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop #4 Initial Speed 60.5 mph Stopping distance 174.8 ft.

AVERAGE FT/SEC.^{2} = 22.52

WAIT 5 MINUTES BEFORE PROCEEDING TO PHASE II

PHASE II

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #5 COMPLETED

Stop #6 COMPLETED

Stop #7 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop # 8 Initial speed 60.7 mph Stopping distance 188.0 ft.

AVERAGE FT/SEC.^{2} = 21.08

PHASE III

TEST (60 mph - full wheel lock-up)

		YES	NO
Stop #9	Evidence of severe fading prior to locking?		X
	Brakes would lock?	X	
	Vehicle stopped in straight line?	X	
	Vehicle stopped within correct lane?	X	

FINAL AVERAGE : 21.80 FT/SEC.^{2}

BRAKE TESTING

DATE November 27, 1978 LOCATION LACFG MAKE & MODEL FORD LTD II (Fed.

PHASE I

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #1 COMPLETED

Stop #2 COMPLETED

Stop #3 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop #4 Initial Speed 60.0 mph Stopping distance 174.8 ft.

AVERAGE FT/SEC.^{2} = 22.15

WAIT 5 MINUTES BEFORE PROCEEDING TO PHASE II

PHASE II

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #5 COMPLETED

Stop #6 COMPLETED

Stop #7 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop # 8 Initial speed 60.9 mph Stopping distance 182.2 ft.

AVERAGE FT/SEC.^{2} = 21.89

PHASE III

TEST (60 mph - full wheel lock-up)

		YES	NO
Stop #9	Evidence of severe fading prior to locking?		X
	Brakes would lock?	X	
	Vehicle stopped in straight line?	X	
	Vehicle stopped within correct lane?	X	

FINAL AVERAGE: 22.02 FT/SEC.^{2}

BRAKE TESTING

DATE December 4, 1978 LOCATION LACFG MAKE & MODEL MALIBU (Fed.)

PHASE I

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #1 COMPLETED

Stop #2 COMPLETED

Stop #3 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop #4 Initial Speed 60.3 mph Stopping distance 175.9 ft.

AVERAGE FT/SEC.^{2} = 22.23

WAIT 5 MINUTES BEFORE PROCEEDING TO PHASE II

PHASE II

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #5 COMPLETED

Stop #6 COMPLETED

Stop #7 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop # 8 Initial speed 60.3 mph Stopping distance 172.3 ft.

AVERAGE FT/SEC.^{2} = 22.70

PHASE III

TEST (60 mph - full wheel lock-up)

		YES	NO
Stop #9	Evidence of severe fading prior to locking?		X
	Brakes would lock?	X	
	Vehicle stopped in straight line?	X	(Vehicle rotated
	Vehicle stopped within correct lane?	X	slightly to left)

FINAL AVERAGE: 22.47 FT/SEC.^{2}

BRAKE TESTING

DATE November 17, 1978 LOCATION LACFG MAKE & MODEL NEWPORT (Fed.)

PHASE I

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #1 COMPLETED

Stop #2 COMPLETED

Stop #3 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop #4 Initial Speed 58.8 mph Stopping distance 166.0 ft.

AVERAGE FT/SEC.^{2} = 22.40

WAIT 5 MINUTES BEFORE PROCEEDING TO PHASE II

PHASE II

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #5 COMPLETED

Stop #6 COMPLETED

Stop #7 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop # 8 Initial speed 60.3 mph Stopping distance 207.1 ft.

AVERAGE FT/SEC.^{2} = 18.88

PHASE III

TEST (60 mph - full wheel lock-up)

		YES	NO
Stop #9	Evidence of severe fading prior to locking?		X
	Brakes would lock?	X	
	Vehicle stopped in straight line?	X	
	Vehicle stopped within correct lane?	X	

FINAL AVERAGE : 20.64 FT/SEC.^{2}

BRAKE TESTING

DATE November 16, 1978 LOCATION LACFG MAKE & MODEL ST. REGIS (Fed.)

PHASE I

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #1 COMPLETED

Stop #2 COMPLETED

Stop #3 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop #4 Initial Speed 59.7 mph Stopping distance 161.2 ft.

AVERAGE FT/SEC.^{2} = 23.78

WAIT 5 MINUTES BEFORE PROCEEDING TO PHASE II

PHASE II

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #5 COMPLETED

Stop #6 COMPLETED

Stop #7 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop # 8 Initial speed 60.9 mph Stopping distance 171.1 ft.

AVERAGE FT/SEC.^{2} = 23.31

PHASE III

TEST (60 mph - full wheel lock-up)

		YES	NO
Stop #9	Evidence of severe fading prior to locking?		X
	Brakes would lock?	X	
	Vehicle stopped in straight line?	X	
	Vehicle stopped within correct lane?	X	

FINAL AVERAGE : 23.05 FT/SEC.^{2}

BRAKE TESTING

DATE November 17, 1978 LOCATION LACFG MAKE & MODEL VOLARE (Fed.)

PHASE I

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #1 COMPLETED

Stop #2 COMPLETED

Stop #3 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop #4 Initial Speed 60.3 mph Stopping distance 175.7 ft.

AVERAGE FT/SEC.^{2} = 22.26

WAIT 5 MINUTES BEFORE PROCEEDING TO PHASE II

PHASE II

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #5 COMPLETED

Stop #6 COMPLETED

Stop #7 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop # 8 Initial speed 59.8 mph Stopping distance 178.2 ft.

AVERAGE FT/SEC.^{2} = 21.58

PHASE III

TEST (60 mph - full wheel lock-up)

		YES	NO
Stop #9	Evidence of severe fading prior to locking?		X
	Brakes would lock?	X	
	Vehicle stopped in straight line?	X	
	Vehicle stopped within correct lane?	X	

FINAL AVERAGE: 21.88 FT/SEC.^{2}

BRAKE TESTING

DATE November 16, 1978 LOCATION LACFG MAKE & MODEL ASPEN (Ca.)

PHASE I

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #1 COMPLETED

Stop #2 COMPLETED

Stop #3 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop #4 Initial Speed 57.8 mph Stopping distance 147.8 ft.

AVERAGE FT/SEC.^{2} = 24.31

WAIT 5 MINUTES BEFORE PROCEEDING TO PHASE II

PHASE II

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #5 COMPLETED

Stop #6 COMPLETED

Stop #7 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop # 8 Initial speed 59.2 mph Stopping distance 160.1 ft.

AVERAGE FT/SEC.^{2} = 23.54

PHASE III

TEST (60 mph - full wheel lock-up)

		YES	NO
Stop #9	Evidence of severe fading prior to locking?		X
	Brakes would lock?	X	
	Vehicle stopped in straight line?	X	
	Vehicle stopped within correct lane?	X	

FINAL AVERAGE: 23.93 FT/SEC.^{2}

BRAKE TESTING

DATE November 29, 1978 LOCATION LACFG MAKE & MODEL FAIRMONT (Ca.)

PHASE I

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #1 COMPLETED

Stop #2 COMPLETED

Stop #3 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop #4 Initial Speed 60.7 mph Stopping distance 193.1 ft.

AVERAGE FT/SEC.^{2} = 20.52

WAIT 5 MINUTES BEFORE PROCEEDING TO PHASE II

PHASE II

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #5 COMPLETED

Stop #6 COMPLETED

Stop #7 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop # 8 Initial speed 59.5 mph Stopping distance 181.4 ft.

AVERAGE FT/SEC.^{2} = 20.99

PHASE III

TEST (60 mph - full wheel lock-up)

		YES	NO
Stop #9	Evidence of severe fading prior to locking?		X
	Brakes would lock?	X	
	Vehicle stopped in straight line?	X (Rotated 20 deg. left)	
	Vehicle stopped within correct lane?	X	

FINAL AVERAGE : 20.76 FT/SEC.^{2}

BRAKE TESTING

DATE November 15, 1978 LOCATION LACFG MAKE & MODEL IMPALA (Ca.)

PHASE I

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #1 COMPLETED

Stop #2 COMPLETED

Stop #3 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop #4 Initial Speed 60.2 mph Stopping distance 186.8 ft.

AVERAGE FT/SEC.^{2} = 20.87

WAIT 5 MINUTES BEFORE PROCEEDING TO PHASE II

PHASE II

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #5 COMPLETED

Stop #6 COMPLETED

Stop #7 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop # 8 Initial speed 60.2 mph Stopping distance 181.7 ft.

AVERAGE FT/SEC.^{2} = 21.45

PHASE III

TEST (60 mph - full wheel lock-up)

		YES	NO
Stop #9	Evidence of severe fading prior to locking?		X
	Brakes would lock?	X	
	Vehicle stopped in straight line?	X	
	Vehicle stopped within correct lane?	X	

FINAL AVERAGE: 21.16 FT/SEC.^{2}

BRAKE TESTING

DATE November 28, 1978 LOCATION LACFG MAKE & MODEL FORD LTD (Ca.)

PHASE I

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #1 COMPLETED

Stop #2 COMPLETED

Stop #3 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop #4 Initial Speed 60.2 mph Stopping distance 177.6 ft.

AVERAGE FT/SEC.^{2} = 21.95

WAIT 5 MINUTES BEFORE PROCEEDING TO PHASE II

PHASE II

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #5 COMPLETED

Stop #6 COMPLETED

Stop #7 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop # 8 Initial speed 59.1 mph Stopping distance 168.1 ft.

AVERAGE FT/SEC.^{2} = 22.35

PHASE III

TEST (60 mph - full wheel lock-up)

		YES	NO
Stop #9	Evidence of severe fading prior to locking?		X
	Brakes would lock?	X	
	Vehicle stopped in straight line?	X	
	Vehicle stopped within correct lane?	X	

NOTE: Premature locking of rear brakes when hot--not able to achieve true impending skid.

FINAL AVERAGE: 22.15 FT/SEC.^{2}

BRAKE TESTING

DATE November 27, 1978 LOCATION LACFG MAKE & MODEL FORD LTD II (Ca.)

PHASE I

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #1 COMPLETED

Stop #2 COMPLETED

Stop #3 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop #4 Initial Speed 61.5 mph Stopping distance 175.2 ft.

AVERAGE FT/SEC.^{2} = 23.22

WAIT 5 MINUTES BEFORE PROCEEDING TO PHASE II

PHASE II

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #5 COMPLETED

Stop #6 COMPLETED

Stop #7 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop # 8 Initial speed 60.5 mph Stopping distance 169.6 ft.

AVERAGE FT/SEC.^{2} = 23.21

PHASE III

TEST (60 mph - full wheel lock-up)

		YES	NO
Stop #9	Evidence of severe fading prior to locking?		X
	Brakes would lock?	X	
	Vehicle stopped in straight line?	X	
	Vehicle stopped within correct lane?	X	

FINAL AVERAGE : 23.22 FT/SEC.^{2}

BRAKE TESTING

DATE November 15, 1978 LOCATION LACFG MAKE & MODEL MALIBU (Ca.)

PHASE I

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #1 COMPLETED

Stop #2 COMPLETED

Stop #3 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop #4 Initial Speed 60.2 mph Stopping distance 184.4 ft.

