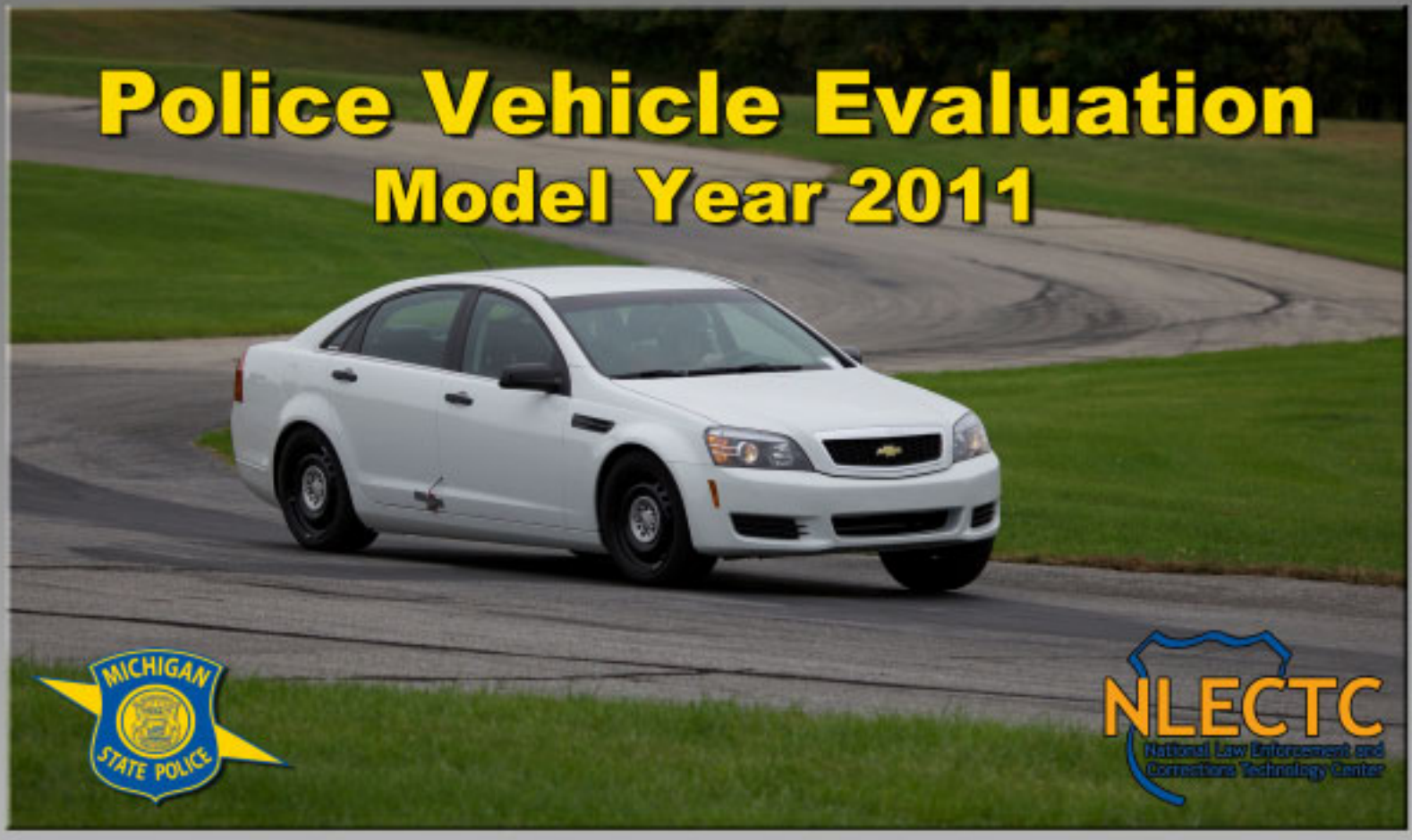
Police Vehicle Evaluation
Model Year 2011



MICHIGAN STATE POLICE

NLECTC
National Law Enforcement and Corrections Technology Center

STATE OF MICHIGAN
Department of State Police
and
Department of Management and Budget

2011 Model Year
Police Vehicle
Evaluation Program

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PREFACE

The Michigan State Police Vehicle Test Team is pleased to announce the results of the 2011 model year Police Vehicle Evaluation. This year we tested ten vehicles in total, and four motorcycles. We appreciate your continued support and encouragement. The vehicles evaluated this year included the following:

POLICE CATEGORY

Ford Police Interceptor (3.27:1)	4.6L
Ford Police Interceptor (3.55:1)	4.6L
Chevrolet Caprice 9C1	6.0L
Chevrolet Caprice 9C1 E85	6.0L
Chevrolet Impala 9C1	3.9L
Chevrolet Impala 9C1 E85	3.9L
Chevrolet Tahoe PPV 2WD	5.3L
Chevrolet Tahoe PPV 2WD E85	5.3L
Dodge Charger	3.6L
Dodge Charger	5.7L

MOTORCYCLES

Harley-Davidson Electra Glide FLHTP

Harley-Davidson Road King FLHP

BMW R 1200 RTP

Kawasaki Concours 14 ABS Police

GENERAL INFORMATION

All of the cars were tested with a clean roof (no overhead light or lightbar) and without "A" pillar mount spotlights. We believe this is the best way to ensure all of the vehicles are tested on an equal basis. Remember that once overhead lights, spotlights, radio antennas, sirens, and other emergency equipment are installed, overall performance may be somewhat lower than we report.

Each vehicle was tested with the tires that are available as original equipment on the production model. Specific tire information for each vehicle is available in the Vehicle Description portion of this report. All vehicles listed in this report were equipped with electronic speed limiters.

Motorcycles were tested with equipment installed as provided by their respective manufacturer. Harley-Davidson chose to test their bikes with minimal equipment. BMW and Kawasaki chose to test their bike with the majority of the equipment installed.

Chrysler Proving Grounds - Acceleration, Top Speed, & Braking Tests

We had a full line up of test vehicles. We would like to thank Mr. Craig Hageman for the assistance we received from the staff at the Chrysler Proving Grounds. We experienced a rain delay during this portion of testing. It was suspended from 9:15 am until 12:40 pm. However, all portions were completed by the end of the day.

We appreciate the support we received from General Motors, Ford, Chrysler, Harley-Davidson, BMW and Kawasaki Motors Corp. during testing. This also was the fourth year of motorcycle testing and we continue to get great feedback on this important component to the testing lineup. We expect other manufacturers that produce law enforcement motorcycles to participate in the future.

Michigan State Police Precision Driving Unit- Motorcycle Dynamics

Sunday we completed the motorcycle dynamics testing with cool temperatures. This portion of the testing continues to grow. We had a large audience of observers, all interested in the new products being tested.

Grattan Raceway - Vehicle Dynamics (High Speed Handling) Test

The weather was great and all the dynamics tests were completed. The vehicles were loaded up and returned to the Precision Driving Unit where they were made ready for the Ergonomics portion of the test.

After the second series of laps the Chevrolet Caprice 9C1 (regular fuel) was examined by GM personnel as the drivers expressed concern regarding the vehicles ability to remain stable while turning. The drivers experienced a floating sensation as the vehicle was driven at high speeds through various turns on the raceway. The drivers were also experiencing a noticeable vibration during heavy braking. GM engineers and technicians thoroughly checked the vehicle and found nothing of concern.

While driving the Chevrolet Caprice 9C1 (regular fuel) during the third series of laps, the driver aborted the run due to a reduction of engine power. The vehicle was examined by GM engineers and technicians with no problems identified. When restarted, the vehicle returned to full power. This series of laps were run again at the end of the day to complete the test. This vehicle did not exhibit this problem again during the remainder of testing.

After a thorough post test inspection, GM engineers discovered that pre-production, hand built, proto type front struts used on the Caprice 9C1 experienced internal parts failure and the rear suspension cradle required stiffer isolation bushings. On October 7th, the MSP Test Team met GM personnel at the Grattan Raceway for further evaluation of the Chevrolet Caprice 9C1. With these two issues resolved, the test team found the handling of the Caprice to be much improved.

The original times posted by the Chevrolet Caprice 9C1 on test day remain as the official results. The laps driven on October 7th were merely for determining handling issues have been resolved.

We recommend you review the information contained in this report and then apply it to the needs of your agency. This report is not an endorsement of products, but a means of learning what's available for your officers so they can do their job effectively and safely. If anything in this report requires further explanation or clarification, please call or write.

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ACKNOWLEGEMENTS

We would like to thank the following contributors. We are grateful for their support and encouragement toward our ultimate goal: a safe, successful testing program that benefits the law enforcement community nationwide and beyond.

Colonel Eddie L. Washington, Jr., Director, Michigan Department of State Police
Lt. Colonel Gary Gorski, Deputy Director, Field Services Bureau
Lt. Colonel Kriste K. Etue, Deputy Director, Administrative Services Bureau
Personnel from the Michigan Department of Management & Budget, Vehicle and Travel Services

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Mr. Sam Faasen and personnel from Grattan Raceway Park

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The Michigan State Police Rockford Post for their assistance at Grattan Raceway.

Michigan State Police Ergonomic Evaluators – MC Officer Niki Brehm, Tpr. Ernie Felkers, Tpr. Scott Carlson, Tpr. Todd Price, Tpr. Mike Fink, Tpr. Bennie Boyd, Tpr. Dave Cope, Tpr. Pat Roti, and Tpr. Randy Phare.

Special thanks to General Motors, Ford Motor Company, Chrysler Motors, Harley-Davidson Motorcycle, BMW Motorrad USA, and Kawasaki Motors Corp. for their hard work in building and preparing the test cars and motorcycles. We are grateful for your dedication to law enforcement. Everyday law enforcement looks to these vehicles to do a list of duties varied and enduring.

Finally, thanks to all in the United States and Canada who represent law enforcement and purchasing agencies for your constant encouragement and support. We are proud to make a contribution to the law enforcement community.