AVERAGE FT/SEC.^{2} = 21.14

WAIT 5 MINUTES BEFORE PROCEEDING TO PHASE II

PHASE II

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #5 COMPLETED

Stop #6 COMPLETED

Stop #7 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop # 8 Initial speed 60.4 mph Stopping distance 170.4 ft.

AVERAGE FT/SEC.^{2} = 23.03

PHASE III

TEST (60 mph - full wheel lock-up)

		YES	NO
Stop #9	Evidence of severe fading prior to locking?		X
	Brakes would lock?	X	
	Vehicle stopped in straight line?	X	
	Vehicle stopped within correct lane?	X	

FINAL AVERAGE: 22.09 FT/SEC.^{2}

BRAKE TESTING

DATE November 17, 1978 LOCATION LACFG MAKE & MODEL NEWPORT (Ca.)

PHASE I

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #1 COMPLETED

Stop #2 COMPLETED

Stop #3 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop #4 Initial Speed 61.4 mph Stopping distance 182.2 ft.

AVERAGE FT/SEC.^{2} = 22.25

WAIT 5 MINUTES BEFORE PROCEEDING TO PHASE II

PHASE II

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #5 COMPLETED

Stop #6 COMPLETED

Stop #7 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop # 8 Initial speed 60.1 mph Stopping distance 162.3 ft.

AVERAGE FT/SEC.^{2} = 23.94

PHASE III

TEST (60 mph - full wheel lock-up)

		YES	NO
Stop #9	Evidence of severe fading prior to locking?		X
	Brakes would lock?	X	
	Vehicle stopped in straight line?	X	
	Vehicle stopped within correct lane?	X	

FINAL AVERAGE : 23.10 FT/SEC.^{2}

BRAKE TESTING

DATE November 16, 1978 LOCATION LACFG MAKE & MODEL ST. REGIS (Ca.)

PHASE I

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #1 COMPLETED

Stop #2 COMPLETED

Stop #3 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop #4 Initial Speed 60.3 mph Stopping distance 197.5 ft.

AVERAGE FT/SEC.^{2} = 19.80

WAIT 5 MINUTES BEFORE PROCEEDING TO PHASE II

PHASE II

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #5 COMPLETED

Stop #6 COMPLETED

Stop #7 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop # 8 Initial speed 59.3 mph Stopping distance 203.9 ft.

AVERAGE FT/SEC.^{2} = 18.55

PHASE III

TEST (60 mph - full wheel lock-up)

		YES	NO
Stop #9	Evidence of severe fading prior to locking?		X
	Brakes would lock?	X	
	Vehicle stopped in straight line?	X	
	Vehicle stopped within correct lane?	X	

FINAL AVERAGE: 19.18 FT/SEC.^{2}

BRAKE TESTING

DATE November 17, 1978 LOCATION LACFG MAKE & MODEL VOLARE (Ca.)

PHASE I

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #1 COMPLETED

Stop #2 COMPLETED

Stop #3 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop #4 Initial Speed 60.1 mph Stopping distance 160.6 ft.

AVERAGE FT/SEC.^{2} = 24.19

WAIT 5 MINUTES BEFORE PROCEEDING TO PHASE II

PHASE II

BRAKE HEAT-UP (90 mph - 22 ft. per sec.^{2})

Stop #5 COMPLETED

Stop #6 COMPLETED

Stop #7 COMPLETED

TEST (60 mph - Impending skid - maximum deceleration rate attainable)

Stop # 8 Initial speed 60.2 mph Stopping distance 175.4 ft.

AVERAGE FT/SEC.^{2} = 22.22

PHASE III

TEST (60 mph - full wheel lock-up)

		YES	NO
Stop #9	Evidence of severe fading prior to locking?		X
	Brakes would lock?	X	
	Vehicle stopped in straight line?	Rotated slightly to left	
	Vehicle stopped within correct lane?	X	

FINAL AVERAGE: 23.21 FT/SEC.^{2}

APPENDIX B

ACCELERATION AND TOP SPEEDS

ACCELERATION & TOP SPEED TESTS

(All times in seconds. All speeds in miles per hour.)

TEST LOCATION: ONTARIO MOTOR SPEEDWAY

ACCELERATION

MAKE & MODEL DODGE ASPEN (Federal) DATE TESTED: Dec. 7, 1978

SPEEDS	TIME REQUIREMENT	WEST RUN #1	EAST RUN #2	WEST RUN #3	EAST RUN #4	AVERAGE
0 - 60	NONE	10.22	9.89	10.01	9.69	9.98
0 - 80	NONE	19.22	17.23	18.78	17.03	18.07
0 - 100	NONE	36.71	31.92	35.73	32.49	34.19

Quarter Mile Average 79.25 M.P.H.: Time: 17.25 Seconds TOP SPEED: 112.5

ACCELERATION

MAKE & MODEL FORD FAIRMONT (Federal) DATE TESTED: Dec. 8, 1978

SPEEDS	TIME REQUIREMENT	WEST RUN #1	EAST RUN #2	WEST RUN #3	EAST RUN #4	AVERAGE
0 - 60	NONE	11.73	10.65	12.01	10.83	11.31
0 - 80	NONE	23.13	19.40	22.44	19.31	21.07
0 - 100	NONE	47.73	49.39	47.15	-	48.09

Quarter Mile Average 75.75 M.P.H.: Time: 17.75 Seconds TOP SPEED: 108.2

ACCELERATION & TOP SPEED TESTS

(All times in seconds. All speeds in miles per hour.)

TEST LOCATION: ONTARIO MOTOR SPEEDWAY

ACCELERATION

MAKE & MODEL CHEVROLET IMPALA (Federal) DATE TESTED: Dec. 7, 1978

SPEEDS	TIME REQUIREMENT	WEST RUN #1	EAST RUN #2	WEST RUN #3	EAST RUN #4	AVERAGE
0 - 60	NONE	12.77	11.95	12.74	12.00	12.37
0 - 80	NONE	24.54	20.10	23.95	20.56	22.29
0 - 100	NONE	42.58	42.55	42.42	42.88	42.61

Quarter Mile Average 76.40 M.P.H.: Time: 18.43 Seconds TOP SPEED: 110.4

ACCELERATION

MAKE & MODEL FORD LTD (Federal) DATE TESTED: Dec. 8, 1978

SPEEDS	TIME REQUIREMENT	WEST RUN #1	EAST RUN #2	WEST RUN #3	EAST RUN #4	AVERAGE
0 - 60	NONE	13.19	11.33	12.82	10.62	11.99
0 - 80	NONE	27.36	21.19	26.68	20.26	23.87
0 - 100	NONE	-	-	54.18	-	

Quarter Mile Average 72.25 M.P.H.: Time: 18.19 Seconds TOP SPEED: 104.0

ACCELERATION & TOP SPEED TESTS

(All times in seconds. All speeds in miles per hour.)

TEST LOCATION: ONTARIO MOTOR SPEEDWAY

ACCELERATION

MAKE & MODEL FORD LTD II (Federal) DATE TESTED: Dec. 8, 1978

SPEEDS	TIME REQUIREMENT	WEST RUN #1	EAST RUN #2	WEST RUN #3	EAST RUN #4	AVERAGE
0 - 60	NONE	15.10	13.89	14.29	12.83	14.02
0 - 80	NONE	32.08	24.82	28.07	24.03	27.25
0 - 100	NONE	UNABLE TO ATTAIN SPEED DUE TO WIND AND LACK OF ENGINE POWER				

Quarter Mile Average 71.2 M.P.H.: Time: 19.45 Seconds TOP SPEED: 102.4

ACCELERATION

MAKE & MODEL CHEVROLET MALIBU (Federal) DATE TESTED: Dec. 7, 1978

SPEEDS	TIME REQUIREMENT	WEST RUN #1	EAST RUN #2	WEST RUN #3	EAST RUN #4	AVERAGE
0 - 60	NONE	11.59	10.58	11.10	10.71	11.00
0 - 80	NONE	21.55	19.64	21.61	19.52	20.58
0 - 100	NONE	45.96	37.71	45.98	37.82	41.87

Quarter Mile Average 76.2 M.P.H.: Time: N/A Seconds TOP SPEED: 109.3

CONTINUED

1 OF 2

ACCELERATION & TOP SPEED TESTS

(All times in seconds. All speeds in miles per hour.)

TEST LOCATION: ONTARIO MOTOR SPEEDWAY

ACCELERATION

MAKE & MODEL CHRYSLER NEWPORT (Federal) DATE TESTED: Dec. 7, 1978

SPEEDS	TIME REQUIREMENT	WEST RUN #1	EAST RUN #2	WEST RUN #3	EAST RUN #4	AVERAGE
0 - 60	NONE	13.32	12.24	13.15	12.36	12.77
0 - 80	NONE	26.04	22.39	24.91	22.24	23.90
0 - 100	NONE	52.91	46.13	49.07	46.21	48.58

Quarter Mile Average _____ M.P.H.: Time: _____ Seconds TOP SPEED: 108.4

RETEST

ACCELERATION

MAKE & MODEL CHRYSLER NEWPORT (Federal) DATE TESTED: Dec. 8, 1978

SPEEDS	TIME REQUIREMENT	WEST RUN #1	EAST RUN #2	WEST RUN #3	EAST RUN #4	AVERAGE
0 - 60	NONE	9.69	11.40	11.87	11.46	11.11
0 - 80	NONE	17.56	20.96	22.59	21.04	20.54
0 - 100	NONE	36.88	40.19	50.53	40.20	41.95

Quarter Mile Average 81.6 M.P.H.: Time: 17.08 Seconds TOP SPEED: 111.5

ACCELERATION & TOP SPEED TESTS

(All times in seconds. All speeds in miles per hour.)

TEST LOCATION: ONTARIO MOTOR SPEEDWAY

ACCELERATION

MAKE & MODEL DODGE ST. REGIS (Federal) DATE TESTED: Dec. 7, 1978

SPEEDS	TIME REQUIREMENT	WEST RUN #1	EAST RUN #2	WEST RUN #3	EAST RUN #4	AVERAGE
0 - 60	NONE	12.21	10.05	10.98	9.91	10.79
0 - 80	NONE	21.15	17.54	19.62	17.21	18.88
0 - 100	NONE	39.68	36.30	37.94	34.68	37.15

Quarter Mile Average 79.2 M.P.H.: Time: 18.04 Seconds TOP SPEED: 115.2

RETEST

ACCELERATION

MAKE & MODEL DODGE ST. REGIS (Federal) DATE TESTED: Dec. 8, 1978

SPEEDS	TIME REQUIREMENT	WEST RUN #1	EAST RUN #2	WEST RUN #3	EAST RUN #4	AVERAGE
0 - 60	NONE	9.90	9.53	9.92	9.39	9.69
0 - 80	NONE	17.85	16.51	17.55	16.31	17.06
0 - 100	NONE	36.72	31.93	36.22	31.33	34.05

Quarter Mile Average 80.45 M.P.H.: Time: 17.18 Seconds TOP SPEED: 117.0

ACCELERATION & TOP SPEED TESTS

(All times in seconds. All speeds in miles per hour.)