Michigan State Police Vehicle Test Team:

TEST EQUIPMENT

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

Corrsys Datron a Kistler Company
39205 Country Club Dr. Suite C20, Farmington Hills, Mi 48331

DLS Smart Sensor – Optical non-contact speed and distance sensor

Correvit L-350 1 Axis Optical Sensor

Shoei Helmets, 3002 Dow Ave., Suite 128, Tustin, CA 92780

Law Enforcement Helmet – Model RJ-Air LE
Motorcycle Helmet – Multi Tech

AMB i.t. US INC., 1631 Phoenix Blvd., Suite 11, College Park, GA 30349

AMB TranX extended loop decoder

Mains adapter 230 V AC/12 V DC

AMB TranX260 transponders

AMMCO TOOLS, Inc., 2100 Commonwealth Ave., North Chicago, IL 60064

Decelerometer, Model 7350

TEST VEHICLE DESCRIPTIONS AND PHOTOGRAPHS

Ford Police Interceptor
3.27:1

TEST VEHICLE DESCRIPTION

MAKE Ford	**MODEL** Police Interceptor	**SALES CODE NO.** P71	
ENGINE DISPLACEMENT	**CUBIC INCHES** 281	**LITERS** 4.6	
FUEL SYSTEM	Sequential Multiport Fuel Injection	**EXHAUST** Dual	
HORSEPOWER (SAENET)	250 @ 5000 RPM	**ALTERNATOR** 200 A	
TORQUE	297 ft-lbs @ 400 RPM	**BATTERY** 750 CCA	
COMPRESSION RATIO	9.4:1		
TRANSMISSION	**MODEL** 4R70W	**TYPE** 4-Speed Electronic Automatic	
	LOCKUP TORQUE CONVERTER? Yes		
	OVERDRIVE? Yes		
AXLE RATIO	3.27		
STEERING	Power Rack & Pinion		
TURNING CIRCLE (CURB TO CURB)	40.3 ft		
TIRE SIZE, LOAD & SPEED RATING	Goodyear Eagle RS-A P235/55R17 98W		
SUSPENSION TYPE (FRONT)	Independent SLA with ball joint & coil spring		
SUSPENSION TYPE (REAR)	4 bar link with Watts Linkage		
GROUND CLEARANCE, MINIMUM	5.6 in.	**LOCATION** Exhaust joint	
BRAKE SYSTEM	Power, dual front piston, single rear piston, 4 circuit and ABS		
BRAKES, FRONT	**TYPE** Vented disc	**SWEPT AREA** 273 sq. in.	
BRAKES, REAR	**TYPE** Vented disc	**SWEPT AREA** 176 sq. in.	
FUEL CAPACITY	**GALLONS** 19.0	**LITERS** 71.9	
GENERAL MEASUREMENTS	**WHEELBASE** 114.6 in.	**LENGTH** 212.0 in.	
	TEST WEIGHT 4184	**HEIGHT** 58.3 in.	
HEADROOM	**FRONT** 39.5 in.	**REAR** 37.8 in.	
LEGROOM	**FRONT** 41.6 in.	**REAR** 38.0 in.	
SHOULDER ROOM	**FRONT** 60.6 in.	**REAR** 60.0 in.	
HIPROOM	**FRONT** 57.4 in.	**REAR** 56.1 in.	
INTERIOR VOLUME	**FRONT** 57.6 cu. ft.	**REAR** 49.8 cu. ft.	
	COMB 107.5 cu. ft.	**TRUNK** 20.6 cu. ft.	
EPA MILEAGE EST. (MPG)	**CITY** 14	**HIGHWAY** 21	**COMBINED** 17
EPA MILEAGE EST. (MPG) Unadjusted	**CITY** 17.9	**HIGHWAY** 29.7	**COMBINED** 21.7

Ford Police Interceptor
3.55:1

TEST VEHICLE DESCRIPTION

MAKE Ford	**MODEL** Police Interceptor		**SALES CODE NO.** P71		
ENGINE DISPLACEMENT	**CUBIC INCHES** 281		**LITERS** 4.6		
FUEL SYSTEM	Sequential Multiport Fuel Injection E85 Capable		**EXHAUST** Dual		
HORSEPOWER (SAE NET)	250 @ 5000 RPM		**ALTERNATOR** 200 A		
TORQUE	297 ft-lbs @ 4000 RPM		**BATTERY** 750 CCA		
COMPRESSION RATIO	9.4:1				
TRANSMISSION	**MODEL** 4R70W	**TYPE** 4-Speed Electronic Automatic			
	LOCKUP TORQUE CONVERTER? Yes				
	OVERDRIVE? Yes				
AXLE RATIO	3.55				
STEERING	Power Rack and Pinion, variable ratio				
TURNING CIRCLE (CURB TO CURB)	40.3 ft.				
TIRE SIZE, LOAD & SPEED RATING	Goodyear Eagle RS-A P235/55R17 98W				
SUSPENSION TYPE (FRONT)	Independent SLA with ball joint & coil spring				
SUSPENSION TYPE (REAR)	4 bar link with Watts Linkage				
GROUND CLEARANCE, MINIMUM	5.6 in.	**LOCATION** Exhaust joint			
BRAKE SYSTEM	Power, dual front piston, single rear piston, 4 circuit and ABS				
BRAKES, FRONT	**TYPE** Vented disc		**SWEPT AREA** 273 sq. in.		
BRAKES, REAR	**TYPE** Vented disc		**SWEPT AREA** 176 sq. in.		
FUEL CAPACITY	**GALLONS** 19.0		**LITERS** 71.9		
GENERAL MEASUREMENTS	**WHEELBASE** 114.6 in.		**LENGTH** 212.0 in.		
	TEST WEIGHT 4139		**HEIGHT** 58.3 in.		
HEADROOM	**FRONT** 39.5 in.		**REAR** 37.8 in.		
LEGROOM	**FRONT** 41.6 in.		**REAR** 38.0 in.		
SHOULDER ROOM	**FRONT** 60.6 in.		**REAR** 60.0 in.		
HIPROOM	**FRONT** 57.4 in.		**REAR** 56.1 in.		
INTERIOR VOLUME	**FRONT** 57.6 cu. ft.		**REAR** 49.8 cu. ft.		
	COMB 107.5 cu. ft.		**TRUNK** 20.6 cu. ft.		
EPA MILEAGE EST. (MPG) Label	**CITY** 14	**HIGHWAY** 21	**COMBINED** 17		
EPA MILEAGE EST. (MPG) Unadjusted	**CITY** 17.9	**HIGHWAY** 29.7	**COMBINED** 21.7		