TEST LOCATION: ONTARIO MOTOR SPEEDWAY

ACCELERATION

MAKE & MODEL PLYMOUTH VOLARE (Federal) DATE TESTED: Dec. 8, 1978

SPEEDS	TIME REQUIREMENT	WEST RUN #1	EAST RUN #2	WEST RUN #3	EAST RUN #4	AVERAGE
0 - 60	NONE	10.34	10.43	9.99	9.27	10.00
0 - 80	NONE	19.39	18.26	18.70	16.97	18.33
0 - 100	NONE	36.85	33.79	35.07	32.86	34.64

Quarter Mile Average 77.7 M.P.H.: Time: 17.32 Seconds TOP SPEED: 112.1

ACCELERATION & TOP SPEED TESTS

(All times in seconds. All speeds in miles per hour.)

TEST LOCATION: ONTARIO MOTOR SPEEDWAY

ACCELERATION

MAKE & MODEL DODGE ASPEN (Ca.) DATE TESTED: Dec. 7, 1978

SPEEDS	TIME REQUIREMENT	WEST RUN #1	EAST RUN #2	WEST RUN #3	EAST RUN #4	AVERAGE
0 - 60	NONE	11.27	10.32	11.19	10.53	10.83
0 - 80	NONE	20.87	18.58	20.42	18.18	19.51
0 - 100	NONE	37.31	38.51	37.38	36.85	37.51

Quarter Mile Average 77.3 M.P.H.: Time: 17.97 Seconds TOP SPEED: 110.6

ACCELERATION

MAKE & MODEL FORD FAIRMONT (Ca.) DATE TESTED: Dec. 8, 1978

SPEEDS	TIME REQUIREMENT	WEST RUN #1	EAST RUN #2	WEST RUN #3	EAST RUN #4	AVERAGE
0 - 60	NONE	11.75	10.73	11.56	10.47	11.12
0 - 80	NONE	24.08	19.17	24.35	19.04	21.66
0 - 100	NONE	44.64	WIND	43.87	WIND	44.26

Quarter Mile Average 76.1 M.P.H.: Time: 18.13 Seconds TOP SPEED: 108.1

ACCELERATION & TOP SPEED TESTS

(All times in seconds. All speeds in miles per hour.)

TEST LOCATION: ONTARIO MOTOR SPEEDWAY

ACCELERATION

MAKE & MODEL CHEVROLET IMPALA (Ca.) DATE TESTED: Dec. 7, 1978

SPEEDS	TIME REQUIREMENT	WEST RUN #1	EAST RUN #2	WEST RUN #3	EAST RUN #4	AVERAGE
0 - 60	NONE	12.93	11.22	13.14	12.29	12.40
0 - 80	NONE	26.42	20.58	25.31	21.71	23.51
0 - 100	NONE	47.00	41.61	46.59	43.25	44.61

Quarter Mile Average 75.25 M.P.H.: Time: 18.43 Seconds TOP SPEED: 109.2

ACCELERATION

MAKE & MODEL FORD LTD (Ca.) DATE TESTED: Dec. 8, 1978

SPEEDS	TIME REQUIREMENT	WEST RUN #1	EAST RUN #2	WEST RUN #3	EAST RUN #4	AVERAGE
0 - 60	NONE	13.15	11.55	12.87	11.44	12.25
0 - 80	NONE	27.94	22.09	27.38	21.51	24.73
0 - 100	NONE	UNABLE TO ATTAIN SPEED DUE TO WIND AND LACK OF ENGINE POWER				

Quarter Mile Average 73.15 M.P.H.: Time: 18.76 Seconds TOP SPEED: 102.4

ACCELERATION & TOP SPEED TESTS

(All times in seconds. All speeds in miles per hour.)

TEST LOCATION: ONTARIO MOTOR SPEEDWAY

ACCELERATION

MAKE & MODEL FORD LTD II (Ca.) DATE TESTED: Dec. 8, 1978

SPEEDS	TIME REQUIREMENT	WEST RUN #1	EAST RUN #2	WEST RUN #3	EAST RUN #4	AVERAGE
0 - 60	NONE	15.74	14.42	15.58	14.02	14.94
0 - 80	NONE	32.53	26.49	30.54	27.29	29.21
0 - 100	NONE	UNABLE TO ATTAIN SPEED DUE TO WIND AND LACK OF ENGINE POWER				

Quarter Mile Average 69.85 M.P.H.: Time: 20.27 Seconds TOP SPEED: 99.4

ACCELERATION

MAKE & MODEL CHEVROLET MALIBU (Ca.) DATE TESTED: Dec. 7, 1978

SPEEDS	TIME REQUIREMENT	WEST RUN #1	EAST RUN #2	WEST RUN #3	EAST RUN #4	AVERAGE
0 - 60	NONE	11.45	10.86	11.13	10.66	11.03
0 - 80	NONE	22.56	19.53	22.33	19.44	20.97
0 - 100	NONE	46.17	37.22	45.09	37.88	41.59

Quarter Mile Average 75.85 M.P.H.: Time: N/A Seconds TOP SPEED: 108.2

ACCELERATION & TOP SPEED TESTS

(All times in seconds. All speeds in miles per hour.)

TEST LOCATION: ONTARIO MOTOR SPEEDWAY

ACCELERATION

MAKE & MODEL CHRYSLER NEWPORT (Ca.) DATE TESTED: Dec. 7, 1978

SPEEDS	TIME REQUIREMENT	WEST RUN #1	EAST RUN #2	WEST RUN #3	EAST RUN #4	AVERAGE
0 - 60	NONE	11.86	10.89	11.69	10.49	11.23
0 - 80	NONE	20.58	18.47	20.34	18.11	19.38
0 - 100	NONE	40.50	35.53	39.76	33.93	37.43

Quarter Mile Average 78.65 M.P.H.: Time: 18.94 Seconds TOP SPEED: 114.4

ACCELERATION

MAKE & MODEL DODGE ST. REGIS (Ca.) DATE TESTED: Dec. 7, 1978

SPEEDS	TIME REQUIREMENT	WEST RUN #1	EAST RUN #2	WEST RUN #3	EAST RUN #4	AVERAGE
0 - 60	NONE	11.80	10.84	11.68	10.61	11.23
0 - 80	NONE	21.08	18.03	20.74	18.08	19.48
0 - 100	NONE	40.71	41.45	39.73	40.60	40.62

Quarter Mile Average 79.15 M.P.H.: Time: 18.26 Seconds TOP SPEED: 116.1

ACCELERATION & TOP SPEED TESTS

(All times in seconds. All speeds in miles per hour.)

TEST LOCATION: ONTARIO MOTOR SPEEDWAY

ACCELERATION

MAKE & MODEL PLYMOUTH VOLARE (Ca.) DATE TESTED: Dec. 8, 1978

SPEEDS	TIME REQUIREMENT	WEST RUN #1	EAST RUN #2	WEST RUN #3	EAST RUN #4	AVERAGE
0 - 60	NONE	12.68	11.43	12.96	11.63	12.18
0 - 80	NONE	23.50	21.48	23.49	21.25	22.43
0 - 100	NONE	46.16	42.91	46.10	43.07	44.56

Quarter Mile Average 74.25 M.P.H.: Time: 18.70 Seconds TOP SPEED: 107.2

Excerpted from: 1979 Patrol Vehicle Specifications, Evaluation, and Purchasing Program--Michigan State Police

ACCELERATION & TOP SPEED TESTS

TEST LOCATION CHRYSLER PROVING GROUNDS DATE OCTOBER 28, 1978

ACCELERATION

MAKE & MODEL CHEVROLET IMPALA BEGINNING TIME 9:36 AM/~~PM~~

SPEEDS	TIME REQUIREMENT	RUN #1 N	RUN #2 S	RUN #3 N	RUN #4 S	AVERAGE
0 - 60	13 sec.	11.24	11.01	11.24	10.98	11.117
0 - 80	23 sec.	20.17	19.36	20.50	19.10	19.782
0 - 100	43 sec.	37.54	32.58	37.63	33.29	35.260

TOP SPEED

110 MPH MINIMUM YES DISTANCE 1.42 miles TOP SPEED ATTAINED 112.5 MPH

ACCELERATION

MAKE & MODEL CHRYSLER NEWPORT BEGINNING TIME 10:51 AM/~~PM~~

SPEEDS	TIME REQUIREMENT	RUN #1 N	RUN #2 S	RUN #3 N	RUN #4 S	AVERAGE
0 - 60	13 sec.	10.32	10.09	10.33	9.96	10.175
0 - 80	23 sec.	18.33	17.38	19.03	17.75	18.122
0 - 100	43 sec.	33.78	29.46	34.12	28.78	31.535

TOP SPEED

110 MPH MINIMUM YES DISTANCE 1.24 miles TOP SPEED ATTAINED 121.3 MPH

ACCELERATION & TOP SPEED TESTS

TEST LOCATION CHRYSLER PROVING GROUNDS DATE OCTOBER 28, 1978

ACCELERATION

MAKE & MODEL DODGE ST. REGIS BEGINNING TIME 11.42 AM/~~PM~~

SPEEDS	TIME REQUIREMENT	RUN #1 N	RUN #2 S	RUN #3 N	RUN #4 S	AVERAGE
0 - 60	13 sec.	10.15	9.92	10.15	10.24	10.115
0 - 80	23 sec.	17.78	17.09	18.07	17.35	17.572
0 - 100	43 sec.	31.34	28.18	32.78	28.51	30.202

TOP SPEED

110 MPH MINIMUM YES DISTANCE 1.02 miles TOP SPEED ATTAINED 122.9 MPH

ACCELERATION

MAKE & MODEL FORD LTD BEGINNING TIME 12:10 AM/~~PM~~

SPEEDS	TIME REQUIREMENT	RUN #1 N	RUN #2 S	RUN #3 N	RUN #4 S	AVERAGE
0 - 60	13 sec.	12.62	12.17	12.42	12.13	12.335
0 - 80	23 sec.	24.20	22.74	24.71	22.08	23.432
0 - 100	43 sec.	79.88	52.53	73.91	47.00	63.330

TOP SPEED

110 MPH MINIMUM NO DISTANCE _____ TOP SPEED ATTAINED 105.4 MPH

ACCELERATION & TOP SPEED TESTS

TEST LOCATION CHRYSLER PROVING GROUNDS DATE OCTOBER 28, 1978

ACCELERATION

MAKE & MODEL FORD LTD II BEGINNING TIME 10:12 AM/~~PM~~

SPEEDS	TIME REQUIREMENT	RUN #1 N	RUN #2 S	RUN #3 N	RUN #4 S	AVERAGE
0 - 60	13 sec.	15.02	14.67	15.17	14.42	14.820
0 - 80	23 sec.	28.86	25.83	28.83	24.93	27.112
0 - 100	43 sec.	84.58	50.58	80.34	51.27	66.692

TOP SPEED

110 MPH MINIMUM NO* DISTANCE 5.52 miles TOP SPEED ATTAINED 111.1 MPH

*Failed to obtain 110 MPH within 3 miles

ACCELERATION

MAKE & MODEL _____ BEGINNING TIME _____ AM/PM

SPEEDS	TIME REQUIREMENT	RUN #1	RUN #2	RUN #3	RUN #4	AVERAGE
0 - 60						
0 - 80						
0 - 100						

TOP SPEED

110 MPH MINIMUM _____ DISTANCE _____ TOP SPEED ATTAINED _____ MPH

APPENDIX C

ERGONOMICS EVALUATION

PATROL VEHICLE EVALUATION QUESTIONNAIRE

MAKE Dodge Aspen YEAR 1979

Item	Rating
FRONT SEAT	
Seat Comfort (padding, springing)	2.50
Seat Position (range of adjustment, backrest)	2.58
Seat to Control Relationships (steering wheel, pedals, dash panel)	3.00
Headroom and Legroom (adequacy)	2.92
INSTRUMENT PANEL	
Safety (padding, protrusions)	2.29
Visibility (instruments, controls)	3.08
Reflection and Glare (windshield, instruments)	2.79
Instruments (adequacy, legibility)	2.88
WINDSHIELD - MIRROR	
Road Visibility (distortion, obstructions)	2.92
Reflections (instruments, controls)	2.83
Mirror Coverage (adjustment, rear visibility)	2.50
Mirror Location (accessibility, visibility, windshield obscurement)	2.54

Aspen (cont.)

Item	Rating
CONTROLS	
Steering Wheel (angle, size, position)	2.75
Shift Lever (accessibility, indicator visibility)	2.96
Knobs and Switches (reach, markings, visibility, arrangement for use)	3.13
Hand Brake (location, force required, confusion with hood device)	2.71
Pedals (size, spacing, angle)	2.87
REAR SEAT	
Seat Comfort (padding, springing)	2.48
Headroom and Legroom (adequacy)	1.96
DOORS	
Front Door Opening (ease of ingress and egress)	2.92
Rear Door Opening (ease of prisoner loading)	2.33
Window and Door Handles (accessibility, ease of operation)	2.38
WINDOWS	
Left Side (visibility, blind areas)	2.79
Right Side (visibility, blind areas)	2.75
Rear (visibility of rear corners)	2.58
TRUNK	
Lid (angle, size of opening)	2.88
Compartment (size, obstructions)	1.88
Total	72.20
Average	2.67

PATROL VEHICLE EVALUATION QUESTIONNAIRE

MAKE Ford Fairmont YEAR 1979

Item	Rating
FRONT SEAT	
Seat Comfort (padding, springing)	2.17
Seat Position (range of adjustment, backrest)	2.00
Seat to Control Relationships (steering wheel, pedals, dash panel)	1.92
Headroom and Legroom (adequacy)	1.75
INSTRUMENT PANEL	
Safety (padding, protrusions)	2.29
Visibility (instruments, controls)	2.46
Reflection and Glare (windshield, instruments)	2.25
Instruments (adequacy, legibility)	2.08
WINDSHIELD - MIRROR	
Road Visibility (distortion, obstructions)	2.63
Reflections (instruments, controls)	2.42
Mirror Coverage (adjustment, rear visibility)	2.29
Mirror Location (accessibility, visibility, windshield obscurement)	2.29

Fairmont (cont.)

Item	Rating
CONTROLS	
Steering Wheel (angle, size, position)	2.08
Shift Lever (accessibility, indicator visibility)	1.42
Knobs and Switches (reach, markings, visibility, arrangement for use)	2.21
Hand Brake (location, force required, confusion with hood device)	2.75
Pedals (size, spacing, angle)	1.79
REAR SEAT	
Seat Comfort (padding, springing)	2.23
Headroom and Legroom (adequacy)	1.64
DOORS	
Front Door Opening (ease of ingress and egress)	1.77
Rear Door Opening (ease of prisoner loading)	1.78
Window and Door Handles (accessibility, ease of operation)	2.04
WINDOWS	
Left Side (visibility, blind areas)	2.83
Right Side (visibility, blind areas)	2.65
Rear (visibility of rear corners)	2.71
TRUNK	
Lid (angle, size of opening)	2.96
Compartment (size, obstructions)	3.08
Total	60.49
Average	2.24

PATROL VEHICLE EVALUATION QUESTIONNAIRE

MAKE Chevrolet Impala YEAR 1979

Item	Rating
FRONT SEAT	
Seat Comfort (padding, springing)	2.83
Seat Position (range of adjustment, backrest)	3.00
Seat to Control Relationships (steering wheel, pedals, dash panel)	3.00
Headroom and Legroom (adequacy)	3.33
INSTRUMENT PANEL	
Safety (padding, protrusions)	3.00
Visibility (instruments, controls)	2.63
Reflection and Glare (windshield, instruments)	2.75
Instruments (adequacy, legibility)	2.88
WINDSHIELD - MIRROR	
Road Visibility (distortion, obstructions)	3.00
Reflections (instruments, controls)	2.87
Mirror Coverage (adjustment, rear visibility)	2.91
Mirror Location (accessibility, visibility, windshield obscurement)	2.74

Impala (cont.)

Item	Rating
CONTROLS	
Steering Wheel (angle, size, position)	3.17
Shift Lever (accessibility, indicator visibility)	3.00
Knobs and Switches (reach, markings, visibility, arrangement for use)	2.61
Hand Brake (location, force required, confusion with hood device)	2.96
Pedals (size, spacing, angle)	3.13
REAR SEAT	
Seat Comfort (padding, springing)	2.57
Headroom and Legroom (adequacy)	2.17
DOORS	
Front Door Opening (ease of ingress and egress)	2.91
Rear Door Opening (ease of prisoner loading)	2.44
Window and Door Handles (accessibility, ease of operation)	2.77
WINDOWS	
Left Side (visibility, blind areas)	2.79
Right Side (visibility, blind areas)	2.71
Rear (visibility of rear corners)	2.38
TRUNK	
Lid (angle, size of opening)	3.25
Compartment (size, obstructions)	3.13
Total	76.93
Average	2.85

PATROL VEHICLE EVALUATION QUESTIONNAIRE

MAKE Ford LTD YEAR 1979

Item	Rating
FRONT SEAT	
Seat Comfort (padding, springing)	3.38
Seat Position (range of adjustment, backrest)	3.29
Seat to Control Relationships (steering wheel, pedals, dash panel)	3.00
Headroom and Legroom (adequacy)	3.13
INSTRUMENT PANEL	
Safety (padding, protrusions)	2.42
Visibility (instruments, controls)	2.79
Reflection and Glare (windshield, instruments)	2.79
Instruments (adequacy, legibility)	2.38
WINDSHIELD - MIRROR	
Road Visibility (distortion, obstructions)	3.08
Reflections (instruments, controls)	2.86
Mirror Coverage (adjustment, rear visibility)	2.83
Mirror Location (accessibility, visibility, windshield obscurement)	2.96

LTD (cont.)

Item	Rating
CONTROLS	
Steering Wheel (angle, size, position)	2.83
Shift Lever (accessibility, indicator visibility)	2.86
Knobs and Switches (reach, markings, visibility, arrangement for use)	2.75
Hand Brake (location, force required, confusion with hood device)	2.63
Pedals (size, spacing, angle)	2.71
REAR SEAT	
Seat Comfort (padding, springing)	3.21
Headroom and Legroom (adequacy)	2.75
DOORS	
Front Door Opening (ease of ingress and egress)	2.90
Rear Door Opening (ease of prisoner loading)	3.00
Window and Door Handles (accessibility, ease of operation)	2.29
WINDOWS	
Left Side (visibility, blind areas)	2.52
Right Side (visibility, blind areas)	2.52
Rear (visibility of rear corners)	2.55
TRUNK	
Lid (angle, size of opening)	3.39
Compartment (size, obstructions)	3.48
Total	77.30
Average	2.86

PATROL VEHICLE EVALUATION QUESTIONNAIRE

MAKE Ford LTD II YEAR 1979

Item	Rating
FRONT SEAT	
Seat Comfort (padding, springing)	3.08
Seat Position (range of adjustment, backrest)	2.71
Seat to Control Relationships (steering wheel, pedals, dash panel)	2.63
Headroom and Legroom (adequacy)	2.58
INSTRUMENT PANEL	
Safety (padding, protrusions)	2.67
Visibility (instruments, controls)	2.71
Reflection and Glare (windshield, instruments)	2.48
Instruments (adequacy, legibility)	2.75
WINDSHIELD - MIRROR	
Road Visibility (distortion, obstructions)	2.29
Reflections (instruments, controls)	2.67
Mirror Coverage (adjustment, rear visibility)	2.75
Mirror Location (accessibility, visibility, windshield obscurement)	2.54

LTD II (cont.)

Item	Rating
CONTROLS	
Steering Wheel (angle, size, position)	2.13
Shift Lever (accessibility, indicator visibility)	2.67
Knobs and Switches (reach, markings, visibility, arrangement for use)	2.71
Hand Brake (location, force required, confusion with hood device)	1.90
Pedals (size, spacing, angle)	2.74
REAR SEAT	
Seat Comfort (padding, springing)	2.83
Headroom and Legroom (adequacy)	1.63
DOORS	
Front Door Opening (ease of ingress and egress)	2.23
Rear Door Opening (ease of prisoner loading)	1.79
Window and Door Handles (accessibility, ease of operation)	2.67
WINDOWS	
Left Side (visibility, blind areas)	2.17
Right Side (visibility, blind areas)	2.00
Rear (visibility of rear corners)	1.54
TRUNK	
Lid (angle, size of opening)	2.75
Compartment (size, obstructions)	2.46
Total	66.08
Average	2.48

PATROL VEHICLE EVALUATION QUESTIONNAIRE

MAKE Chevrolet Malibu YEAR 1979

Item	Rating
FRONT SEAT	
Seat Comfort (padding, springing)	2.79
Seat Position (range of adjustment, backrest)	2.79
Seat to Control Relationships (steering wheel, pedals, dash panel)	3.17
Headroom and Legroom (adequacy)	3.00
INSTRUMENT PANEL	
Safety (padding, protrusions)	2.75
Visibility (instruments, controls)	3.21
Reflection and Glare (windshield, instruments)	2.88
Instruments (adequacy, legibility)	3.17
WINDSHIELD - MIRROR	
Road Visibility (distortion, obstructions)	3.04
Reflections (instruments, controls)	3.00
Mirror Coverage (adjustment, rear visibility)	2.79
Mirror Location (accessibility, visibility, windshield obscurement)	2.50

Malibu (cont.)

Item	Rating
CONTROLS	
Steering Wheel (angle, size, position)	3.50
Shift Lever (accessibility, indicator visibility)	2.88
Knobs and Switches (reach, markings, visibility, arrangement for use)	2.83
Hand Brake (location, force required, confusion with hood device)	2.67
Pedals (size, spacing, angle)	2.65
REAR SEAT	
Seat Comfort (padding, springing)	3.00
Headroom and Legroom (adequacy)	2.26
DOORS	
Front Door Opening (ease of ingress and egress)	2.65
Rear Door Opening (ease of prisoner loading)	2.13
Window and Door Handles (accessibility, ease of operation)	2.39
WINDOWS	
Left Side (visibility, blind areas)	2.86
Right Side (visibility, blind areas)	3.25
Rear (visibility of rear corners)	2.75
TRUNK	
Lid (angle, size of opening)	2.33
Compartment (size, obstructions)	2.38
Total	75.62
Average	2.80

PATROL VEHICLE EVALUATION QUESTIONNAIRE

MAKE Chrysler Newport YEAR 1979

Item	Rating
FRONT SEAT	
Seat Comfort (padding, springing)	2.63
Seat Position (range of adjustment, backrest)	2.79
Seat to Control Relationships (steering wheel, pedals, dash panel)	2.83
Headroom and Legroom (adequacy)	3.21
INSTRUMENT PANEL	
Safety (padding, protrusions)	2.83
Visibility (instruments, controls)	2.33
Reflection and Glare (windshield, instruments)	2.75
Instruments (adequacy, legibility)	2.46
WINDSHIELD - MIRROR	
Road Visibility (distortion, obstructions)	3.00
Reflections (instruments, controls)	2.83
Mirror Coverage (adjustment, rear visibility)	2.58
Mirror Location (accessibility, visibility, windshield obscurement)	2.67

Newport (cont.)