Chevrolet Caprice 9C1

TEST VEHICLE DESCRIPTION

MAKE Chevrolet	**MODEL** Caprice 9C1	**SALES CODE NO.** 1EW19	
ENGINE DISPLACEMENT	**CUBIC INCHES** 364	**LITERS** 6.0	
FUEL SYSTEM	SPFI – E85 Ethanol Capable	**EXHAUST** Dual	
HORSEPOWER (SAENET)	355 @ 5300 RPM	**ALTERNATOR** 170 amp.	
TORQUE	384 @ 4000 RPM	**BATTERY** 700 CCA	
COMPRESSION RATIO	10.4:1		
TRANSMISSION	**MODEL** 6L80E	**TYPE** 6 – Speed Automatic	
	LOCKUP TORQUE CONVERTER? Yes		
	OVERDRIVE? Yes		
AXLE RATIO	2.92:1		
STEERING	Power Rack and Pinion		
TURNING CIRCLE (CURB TO CURB)	38 ft.		
TIRE SIZE, LOAD & SPEED RATING	P235/50R18 W Rated Goodyear Eagle RS-A		
SUSPENSION TYPE (FRONT)	Independent strut. Coil springs, & stabilizer bar		
SUSPENSION TYPE (REAR)	Independent strut. Coil springs, & stabilizer bar		
GROUND CLEARANCE, MINIMUM	5.6”	**LOCATION** Engine Cradle	
BRAKE SYSTEM	Power, dual hydraulic, anti-lock		
BRAKES, FRONT	**TYPE** Vented Disc	**SWEPT** 310.6 sq in	
BRAKES, REAR	**TYPE** Vented Disc	**SWEPT AREA** 211.44 sq in	
FUEL CAPACITY	**GALLONS** 19.0	LITERS 71.6	
GENERAL MEASUREMENTS	**WHEELBASE** 118.5 in.	**LENGTH** 204.2 in.	
	TEST WEIGHT 4264 lbs.	**HEIGHT** 58.7 in.	
HEADROOM	**FRONT** 38.7 in.	**REAR** 37.5 in.	
LEGROOM	**FRONT** 42.2 in.	**REAR** 43.2 in.	
SHOULDER ROOM	**FRONT** 59.1 in.	**REAR** 58.9 in.	
HIPROOM	**FRONT** 56.6 in.	**REAR** 57.9 in.	
INTERIOR VOLUME	**FRONT** 56.0 cu. ft.	**REAR** 56.0 cu. ft.	
	COMB 112 cu. ft.	**TRUNK** 17.4 cu. ft. w/full size spare and auxiliary battery	
EPA MILEAGE EST. (MPG) Label *	**CITY** 14	**HIGHWAY** 22	**COMBINED** 17
EPA MILEAGE EST. (MPG) Unadjusted *	**CITY** 17.3	**HIGHWAY** 30.5	**COMBINED** 21.5
EPA Mileage EST (MPG) Label E85 *	**CITY** 14	**HIGHWAY** 22	**COMBINED** 17
EPA Mileage EST (MPG) Unadjusted E85 *	**CITY** 17.3	**HIGHWAY** 30.5	**COMBINED** 21.5

*** Official fuel economy available January 2011 @ gmfleet.com**

Chevrolet Impala 9C1

TEST VEHICLE DESCRIPTION

MAKE Chevrolet	**MODEL** Impala 9C1		**SALES CODE NO.** 1WS19		
ENGINE DISPLACEMENT	**CUBIC INCHES** 237		**LITERS** 3.9		
FUEL SYSTEM	SPFI – E85 Ethanol Capable		**EXHAUST** Single		
HORSEPOWER (SAE NET)	233 @ 5600 RPM		**ALTERNATOR** 150 amp.		
TORQUE	240 @ 4000 RPM		**BATTERY** 750 CCA		
COMPRESSION RATIO	9.4:1				
TRANSMISSION	**MODEL** 4T65E	**TYPE** 4-Speed Automatic			
	LOCKUP TORQUE CONVERTER? Yes				
	OVERDRIVE? Yes				
AXLE RATIO	3.29:1				
STEERING	Power Rack and Pinion				
TURNING CIRCLE (CURB TO CURB)	38 ft.				
TIRE SIZE, LOAD & SPEED RATING	Pirelli AL3 P225/60R16 V-Rated				
SUSPENSION TYPE (FRONT)	Independent McPherson strut, coil springs & stabilizer bar				
SUSPENSION TYPE (REAR)	Independent Tri-Link coil spring over strut & stabilizer bar				
GROUND CLEARANCE, MINIMUM	7.1 in.	**LOCATION** Engine cradle			
BRAKE SYSTEM	Power, dual hydraulic, anti-lock				
BRAKES, FRONT	**TYPE** Vented disc		**SWEPT AREA** 235.4 sq. in.		
BRAKES, REAR	**TYPE** Solid disc		**SWEPT AREA** 160.3 sq. in.		
FUEL CAPACITY	**GALLONS** 17.0		**LITERS** 64.3		
GENERAL MEASUREMENTS	**WHEELBASE** 110.5 in.		**LENGTH** 200.4 in.		
	TEST WEIGHT 3693		**HEIGHT** 58.7 in.		
HEADROOM	**FRONT** 39.4 in.		**REAR** 37.8 in.		
LEGROOM	**FRONT** 42.3 in.		**REAR** 37.6 in.		
SHOULDER ROOM	**FRONT** 58.7 in.		**REAR** 58.6 in.		
HIPROOM	**FRONT** 56.4 in.		**REAR** 57.2 in.		
INTERIOR VOLUME	**FRONT** 56.5 cu. ft.		**REAR** 55.7 cu. ft.		
	COMB 104.8 cu. ft.		**TRUNK** 18.6 cu. ft. w/ compact spare		
EPA MILEAGE EST. (MPG) Label	**CITY** 17	**HIGHWAY** 24	**COMBINED** 20		
EPA MILEAGE EST. (MPG) Unadjusted	**CITY** 21.2	**HIGHWAY** 33.8	**COMBINED** 25.5		
EPA Mileage EST (MPG) Label E85	**CITY** 12	**HIGHWAY** 18	**COMBINED** 14		
EPA Mileage EST (MPG) Unadjusted E85	**CITY** 15.5	**HIGHWAY** 24.7	**COMBINED** 18.6		

Chevrolet Tahoe PPV 2WD

VEHICLE TEST DESCRIPTION

MAKE Chevrolet	**MODEL** Tahoe PPV – 2WD		**SALES CODE NO.** CC10706		
ENGINE DISPLACEMENT	**CUBIC INCHES** 327		**LITERS** 5.3		
FUEL SYSTEM	SPFI – E85 Ethanol Capable		**EXHAUST** Single		
HORSEPOWER (SAE NET)	320 @ 5200 RPM		**ALTERNATOR** 160		
TORQUE	340 ft-lbs @ 4000 RPM		**BATTERY** 730 CCA		
COMPRESSION RATIO	9.5:1				
TRANSMISSION	**MODEL** 6L80E	**TYPE** 6 – Speed Automatic Overdrive			
	LOCKUP TORQUE CONVERTER? Yes				
	OVERDRIVE? Yes				
AXLE RATIO	3.08				
STEERING	Power – Rack & Pinion				
TURNING CIRCLE (CURB TO CURB)	39.0 ft.				
TIRE SIZE, LOAD & SPEED RATING	Goodyear RS-A Police Radial P265/60R17, W Rated				
SUSPENSION TYPE (FRONT)	Independent, single coil over shock with stabilizer bar				
SUSPENSION TYPE (REAR)	Multi-link with coil springs				
GROUND CLEARANCE, MINIMUM	8.00 in.	**LOCATION** Rear axle			
BRAKE SYSTEM	Vacuum-boost, power, anti-lock				
BRAKES, FRONT	**TYPE** Disc		**SWEPT AREA** 256.6 sq. in.		
BRAKES, REAR	**TYPE** Disc		**SWEPT AREA** 248 sq. in.		
FUEL CAPACITY	**GALLONS** 26.0		**LITERS** 98.4		
GENERAL MEASUREMENTS	**WHEELBASE** 116.0 in.		**LENGTH** 198.9 in.		
	TEST WEIGHT 5311		**HEIGHT** 73.9		
HEADROOM	**FRONT** 40.3 in.		**REAR** 39.2 in.		
LEGROOM	**FRONT** 41.3 in.		**REAR** 39.0 in.		
SHOULDER ROOM	**FRONT** 65.3 in.		**REAR** 65.2 in.		
HIPROOM	**FRONT** 64.4 in.		**REAR** 60.6 in.		
INTERIOR VOLUME ***MAX. CARGO IS W/REAR SEATS FOLDED DOWN**	**FRONT** 62.9 cu. ft.		**REAR** 57.68 cu. ft.		
	COMB 120.58 cu. ft.		***MAX. CARGO** 108.9 cu. ft.		
EPA MILEAGE EST. (MPG) Label	**CITY** 15	**HIGHWAY** 21	**COMBINED** 17		
EPA MILEAGE EST. (MPG) Unadjusted	**CITY** 18.3	**HIGHWAY** 29.4	**COMBINED** 22.1		
EPA MILEAGE EST. (MPG) E85 Label	**CITY** 11	**HIGHWAY** 16	**COMBINED** 13		
EPA MILEAGE EST. (MPG) E85 Unadjusted	**CITY** 13.4	**HIGHWAY** 22.2	**COMBINED** 16.3		