Item	Rating
CONTROLS	
Steering Wheel (angle, size, position)	2.83
Shift Lever (accessibility, indicator visibility)	2.88
Knobs and Switches (reach, markings, visibility, arrangement for use)	2.42
Hand Brake (location, force required, confusion with hood device)	2.17
Pedals (size, spacing, angle)	2.67
REAR SEAT	
Seat Comfort (padding, springing)	2.86
Headroom and Legroom (adequacy)	2.92
DOORS	
Front Door Opening (ease of ingress and egress)	2.95
Rear Door Opening (ease of prisoner loading)	2.92
Window and Door Handles (accessibility, ease of operation)	2.46
WINDOWS	
Left Side (visibility, blind areas)	2.92
Right Side (visibility, blind areas)	2.79
Rear (visibility of rear corners)	2.63
TRUNK	
Lid (angle, size of opening)	3.17
Compartment (size, obstructions)	3.13
Total	72.16
Average	2.67

PATROL VEHICLE EVALUATION QUESTIONNAIRE

MAKE Dodge St. Regis YEAR 1979

Item	Rating
FRONT SEAT	
Seat Comfort (padding, springing)	2.75
Seat Position (range of adjustment, backrest)	2.96
Seat to Control Relationships (steering wheel, pedals, dash panel)	2.96
Headroom and Legroom (adequacy)	3.33
INSTRUMENT PANEL	
Safety (padding, protrusions)	3.08
Visibility (instruments, controls)	2.44
Reflection and Glare (windshield, instruments)	2.65
Instruments (adequacy, legibility)	2.63
WINDSHIELD - MIRROR	
Road Visibility (distortion, obstructions)	3.13
Reflections (instruments, controls)	2.67
Mirror Coverage (adjustment, rear visibility)	2.67
Mirror Location (accessibility, visibility, windshield obscurement)	2.88

St. Regis (cont.)

Item	Rating
CONTROLS	
Steering Wheel (angle, size, position)	2.88
Shift Lever (accessibility, indicator visibility)	2.92
Knobs and Switches (reach, markings, visibility, arrangement for use)	2.63
Hand Brake (location, force required, confusion with hood device)	2.46
Pedals (size, spacing, angle)	2.87
REAR SEAT	
Seat Comfort (padding, springing)	2.79
Headroom and Legroom (adequacy)	2.83
DOORS	
Front Door Opening (ease of ingress and egress)	3.00
Rear Door Opening (ease of prisoner loading)	3.13
Window and Door Handles (accessibility, ease of operation)	2.70
WINDOWS	
Left Side (visibility, blind areas)	2.83
Right Side (visibility, blind areas)	2.83
Rear (visibility of rear corners)	2.67
TRUNK	
Lid (angle, size of opening)	3.25
Compartment (size, obstructions)	2.99
Total	76.93
Average	2.85

PATROL VEHICLE EVALUATION QUESTIONNAIRE

MAKE Plymouth Volare YEAR 1979

Item	Rating
FRONT SEAT	
Seat Comfort (padding, springing)	2.79
Seat Position (range of adjustment, backrest)	2.79
Seat to Control Relationships (steering wheel, pedals, dash panel)	2.96
Headroom and Legroom (adequacy)	2.71
INSTRUMENT PANEL	
Safety (padding, protrusions)	2.21
Visibility (instruments, controls)	3.08
Reflection and Glare (windshield, instruments)	2.83
Instruments (adequacy, legibility)	2.96
WINDSHIELD - MIRROR	
Road Visibility (distortion, obstructions)	3.08
Reflections (instruments, controls)	2.88
Mirror Coverage (adjustment, rear visibility)	2.58
Mirror Location (accessibility, visibility, windshield obscurement)	2.67

Volare (cont.)

Item	Rating
CONTROLS	
Steering Wheel (angle, size, position)	2.79
Shift Lever (accessibility, indicator visibility)	2.96
Knobs and Switches (reach, markings, visibility, arrangement for use)	3.17
Hand Brake (location, force required, confusion with hood device)	2.83
Pedals (size, spacing, angle)	2.83
REAR SEAT	
Seat Comfort (padding, springing)	2.46
Headroom and Legroom (adequacy)	1.96
DOORS	
Front Door Opening (ease of ingress and egress)	2.65
Rear Door Opening (ease of prisoner loading)	2.33
Window and Door Handles (accessibility, ease of operation)	2.41
WINDOWS	
Left Side (visibility, blind areas)	2.75
Right Side (visibility, blind areas)	2.75
Rear (visibility of rear corners)	2.54
TRUNK	
Lid (angle, size of opening)	2.58
Compartment (size, obstructions)	1.71
Total	72.26
Average	2.68

APPENDIX D

MECHANICAL EVALUATION

MECHANICAL EVALUATION: PATROL VEHICLES

MAKE Dodge Aspen (Federal) YEAR 1979

Item	Rating
ELECTRICAL SYSTEM	
Battery	3.00
Alternator	2.75
Starter	2.25
Ignition	2.75
Lights	2.75
FUEL SYSTEM	
Carburetor	2.25
Fuel Pump and Filter	2.25
Fuel Tank and Lines	2.50
COOLING SYSTEM	
Radiator	2.50
Water Pump	1.50
Hoses	2.50
Coolant Recovery	3.00
Fan	3.00
EXHAUST SYSTEM	
Catalytic Converter	2.50
Pipes	2.50
ENGINE AND ACCESSORIES	
Engine Removal	1.75
Valve Covers	2.00
Oil Pan	2.00
Drain Plug	2.75
Dip Stick	2.75
Oil Filter	2.25
Power Steering Pump	2.25
Air Conditioning Compressor	2.50
TRANSMISSION	
Transmission Removal	3.00
Pan and Drain Plug	2.50
Dip Stick	2.00
Filter	3.00
Cooler	3.00
REAR AXLE DRIVESHAFT	
Differential Carrier Removal	2.25
Filler and Drain Plugs	2.25
Axles and Wheel Bearings	2.75
Driveshaft	2.50
Universal Joints	2.50

MECHANICAL EVALUATION: PATROL VEHICLES (continued)

MAKE Dodge Aspen (Federal)

Item		Rating
BRAKES		
Master Cylinder and Booster		2.25
Front Wheel Brakes		3.00
Rear Wheel Brakes		3.00
SUSPENSION AND STEERING		
Front		3.00
Rear		2.00
Shock Absorbers		2.25
Power Steering		2.00
Front End Alignment		1.67
BODY		
Windshield		3.00
Door Glass		3.00
Heater		1.75
Door Pillars		2.75
Instrument Panel		2.50
Body Wiring		2.00
Seat Belts		3.00
	Total	119.18
	Average	2.48

MECHANICAL EVALUATION: PATROL VEHICLES

MAKE Ford Fairmont (Federal) YEAR 1979

Item	Rating
ELECTRICAL SYSTEM	
Battery	3.00
Alternator	2.50
Starter	2.50
Ignition	3.00
Lights	2.75
FUEL SYSTEM	
Carburetor	2.50
Fuel Pump and Filter	1.75
Fuel Tank and Lines	2.50
COOLING SYSTEM	
Radiator	2.75
Water Pump	1.50
Hoses	2.25
Coolant Recovery	3.00
Fan	2.50
EXHAUST SYSTEM	
Catalytic Converter	2.00
Pipes	2.50
ENGINE AND ACCESSORIES	
Engine Removal	2.00
Valve Covers	1.50
Oil Pan	1.25
Drain Plug	2.75
Dip Stick	3.00
Oil Filter	2.50
Power Steering Pump	2.50
Air Conditioning Compressor	2.50
TRANSMISSION	
Transmission Removal	2.25
Pan and Drain Plug	2.50
Dip Stick	2.50
Filter	2.50
Cooler	3.00
REAR AXLE DRIVESHAFT	
Differential Carrier Removal	2.25
Filler and Drain Plugs	2.33
Axles and Wheel Bearings	2.50
Driveshaft	2.75
Universal Joints	2.75

MECHANICAL EVALUATION: PATROL VEHICLES (continued)

MAKE Ford Fairmont (Federal)

Item		Rating
BRAKES		
Master Cylinder and Booster		2.50
Front Wheel Brakes		2.75
Rear Wheel Brakes		2.75
SUSPENSION AND STEERING		
Front		3.00
Rear		2.75
Shock Absorbers		2.25
Power Steering		2.50
Front End Alignment		1.75
BODY		
Windshield		3.00
Door Glass		2.75
Heater		1.75
Door Pillars		2.25
Instrument Panel		1.75
Body Wiring		2.00
Seat Belts		2.50
	Total	116.59
	Average	2.43

MECHANICAL EVALUATION: PATROL VEHICLES

MAKE Chevrolet Impala (Federal) YEAR 1979

Item	Rating
ELECTRICAL SYSTEM	
Battery	3.00
Alternator	3.00
Starter	2.00
Ignition	3.00
Lights	2.75
FUEL SYSTEM	
Carburetor	2.50
Fuel Pump and Filter	2.50
Fuel Tank and Lines	3.00
COOLING SYSTEM	
Radiator	3.25
Water Pump	2.75
Hoses	2.25
Coolant Recovery	3.50
Fan	3.00
EXHAUST SYSTEM	
Catalytic Converter	1.50
Pipes	2.75
ENGINE AND ACCESSORIES	
Engine Removal	2.25
Valve Covers	1.75
Oil Pan	1.75
Drain Plug	3.00
Dip Stick	3.00
Oil Filter	3.00
Power Steering Pump	2.00
Air Conditioning Compressor	3.00
TRANSMISSION	
Transmission Removal	2.75
Pan and Drain Plug	3.00
Dip Stick	2.75
Filter	2.75
Cooler	3.00
REAR AXLE DRIVESHAFT	
Differential Carrier Removal	2.50
Filler and Drain Plugs	2.50
Axles and Wheel Bearings	2.75
Driveshaft	3.00
Universal Joints	2.75

MECHANICAL EVALUATION: PATROL VEHICLES (continued)

MAKE Chevrolet Impala (Federal)

Item		Rating
BRAKES		
Master Cylinder and Booster		2.75
Front Wheel Brakes		3.00
Rear Wheel Brakes		2.75
SUSPENSION AND STEERING		
Front		2.75
Rear		3.00
Shock Absorbers		2.50
Power Steering		2.75
Front End Alignment		3.00
BODY		
Windshield		3.00
Door Glass		3.00
Heater		1.50
Door Pillars		2.50
Instrument Panel		2.00
Body Wiring		2.00
Seat Belts		3.00
	Total	127.73
	Average	2.66