Dodge Charger
3.6L

TEST VEHICLE DESCRIPTION

MAKE Dodge	**MODEL** Charger	**SALES CODE NO.** 27A	
ENGINE DISPLACEMENT	**CUBIC INCHES** 220	**LITERS** 3.6	
FUEL SYSTEM	Sequential Port Fuel Injection	**EXHAUST** Dual	
HORSEPOWER (SAE NET)	291 @ 6400	**ALTERNATOR** 220 Amp	
TORQUE	260 ft-lbs @ 4400	**BATTERY** 800 CCA	
COMPRESSION RATIO	10.2:1		
TRANSMISSION	**MODEL** A580	**TYPE** 5 Speed Electronic Automatic	
	LOCKUP TORQUE CONVERTER? Yes		
	OVERDRIVE? Yes		
AXLE RATIO	2.65:1		
STEERING	Power Rack & Pinion		
TURNING CIRCLE (CURB TO CURB)	38.9		
TIRE SIZE, LOAD & SPEED RATING	Goodyear Eagle RSA P225/60R 18 99V (B)		
SUSPENSION TYPE (FRONT)	Independent High Arm SLA with Dual Ball Joint Lower, Coil Spring, Sway Bar		
SUSPENSION TYPE (REAR)	Independent Multi-Link, Coil Spring, Sway Bar		
GROUND CLEARANCE, MINIMUM	5.2 in.	**LOCATION** Fascia Belly Pan	
BRAKE SYSTEM	Power, Dual Piston Front/Single Piston Rear, Anti-Lock		
BRAKES, FRONT	**TYPE** Vented Disc	**SWEPT AREA** 282 sq. in.	
BRAKES, REAR	**TYPE** Vented Disc	**SWEPT AREA** 242 sq. in.	
FUEL CAPACITY	**GALLONS** 19	**LITERS** 72	
GENERAL MEASUREMENTS	**WHEELBASE** 120 in.	**LENGTH** 200.1 in.	
	TEST WEIGHT 4035	**HEIGHT** 58.2 in.	
HEADROOM	**FRONT** 38.6 in.	**REAR** 36.7 in.	
LEGROOM	**FRONT** 41.8 in.	**REAR** 40.1 in.	
SHOULDER ROOM	**FRONT** 59.5 in.	**REAR** 57.9 in.	
HIPROOM	**FRONT** 56.2 in.	**REAR** 56.1 in.	
INTERIOR VOLUME	**FRONT** 55.6 cu. ft.	**REAR** 49.31 cu. ft.	
	COMB 104.9 cu. ft.	**TRUNK** 14.8 cu. ft.	
EPA MILEAGE EST. (MPG) Label	**CITY** 19	**HIGHWAY** 26	**COMBINED** 21
EPA MILEAGE EST. (MPG) Unadjusted	**CITY** 23.2	**HIGHWAY** 36.6	**COMBINED** 27.8

Dodge Charger
5.7L

TEST VEHICLE DESCRIPTION

MAKE Dodge	**MODEL** Charger		**SALES CODE NO.** 29A		
ENGINE DISPLACEMENT	**CUBIC INCHES** 345		**LITERS** 5.7		
FUEL SYSTEM	Sequential Port Fuel Injection		**EXHAUST** Dual		
HORSEPOWER (SAE NET)	370 @ 5150		**ALTERNATOR** 220 Amp		
TORQUE	397 ft-lbs @ 4250		**BATTERY** 800 CCA		
COMPRESSION RATIO	10.5:1				
TRANSMISSION	**MODEL** A580	**TYPE** 5 Speed Electronic Automatic			
	LOCKUP TORQUE CONVERTER? Yes				
	OVERDRIVE? Yes				
AXLE RATIO	2.65:1				
STEERING	Power Rack & Pinion				
TURNING CIRCLE (CURB TO CURB)	38.9				
TIRE SIZE, LOAD & SPEED RATING	Goodyear Eagle RSA P225/60R 18 99V (B)				
SUSPENSION TYPE (FRONT)	Independent High Arm SLA w/ Dual Ball Joint Lower, Coil Spring, Sway Bar				
SUSPENSION TYPE (REAR)	Independent Multi-Link, Coil Spring, Sway Bar				
GROUND CLEARANCE, MINIMUM	5.2 in.	**LOCATION** Fascia Belly Pan			
BRAKE SYSTEM	Power, Dual Piston Front/Single Piston Rear, Anti-Lock				
BRAKES, FRONT	**TYPE** Vented Disc		**SWEPT AREA** 282 sq. in.		
BRAKES, REAR	**TYPE** Vented Disc		**SWEPT AREA** 242 sq. in.		
FUEL CAPACITY	**GALLONS** 19		**LITERS** 72		
GENERAL MEASUREMENTS	**WHEELBASE** 120 in.		**LENGTH** 200.1 in.		
	TEST WEIGHT 4253		**HEIGHT** 58.2 in.		
HEADROOM	**FRONT** 38.6 in.		**REAR** 36.7 in.		
LEGROOM	**FRONT** 41.8 in.		**REAR** 40.1 in.		
SHOULDER ROOM	**FRONT** 59.5 in.		**REAR** 57.9 in.		
HIPROOM	**FRONT** 56.2 in.		**REAR** 56.1 in.		
INTERIOR VOLUME	**FRONT** 55.6 cu. ft.		**REAR** 49.3 cu. ft.		
	COMB 104.9 cu. ft.		**TRUNK** 14.8 cu. ft.		
EPA MILEAGE EST. (MPG) Label	**CITY** 16	**HIGHWAY** 25	**COMBINED** 19		
EPA MILEAGE EST. (MPG) Unadjusted	**CITY** 19.3	**HIGHWAY** 34.6	**COMBINED** 24.1		