MECHANICAL EVALUATION: PATROL VEHICLES

MAKE Ford LTD (Federal) YEAR 1979

Item	Rating
ELECTRICAL SYSTEM	
Battery	2.75
Alternator	2.50
Starter	3.00
Ignition	2.75
Lights	2.75
FUEL SYSTEM	
Carburetor	2.50
Fuel Pump and Filter	2.25
Fuel Tank and Lines	2.33
COOLING SYSTEM	
Radiator	2.50
Water Pump	2.25
Hoses	2.00
Coolant Recovery	2.50
Fan	2.00
EXHAUST SYSTEM	
Catalytic Converter	2.75
Pipes	2.75
ENGINE AND ACCESSORIES	
Engine Removal	1.75
Valve Covers	1.25
Oil Pan	1.00
Drain Plug	2.75
Dip Stick	2.50
Oil Filter	2.50
Power Steering Pump	2.50
Air Conditioning Compressor	2.75
TRANSMISSION	
Transmission Removal	2.33
Pan and Drain Plug	2.67
Dip Stick	2.67
Filter	2.33
Cooler	2.33
REAR AXLE DRIVESHAFT	
Differential Carrier Removal	2.25
Filler and Drain Plugs	2.75
Axles and Wheel Bearings	2.50
Driveshaft	3.00
Universal Joints	3.00

MECHANICAL EVALUATION: PATROL VEHICLES (continued)

MAKE Ford LTD (Federal)

Item		Rating
BRAKES		
Master Cylinder and Booster		2.25
Front Wheel Brakes		2.75
Rear Wheel Brakes		2.75
SUSPENSION AND STEERING		
Front		2.75
Rear		2.75
Shock Absorbers		2.50
Power Steering		2.50
Front End Alignment		2.75
BODY		
Windshield		2.75
Door Glass		2.75
Heater		1.25
Door Pillars		2.00
Instrument Panel		1.75
Body Wiring		2.00
Seat Belts		2.50
	Total	116.40
	Average	2.43

MECHANICAL EVALUATION: PATROL VEHICLES

MAKE Ford LTD II (Federal) YEAR 1979

Item	Rating
ELECTRICAL SYSTEM	
Battery	2.75
Alternator	2.50
Starter	2.75
Ignition	3.00
Lights	3.00
FUEL SYSTEM	
Carburetor	2.50
Fuel Pump and Filter	2.25
Fuel Tank and Lines	2.50
COOLING SYSTEM	
Radiator	2.75
Water Pump	1.50
Hoses	2.50
Coolant Recovery	2.50
Fan	2.00
EXHAUST SYSTEM	
Catalytic Converter	2.75
Pipes	2.75
ENGINE AND ACCESSORIES	
Engine Removal	2.00
Valve Covers	2.00
Oil Pan	1.75
Drain Plug	2.75
Dip Stick	2.75
Oil Filter	2.50
Power Steering Pump	2.50
Air Conditioning Compressor	2.75
TRANSMISSION	
Transmission Removal	2.50
Pan and Drain Plug	2.50
Dip Stick	2.25
Filter	2.50
Cooler	2.75
REAR AXLE DRIVESHAFT	
Differential Carrier Removal	2.75
Filler and Drain Plugs	2.50
Axles and Wheel Bearings	2.50
Driveshaft	2.75
Universal Joints	2.75

MECHANICAL EVALUATION: PATROL VEHICLES (continued)

MAKE Ford LTD II (Federal)

Item		Rating
BRAKES		
Master Cylinder and Booster		2.50
Front Wheel Brakes		2.75
Rear Wheel Brakes		2.75
SUSPENSION AND STEERING		
Front		2.50
Rear		2.75
Shock Absorbers		2.50
Power Steering		2.50
Front End Alignment		2.75
BODY		
Windshield		2.75
Door Glass		2.25
Heater		2.75
Door Pillars		2.00
Instrument Panel		1.75
Body Wiring		2.00
Seat Belts		2.50
	Total	119.76
	Average	2.50

MECHANICAL EVALUATION: PATROL VEHICLES

MAKE Chevrolet Malibu (Federal) YEAR 1979

Item	Rating
ELECTRICAL SYSTEM	
Battery	3.00
Alternator	3.25
Starter	2.00
Ignition	3.00
Lights	2.75
FUEL SYSTEM	
Carburetor	2.75
Fuel Pump and Filter	3.00
Fuel Tank and Lines	2.00
COOLING SYSTEM	
Radiator	3.25
Water Pump	2.75
Hoses	2.50
Coolant Recovery	3.50
Fan	3.00
EXHAUST SYSTEM	
Catalytic Converter	1.75
Pipes	2.50
ENGINE AND ACCESSORIES	
Engine Removal	2.00
Valve Covers	1.75
Oil Pan	1.50
Drain Plug	3.25
Dip Stick	3.00
Oil Filter	3.00
Power Steering Pump	2.25
Air Conditioning Compressor	3.00
TRANSMISSION	
Transmission Removal	2.75
Pan and Drain Plug	3.00
Dip Stick	2.75
Filter	2.75
Cooler	3.00
REAR AXLE DRIVESHAFT	
Differential Carrier Removal	2.00
Filler and Drain Plugs	2.50
Axles and Wheel Bearings	2.75
Driveshaft	3.00
Universal Joints	2.75

MECHANICAL EVALUATION: PATROL VEHICLES (continued)

MAKE Chevrolet Malibu (Federal)

Item		Rating
BRAKES		
Master Cylinder and Booster		2.75
Front Wheel Brakes		3.00
Rear Wheel Brakes		2.75
SUSPENSION AND STEERING		
Front		3.00
Rear		3.00
Shock Absorbers		2.50
Power Steering		3.00
Front End Alignment		3.00
BODY		
Windshield		3.00
Door Glass		2.75
Heater		1.50
Door Pillars		1.75
Instrument Panel		2.25
Body Wiring		2.25
Seat Belts		2.50
	Total	127.01
	Average	2.65

MECHANICAL EVALUATION: PATROL VEHICLES

MAKE Chrysler Newport (Federal) YEAR 1979

Item	Rating
ELECTRICAL SYSTEM	
Battery	2.75
Alternator	3.00
Starter	2.50
Ignition	2.50
Lights	2.50
FUEL SYSTEM	
Carburetor	2.50
Fuel Pump and Filter	2.50
Fuel Tank and Lines	2.25
COOLING SYSTEM	
Radiator	2.25
Water Pump	2.00
Hoses	2.25
Coolant Recovery	3.00
Fan	3.00
EXHAUST SYSTEM	
Catalytic Converter	2.75
Pipes	2.75
ENGINE AND ACCESSORIES	
Engine Removal	2.50
Valve Covers	1.75
Oil Pan	2.00
Drain Plug	3.00
Dip Stick	3.00
Oil Filter	1.75
Power Steering Pump	2.50
Air Conditioning Compressor	2.50
TRANSMISSION	
Transmission Removal	2.25
Pan and Drain Plug	2.75
Dip Stick	2.50
Filter	3.00
Cooler	3.00
REAR AXLE DRIVESHAFT	
Differential Carrier Removal	2.00
Filler and Drain Plugs	2.00
Axles and Wheel Bearings	2.75
Driveshaft	1.75
Universal Joints	2.50

MECHANICAL EVALUATION: PATROL VEHICLES (continued)

MAKE Chrysler Newport (Federal)

Item		Rating
BRAKES		
Master Cylinder and Booster		2.25
Front Wheel Brakes		3.00
Rear Wheel Brakes		3.00
SUSPENSION AND STEERING		
Front		2.50
Rear		2.75
Shock Absorbers		2.50
Power Steering		2.50
Front End Alignment		2.50
BODY		
Windshield		3.00
Door Glass		2.50
Heater		1.75
Door Pillars		2.00
Instrument Panel		2.00
Body Wiring		2.00
Seat Belts		2.75
	Total	118.99
	Average	2.48

MECHANICAL EVALUATION: PATROL VEHICLES

MAKE Dodge St. Regis (Federal) YEAR 1979

Item	Rating
ELECTRICAL SYSTEM	
Battery	2.75
Alternator	3.00
Starter	2.50
Ignition	2.50
Lights	2.00
FUEL SYSTEM	
Carburetor	2.50
Fuel Pump and Filter	2.50
Fuel Tank and Lines	2.25
COOLING SYSTEM	
Radiator	2.25
Water Pump	2.00
Hoses	2.25
Coolant Recovery	3.00
Fan	3.00
EXHAUST SYSTEM	
Catalytic Converter	2.75
Pipes	2.75
ENGINE AND ACCESSORIES	
Engine Removal	2.50
Valve Covers	1.75
Oil Pan	2.00
Drain Plug	3.00
Dip Stick	3.00
Oil Filter	1.75
Power Steering Pump	2.25
Air Conditioning Compressor	2.25
TRANSMISSION	
Transmission Removal	2.25
Pan and Drain Plug	2.75
Dip Stick	2.25
Filter	3.00
Cooler	3.00
REAR AXLE DRIVESHAFT	
Differential Carrier Removal	2.00
Filler and Drain Plugs	2.00
Axles and Wheel Bearings	2.75
Driveshaft	1.75
Universal Joints	2.50

MECHANICAL EVALUATION: PATROL VEHICLES (continued)

MAKE Dodge St. Regis (Federal)

Item		Rating
BRAKES		
Master Cylinder and Booster		2.25
Front Wheel Brakes		2.50
Rear Wheel Brakes		2.50
SUSPENSION AND STEERING		
Front		2.50
Rear		2.75
Shock Absorbers		2.50
Power Steering		2.50
Front End Alignment		2.50
BODY		
Windshield		3.00
Door Glass		2.50
Heater		2.00
Door Pillars		1.50
Instrument Panel		2.00
Body Wiring		2.00
Seat Belts		2.75
	Total	116.50
	Average	2.43

MECHANICAL EVALUATION: PATROL VEHICLES

MAKE Plymouth Volare (Federal) YEAR 1979

Item	Rating
ELECTRICAL SYSTEM	
Battery	2.75
Alternator	2.75
Starter	2.75
Ignition	2.67
Lights	2.67
FUEL SYSTEM	
Carburetor	2.50
Fuel Pump and Filter	2.50
Fuel Tank and Lines	2.75
COOLING SYSTEM	
Radiator	2.50
Water Pump	1.50
Hoses	2.50
Coolant Recovery	3.00
Fan	3.00
EXHAUST SYSTEM	
Catalytic Converter	2.75
Pipes	2.75
ENGINE AND ACCESSORIES	
Engine Removal	1.75
Valve Covers	2.00
Oil Pan	2.00
Drain Plug	3.00
Dip Stick	2.50
Oil Filter	2.25
Power Steering Pump	2.25
Air Conditioning Compressor	2.50
TRANSMISSION	
Transmission Removal	3.00
Pan and Drain Plug	2.50
Dip Stick	2.00
Filter	3.00
Cooler	3.00
REAR AXLE DRIVESHAFT	
Differential Carrier Removal	2.25
Filler and Drain Plugs	2.25
Axles and Wheel Bearings	2.75
Driveshaft	2.50
Universal Joints	2.50