TEST VEHICLE DESCRIPTION SUMMARY

	Ford Police Interceptor 3.27	Ford Police Interceptor 3.55	Chevrolet Caprice 9C1		Chevrolet Impala 9C1	
ENGINE DISPLACEMENT – CU. IN.	281	281	364		237	
ENGINE DISPLACEMENT – LITERS	4.6	4.6	6.0		3.9	
ENGINE FUEL SYSTEM	SMFI	SMFI	SPFI		SPFI	
HORSEPOWER (SAE NET)	250	250	355		233	
TORQUE (FT. LBS.)	297	297	384		240	
COMPRESSION RATIO	9.4:1	9.4:1	10.4:1		9.4:1	
AXLE RATIO	3.27	3.55	2.92:1		3:29.1	
TURNING CIRCLE – FT. CURB TO CURB	40.3	40.3	38		38	
TRANSMISSION	4 Speed elec. auto	4 Speed elec. auto	6 Speed auto		4 Speed auto	
TRANSMISSION MODEL NUMBER	4R70W	4R70W	6L80E		4T65E	
LOCKUP TORQUE CONVERTER	Yes	Yes	Yes		Yes	
TRANSMISSION OVERDRIVE	Yes	Yes	Yes		Yes	
TIRE SIZE	P235/55R	P235/55R	P235/50R		P225/60R	
WHEEL RIM SIZE – INCHES	17	17	18		16	
GROUND CLEARANCE – INCHES	5.6	5.6	5.6		7.1	
BRAKE SYSTEM	Power, ABS	Power, ABS	Power, ABS		Power, Abs	
BRAKES – FRONT TYPE	Vented Disc	Vented Disc	Vented Disc		Vented Disc	
BRAKES – REAR TYPE	Vented Disc	Vented Disc	Vented Disc		Solid Disc	
FUEL CAPACITY – GALLONS	19	19	19		17	
FUEL CAPACITY – LITERS	71.9	71.9	71.6		64.3	
OVERALL LENGTH – INCHES	212.0	212.0	204.2		200.4	
OVERALL HEIGHT – INCHES	58.3	58.3	58.7		58.7	
TEST WEIGHT – LBS.	4184	4139	4264		3693	
WHEELBASE – INCHES	114.6	114.6	118.5		110.5	
HEADROOM FRONT – INCHES	39.5	39.5	38.7		39.4	
HEADROOM REAR – INCHES	37.8	37.8	37.5		37.8	
LEGROOM FRONT – INCHES	41.6	41.6	42.2		42.3	
LEGROOM REAR – INCHES	38.0	38.0	43.2		37.6	
SHOULDER ROOM FRONT – INCHES	60.6	60.6	59.1		58.7	
SHOULDER ROOM REAR – INCHES	60.0	60.0	58.9		58.6	
HIPROOM FRONT – INCHES	57.4	57.4	56.6		56.4	
HIPROOM REAR – INCHES	56.1	56.1	57.9		57.2	
INTERIOR VOLUME FRONT – CU. FT.	57.6	57.6	56.0		56.5	
INTERIOR VOLUME REAR – CU. FT.	49.8	49.8	56.0		55.7	
INTERIOR VOLUME COMB. – CU. FT.	107.5	107.5	112		104.8	
TRUNK VOLUME – CU. FT.	20.6	20.6	17.4		18.6	
	Gas	**Gas**	**Gas ***	**E-85 ***	**Gas**	**E85**
EPA MILEAGE – CITY – MPG Label	14	**14**	**14**	14	17	12
EPA MILEAGE – CITY – MPG Unadjusted	17.9	17.9	17.3	17.3	21.2	15.5
EPA MILEAGE – HIGHWAY – MPG Label	21	21	22	22	24	18
EPA MILEAGE – HIGHWAY – MPG Unadjusted	29.7	29.7	30.5	30.5	33.8	24.7
EPA MILEAGE – COMBINED – MPG Label	17	17	17	17	20	14
EPA MILEAGE – COMBINED – MPG Unadjusted	21.7	21.7	21.5	21.5	25.5	18.6
			*Official fuel economy available January 2011 @ gmfleet.com			