MECHANICAL EVALUATION: PATROL VEHICLES (continued)

MAKE Plymouth Volare (Federal)

Item		Rating
BRAKES		
Master Cylinder and Booster		2.25
Front Wheel Brakes		3.00
Rear Wheel Brakes		3.00
SUSPENSION AND STEERING		
Front		3.00
Rear		2.00
Shock Absorbers		2.25
Power Steering		2.25
Front End Alignment		2.00
BODY		
Windshield		3.00
Door Glass		3.00
Heater		1.75
Door Pillars		2.75
Instrument Panel		2.50
Body Wiring		2.00
Seat Belts		3.00
	Total	121.10
	Average	2.52

MECHANICAL EVALUATION: PATROL VEHICLES

MAKE Dodge Aspen (CA) YEAR 1979

Item	Rating
ELECTRICAL SYSTEM	
Battery	3.00
Alternator	2.75
Starter	2.67
Ignition	2.75
Lights	2.75
FUEL SYSTEM	
Carburetor	2.25
Fuel Pump and Filter	2.25
Fuel Tank and Lines	2.67
COOLING SYSTEM	
Radiator	2.50
Water Pump	1.50
Hoses	2.50
Coolant Recovery	3.00
Fan	3.00
EXHAUST SYSTEM	
Catalytic Converter	2.75
Pipes	2.75
ENGINE AND ACCESSORIES	
Engine Removal	1.75
Valve Covers	2.00
Oil Pan	2.00
Drain Plug	3.00
Dip Stick	2.75
Oil Filter	2.25
Power Steering Pump	2.25
Air Conditioning Compressor	2.50
TRANSMISSION	
Transmission Removal	3.00
Pan and Drain Plug	2.50
Dip Stick	2.00
Filter	3.00
Cooler	3.00
REAR AXLE DRIVESHAFT	
Differential Carrier Removal	2.67
Filler and Drain Plugs	2.67
Axles and Wheel Bearings	3.00
Driveshaft	2.67
Universal Joints	2.67

MECHANICAL EVALUATION: PATROL VEHICLES (continued)

MAKE *Dodge Aspen (CA)*

Item		Rating
BRAKES		
Master Cylinder and Booster		2.25
Front Wheel Brakes		3.00
Rear Wheel Brakes		3.00
SUSPENSION AND STEERING		
Front		3.00
Rear		2.00
Shock Absorbers		2.33
Power Steering		2.33
Front End Alignment		2.33
BODY		
Windshield		3.00
Door Glass		3.00
Heater		1.75
Door Pillars		2.75
Instrument Panel		2.50
Body Wiring		2.00
Seat Belts		3.00
	Total	123.02
	Average	2.56

MECHANICAL EVALUATION: PATROL VEHICLES

MAKE Ford Fairmont (CA) YEAR 1979

Item	Rating
ELECTRICAL SYSTEM	
Battery	3.00
Alternator	2.50
Starter	2.50
Ignition	3.00
Lights	2.75
FUEL SYSTEM	
Carburetor	2.50
Fuel Pump and Filter	1.75
Fuel Tank and Lines	2.50
COOLING SYSTEM	
Radiator	2.75
Water Pump	1.50
Hoses	2.50
Coolant Recovery	3.00
Fan	2.25
EXHAUST SYSTEM	
Catalytic Converter	2.00
Pipes	2.50
ENGINE AND ACCESSORIES	
Engine Removal	2.00
Valve Covers	1.50
Oil Pan	1.25
Drain Plug	2.75
Dip Stick	3.00
Oil Filter	2.50
Power Steering Pump	2.50
Air Conditioning Compressor	2.50
TRANSMISSION	
Transmission Removal	2.25
Pan and Drain Plug	2.50
Dip Stick	2.50
Filter	2.50
Cooler	3.00
REAR AXLE DRIVESHAFT	
Differential Carrier Removal	2.25
Filler and Drain Plugs	2.50
Axles and Wheel Bearings	2.50
Driveshaft	2.75
Universal Joints	2.75

MECHANICAL EVALUATION: PATROL VEHICLES (continued)

MAKE Ford Fairmont (CA)

Item		Rating
BRAKES		
Master Cylinder and Booster		2.50
Front Wheel Brakes		2.75
Rear Wheel Brakes		2.75
SUSPENSION AND STEERING		
Front		3.00
Rear		2.50
Shock Absorbers		1.75
Power Steering		2.33
Front End Alignment		1.33
BODY		
Windshield		3.00
Door Glass		2.75
Heater		1.50
Door Pillars		2.25
Instrument Panel		1.75
Body Wiring		2.00
Seat Belts		2.50
	Total	115.15
	Average	2.40

MECHANICAL EVALUATION: PATROL VEHICLES

MAKE Chevrolet Impala (CA) YEAR 1979

Item	Rating
ELECTRICAL SYSTEM	
Battery	3.00
Alternator	3.00
Starter	2.00
Ignition	3.00
Lights	2.75
FUEL SYSTEM	
Carburetor	2.50
Fuel Pump and Filter	1.50
Fuel Tank and Lines	3.00
COOLING SYSTEM	
Radiator	3.25
Water Pump	2.75
Hoses	2.25
Coolant Recovery	3.50
Fan	3.00
EXHAUST SYSTEM	
Catalytic Converter	1.50
Pipes	2.75
ENGINE AND ACCESSORIES	
Engine Removal	2.25
Valve Covers	1.50
Oil Pan	1.75
Drain Plug	3.00
Dip Stick	3.00
Oil Filter	3.00
Power Steering Pump	2.00
Air Conditioning Compressor	3.00
TRANSMISSION	
Transmission Removal	2.75
Pan and Drain Plug	3.00
Dip Stick	2.75
Filter	2.75
Cooler	3.00
REAR AXLE DRIVESHAFT	
Differential Carrier Removal	2.50
Filler and Drain Plugs	2.50
Axles and Wheel Bearings	2.75
Driveshaft	3.00
Universal Joints	2.75

MECHANICAL EVALUATION: PATROL VEHICLES (continued)

MAKE Chevrolet Impala (CA)

Item		Rating
BRAKES		
Master Cylinder and Booster		2.75
Front Wheel Brakes		3.00
Rear Wheel Brakes		2.75
SUSPENSION AND STEERING		
Front		2.75
Rear		3.00
Shock Absorbers		2.50
Power Steering		2.75
Front End Alignment		3.00
BODY		
Windshield		3.00
Door Glass		3.00
Heater		1.50
Door Pillars		2.25
Instrument Panel		2.00
Body Wiring		2.00
Seat Belts		3.00
	Total	126.24
	Average	2.63

MECHANICAL EVALUATION: PATROL VEHICLES

MAKE Ford LTD (CA) YEAR 1979

Item	Rating
ELECTRICAL SYSTEM	
Battery	2.75
Alternator	2.50
Starter	3.00
Ignition	2.75
Lights	2.75
FUEL SYSTEM	
Carburetor	2.50
Fuel Pump and Filter	2.25
Fuel Tank and Lines	2.50
COOLING SYSTEM	
Radiator	2.50
Water Pump	2.25
Hoses	2.00
Coolant Recovery	2.50
Fan	2.00
EXHAUST SYSTEM	
Catalytic Converter	2.75
Pipes	2.75
ENGINE AND ACCESSORIES	
Engine Removal	1.50
Valve Covers	1.25
Oil Pan	1.00
Drain Plug	2.75
Dip Stick	2.50
Oil Filter	2.50
Power Steering Pump	2.50
Air Conditioning Compressor	2.75
TRANSMISSION	
Transmission Removal	2.50
Pan and Drain Plug	2.75
Dip Stick	2.75
Filter	2.50
Cooler	2.50
REAR AXLE DRIVESHAFT	
Differential Carrier Removal	2.25
Filler and Drain Plugs	2.75
Axles and Wheel Bearings	2.50
Driveshaft	3.00
Universal Joints	3.00

MECHANICAL EVALUATION: PATROL VEHICLES (continued)

MAKE Ford LTD (CA)

Item		Rating
BRAKES		
Master Cylinder and Booster		2.25
Front Wheel Brakes		2.75
Rear Wheel Brakes		2.75
SUSPENSION AND STEERING		
Front		2.75
Rear		2.75
Shock Absorbers		2.50
Power Steering		2.50
Front End Alignment		2.75
BODY		
Windshield		2.75
Door Glass		2.75
Heater		1.25
Door Pillars		2.00
Instrument Panel		1.75
Body Wiring		2.00
Seat Belts		2.50
	Total	117.00
	Average	2.44

MECHANICAL EVALUATION: PATROL VEHICLES

MAKE Ford LTD II (CA) YEAR 1979

Item	Rating
ELECTRICAL SYSTEM	
Battery	2.75
Alternator	2.50
Starter	2.50
Ignition	3.00
Lights	3.00
FUEL SYSTEM	
Carburetor	2.50
Fuel Pump and Filter	2.25
Fuel Tank and Lines	2.50
COOLING SYSTEM	
Radiator	2.75
Water Pump	1.50
Hoses	2.50
Coolant Recovery	2.50
Fan	2.00
EXHAUST SYSTEM	
Catalytic Converter	2.50
Pipes	2.50
ENGINE AND ACCESSORIES	
Engine Removal	2.00
Valve Covers	2.00
Oil Pan	1.50
Drain Plug	2.75
Dip Stick	2.75
Oil Filter	2.50
Power Steering Pump	2.50
Air Conditioning Compressor	2.75
TRANSMISSION	
Transmission Removal	2.50
Pan and Drain Plug	2.50
Dip Stick	2.00
Filter	2.50
Cooler	2.75
REAR AXLE DRIVESHAFT	
Differential Carrier Removal	2.75
Filler and Drain Plugs	2.50
Axles and Wheel Bearings	2.50
Driveshaft	2.75
Universal Joints	2.75

MECHANICAL EVALUATION: PATROL VEHICLES (continued)

MAKE Ford LTD II (CA)

Item		Rating
BRAKES		
Master Cylinder and Booster		2.50
Front Wheel Brakes		2.75
Rear Wheel Brakes		2.75
SUSPENSION AND STEERING		
Front		2.50
Rear		2.75
Shock Absorbers		2.50
Power Steering		2.50
Front End Alignment		2.75
BODY		
Windshield		2.75
Door Glass		2.25
Heater		2.75
Door Pillars		2.00
Instrument Panel		1.75
Body Wiring		2.00
Seat Belts		2.50
	Total	118.50
	Average	2.47

MECHANICAL EVALUATION: PATROL VEHICLES

MAKE Chevrolet Malibu (CA) YEAR 1979

Item	Rating
ELECTRICAL SYSTEM	
Battery	3.00
Alternator	3.25
Starter	2.00
Ignition	3.00
Lights	2.75
FUEL SYSTEM	
Carburetor	2.75
Fuel Pump and Filter	2.00
Fuel Tank and Lines	2.00
COOLING SYSTEM	
Radiator	3.25
Water Pump	2.75
Hoses	2.50
Coolant Recovery	3.50
Fan	3.00
EXHAUST SYSTEM	
Catalytic Converter	1.75
Pipes	2.50
ENGINE AND ACCESSORIES	
Engine Removal	2.00
Valve Covers	1.50
Oil Pan	1.50
Drain Plug	3.25
Dip Stick	3.00
Oil Filter	3.00
Power Steering Pump	2.25
Air Conditioning Compressor	3.00
TRANSMISSION	
Transmission Removal	2.75
Pan and Drain Plug	3.00
Dip Stick	2.67
Filter	2.33
Cooler	3.00
REAR AXLE DRIVESHAFT	
Differential Carrier Removal	2.00
Filler and Drain Plugs	2.50
Axles and Wheel Bearings	2.75
Driveshaft	3.00
Universal Joints	2.75

MECHANICAL EVALUATION: PATROL VEHICLES (continued)

MAKE Chevrolet Malibu (CA)

Item		Rating
BRAKES		
Master Cylinder and Booster		2.75
Front Wheel Brakes		3.00
Rear Wheel Brakes		2.75
SUSPENSION AND STEERING		
Front		3.00
Rear		2.75
Shock Absorbers		2.25
Power Steering		2.75
Front End Alignment		3.00
BODY		
Windshield		3.00
Door Glass		2.75
Heater		1.50
Door Pillars		2.25
Instrument Panel		2.25
Body Wiring		2.50
Seat Belts		2.50
	Total	125.23
	Average	2.61

MECHANICAL EVALUATION: PATROL VEHICLES

MAKE Chrysler Newport (CA) YEAR 1979

Item	Rating
ELECTRICAL SYSTEM	
Battery	2.75
Alternator	3.00
Starter	2.67
Ignition	2.50
Lights	2.50
FUEL SYSTEM	
Carburetor	2.75
Fuel Pump and Filter	2.75
Fuel Tank and Lines	2.50
COOLING SYSTEM	
Radiator	2.25
Water Pump	2.00
Hoses	2.25
Coolant Recovery	3.00
Fan	3.00
EXHAUST SYSTEM	
Catalytic Converter	2.75
Pipes	2.75
ENGINE AND ACCESSORIES	
Engine Removal	2.50
Valve Covers	1.75
Oil Pan	2.00
Drain Plug	3.00
Dip Stick	3.00
Oil Filter	1.75
Power Steering Pump	2.50
Air Conditioning Compressor	2.50
TRANSMISSION	
Transmission Removal	2.25
Pan and Drain Plug	2.75
Dip Stick	2.50
Filter	3.00
Cooler	3.00
REAR AXLE DRIVESHAFT	
Differential Carrier Removal	2.00
Filler and Drain Plugs	2.00
Axles and Wheel Bearings	2.75
Driveshaft	1.75
Universal Joints	2.50

MECHANICAL EVALUATION: PATROL VEHICLES (continued)

MAKE Chrysler Newport (CA)

Item		Rating
BRAKES		
Master Cylinder and Booster		2.25
Front Wheel Brakes		3.00
Rear Wheel Brakes		3.00
SUSPENSION AND STEERING		
Front		2.50
Rear		2.75
Shock Absorbers		2.50
Power Steering		2.50
Front End Alignment		2.50
BODY		
Windshield		3.00
Door Glass		2.50
Heater		1.75
Door Pillars		2.00
Instrument Panel		2.00
Body Wiring		2.00
Seat Belts		2.75
	Total	119.92
	Average	2.50

MECHANICAL EVALUATION: PATROL VEHICLES

MAKE Dodge St. Regis (CA) YEAR 1979

Item	Rating
ELECTRICAL SYSTEM	
Battery	2.75
Alternator	3.00
Starter	2.67
Ignition	2.50
Lights	2.00
FUEL SYSTEM	
Carburetor	2.50
Fuel Pump and Filter	2.50
Fuel Tank and Lines	2.33
COOLING SYSTEM	
Radiator	2.25
Water Pump	2.00
Hoses	2.25
Coolant Recovery	3.00
Fan	3.00
EXHAUST SYSTEM	
Catalytic Converter	2.67
Pipes	2.67
ENGINE AND ACCESSORIES	
Engine Removal	2.50
Valve Covers	1.75
Oil Pan	2.00
Drain Plug	3.00
Dip Stick	3.00
Oil Filter	2.00
Power Steering Pump	2.50
Air Conditioning Compressor	2.50
TRANSMISSION	
Transmission Removal	2.67
Pan and Drain Plug	3.00
Dip Stick	2.50
Filter	3.00
Cooler	3.00
REAR AXLE DRIVESHAFT	
Differential Carrier Removal	2.00
Filler and Drain Plugs	2.33
Axles and Wheel Bearings	3.00
Driveshaft	2.00
Universal Joints	2.67

MECHANICAL EVALUATION: PATROL VEHICLES (continued)

MAKE Dodge St. Regis (CA)

Item		Rating
BRAKES		
Master Cylinder and Booster		2.25
Front Wheel Brakes		3.00
Rear Wheel Brakes		3.00
SUSPENSION AND STEERING		
Front		2.67
Rear		2.67
Shock Absorbers		2.67
Power Steering		2.50
Front End Alignment		2.50
BODY		
Windshield		3.00
Door Glass		2.50
Heater		1.67
Door Pillars		2.00
Instrument Panel		2.00
Body Wiring		2.00
Seat Belts		2.75
	Total	120.67
	Average	2.51

MECHANICAL EVALUATION: PATROL VEHICLES

MAKE Plymouth Volare (CA) YEAR 1979

Item	Rating
ELECTRICAL SYSTEM	
Battery	3.00
Alternator	2.75
Starter	2.50
Ignition	2.75
Lights	2.75
FUEL SYSTEM	
Carburetor	2.25
Fuel Pump and Filter	2.25
Fuel Tank and Lines	2.50
COOLING SYSTEM	
Radiator	2.50
Water Pump	1.50
Hoses	2.50
Coolant Recovery	3.00
Fan	3.00
EXHAUST SYSTEM	
Catalytic Converter	2.75
Pipes	2.75
ENGINE AND ACCESSORIES	
Engine Removal	1.75
Valve Covers	2.00
Oil Pan	2.00
Drain Plug	3.00
Dip Stick	2.75
Oil Filter	2.25
Power Steering Pump	2.25
Air Conditioning Compressor	2.50
TRANSMISSION	
Transmission Removal	3.00
Pan and Drain Plug	2.50
Dip Stick	2.00
Filter	3.00
Cooler	3.00
REAR AXLE DRIVESHAFT	
Differential Carrier Removal	2.25
Filler and Drain Plugs	2.25
Axles and Wheel Bearings	2.75
Driveshaft	2.50
Universal Joints	2.50

MECHANICAL EVALUATION: PATROL VEHICLES (continued)

MAKE Plymouth Volare (CA)

Item		Rating
BRAKES		
Master Cylinder and Booster		2.25
Front Wheel Brakes		3.00
Rear Wheel Brakes		3.00
SUSPENSION AND STEERING		
Front		3.00
Rear		2.00
Shock Absorbers		2.25
Power Steering		2.25
Front End Alignment		2.00
BODY		
Windshield		3.00
Door Glass		3.00
Heater		1.75
Door Pillars		2.67
Instrument Panel		2.50
Body Wiring		2.00
Seat Belts		3.00
	Total	120.68
	Average	2.51

COUNTY OF LOS ANGELES
MECHANICAL DEPARTMENT

SHERIFF'S PATROL CAR EVALUATION FORM

Make_____ Year_____ Rater_____

Item	Rating*	Considerations
ELECTRICAL SYSTEM		
Battery	P F G E	Maintenance free type; Wattage; Corrosion resistant tray.
Alternator	P F G E	Amperage; Accessibility; Repairability (i.e. diode replacement).
Starter	P F G E	Power; Accessibility; Repairability (i.e. brush replacement).
Ignition	P F G E	Transistorized or high energy; Accessibility; Silicone wires.
Lights	P F G E	Ease of lamp replacement; Water and dustproof; Access for hand lamp alignment.
FUEL SYSTEM		
Carburetor	P F G E	Capacity; Accessibility; Repairability.
Fuel Pump and Filter	P F G E	Capacity; Accessibility; Repairability.
Fuel Tank and Lines	P F G E	Capacity; Puncture resistance.
COOLING SYSTEM		
Radiator	P F G E	Size; Air ducting; Protection.
Water Pump	P F G E	Accessibility, repairability.
Hoses	P F G E	Silicone.
Coolant Recovery	P G G E	Capacity; Accessibility.
Fan	P F G E	Size; Control; Noise

*P=Poor F=Fair G=Good E=Excellent

Item	Rating	Considerations
EXHAUST SYSTEM		
Catalytic Converter	P F G E	Preferred without; Insulation from floor, etc; Protection.
Pipes	P F G E	Accessibility; Support; Insulation from floor, fuel tank, etc.
ENGINE AND ACCESSORIES		
Engine Removal	P F G E	Accessibility; firewall clearance; cross-member clearance.
Valve Covers	P F G E	Bolt fastened; Resistance to deformation.
Oil Pan	P F G E	Ease of removal; Protection
Drain Plug	P F G E	Ease of removal; Durability.
Dip Stick	P F G E	Accessibility; night usibility.
Oil Filter	P F G E	Capacity; Accessibility.
Power Steering Pump	P F G E	Accessibility; Auxiliary cooler; belt arrangement.
Air Conditioning Compressor	P F G E	Accessibility; Rotary or axial type; belt arrangement.
TRANSMISSION		
Transmission Removal	P F G E	Accessibility; cross member clearance.
Pan and Drain Plug	P F G E	Accessibility.
Filter	P F G E	Disposable vs screen; Accessibility.
Cooler	P F G E	Auxiliary vs in-radiator.

Item	Rating	Considerations
REAR AXLE DRIVESHAFT		
Differential Carrier Removal	P F G E	Ease of removal; Repairability.
Filler and Drain Plugs	P F G E	Accessibility; Durability.
Axles and Wheel Bearings	P F G E	Full Floating vs tapered.
Driveshaft	P F G E	Accessibility.
Universal Joints	P F G E	Accessibility; Lube fittings.
BRAKES		
Master Cylinder and Booster	P F G E	Accessibility; Repairability.
Front Wheel Brakes	P F G E	Disc type; Repairability.
Rear Wheel Brakes	P F G E	Disc type; Repairability.
SUSPENSION AND STEERING		
Front	P F G E	Heavy duty; Sway bar; Lube fitting access
Rear	P F G E	Heavy duty; Sway bar
Shock Absorbers	P F G E	Heavy duty; Accessibility
Power Steering	P F G E	Accessibility; Repairability; Protection of hoses
Front End Alignment	P F G E	Accessibility; Shim type

Item	Rating	Consideration
BODY		
Windshield	P F G E	Tinted.
Door Glass	P F G E	Framed.
Heater	P F G E	Accessibility; Silicone hoses.
Door Pillars	P F G E	Adequacy; Ease of barrier installation.
Instrument Panel	P F G E	Accessibility; Repairability.
Body Wiring	P F G E	Accessibility; Repairability.
Seat Belts	P F G E	Retractors; Maintainability.

COMMENTS

Please comment on any feature that you believe is either very good or very poor.

END