TEST VEHICLE DESCRIPTION SUMMARY

	Dodge Charger 3.6L	Dodge Charger 5.7L	Chevrolet Tahoe PPV	
ENGINE DISPLACEMENT – CU. IN.	220	345	327	
ENGINE DISPLACEMENT – LITERS	3.6	5.7	5.3	
ENGINE FUEL SYSTEM	SPFI	SPFI	SPFI	
HORSEPOWER (SAE NET)	291	370	320	
TORQUE (FT. LBS.)	260	397	340	
COMPRESSION RATIO	10.2:1	10.5:1	9.5:1	
AXLE RATIO	2.65:1	2.65:1	3.08	
TURNING CIRCLE – FT. CURB TO CURB	38.9	38.9	39.0	
TRANSMISSION	5 Speed elec. auto	5 Speed elec. auto	6-Speed Automatic Overdrive	
TRANSMISSION MODEL NUMBER	A580	A580	6L80E	
LOCKUP TORQUE CONVERTER	Yes	Yes	Yes	
TRANSMISSION OVERDRIVE	Yes	Yes	Yes	
TIRE SIZE	P225/60R	P225/60R	P265/60R	
WHEEL RIM SIZE – INCHES	18	18	17	
GROUND CLEARANCE – INCHES	5.2	5.2	8.00	
BRAKE SYSTEM	Power, ABS	Power, ABS	Power, ABS	
BRAKES – FRONT TYPE	Vented Disc	Vented Disc	Disc	
BRAKES – REAR TYPE	Vented Disc	Vented Disc	Disc	
FUEL CAPACITY – GALLONS	19	19	26	
FUEL CAPACITY – LITERS	72	72	98.4	
OVERALL LENGTH – INCHES	200.1	200.1	198.9	
OVERALL HEIGHT – INCHES	58.2	58.2	73.9	
TEST WEIGHT – LBS.	4035	4253	5311	
WHEELBASE – INCHES	120	120	116	
HEADROOM FRONT – INCHES	38.6	38.6	40.3	
HEADROOM REAR – INCHES	36.7	36.7	39.2	
LEGROOM FRONT – INCHES	41.8	41.8	41.3	
LEGROOM REAR – INCHES	40.1	40.1	39.0	
SHOULDER ROOM FRONT – INCHES	59.5	59.5	65.3	
SHOULDER ROOM REAR – INCHES	57.9	57.9	65.2	
HIPROOM FRONT – INCHES	56.2	56.2	64.4	
HIPROOM REAR – INCHES	56.1	56.1	60.6	
INTERIOR VOLUME FRONT – CU. FT.	55.6	55.6	62.9	
INTERIOR VOLUME REAR – CU. FT.	49.3	49.3	57.68	
INTERIOR VOLUME COMB. – CU. FT.	104.9	104.9	120.58	
TRUNK VOLUME – CU. FT.	14.8	14.8	108.9	
	Gas	**Gas**	**Gas**	**E85**
EPA MILEAGE – CITY – MPG- Label	19	16	15	11
EPA MILEAGE CITY – MPG - Unadjusted	23.2	19.3	18.3	13.4
EPA MILEAGE – HIGHWAY – MPG - Label	26	25	21	16
.EPA MILEAGE – HIGHWAY – MPG - Unadjusted	36.6	34.6	29.4	22.2
EPA MILEAGE – COMBINED – MPG - Label	21	19	17	13
EPA MILEAGE – COMBINED – MPG Unadjusted	27.8	24.1	22.1	16.3

VEHICLE DYNAMICS TESTING

TEST OBJECTIVE

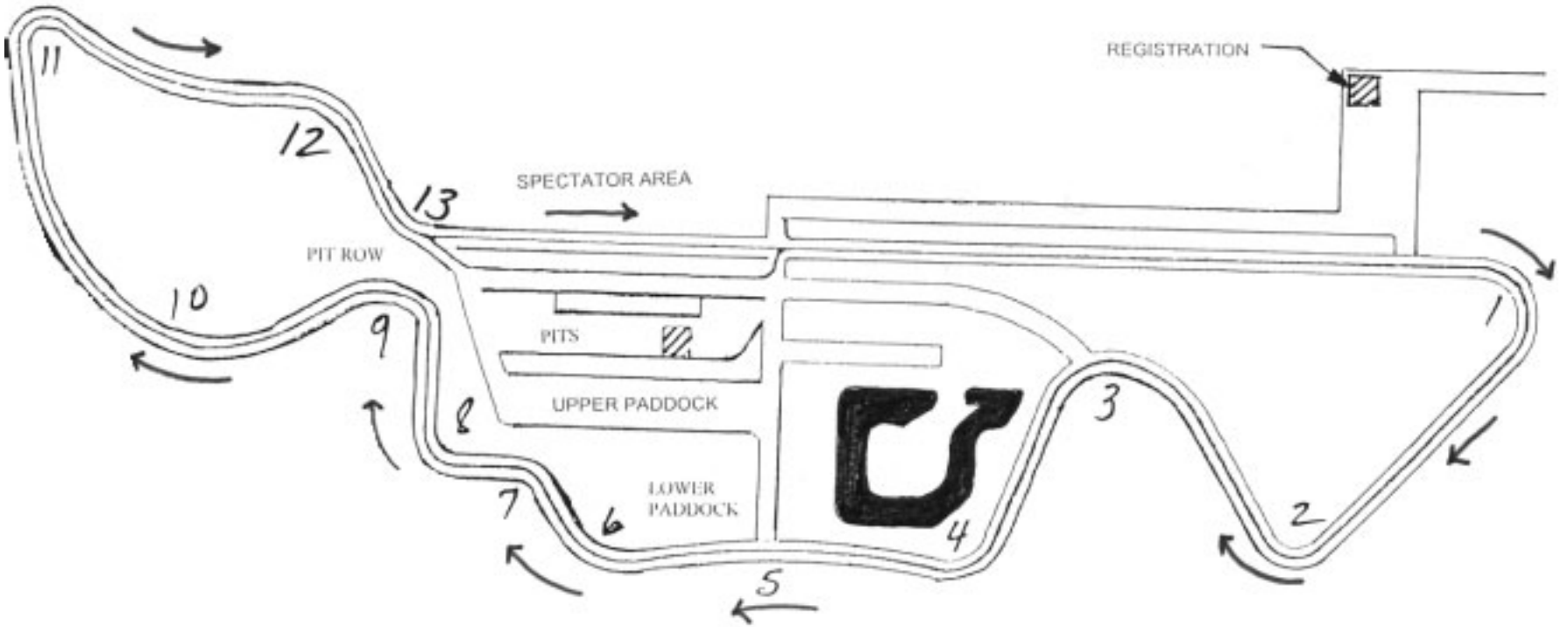
Determine each vehicle's high-speed pursuit or emergency handling characteristics and performance in comparison to the other vehicles in the test group. The course used is a 2-mile road-racing type configuration, containing hills, curves, and corners. The course simulates actual conditions encountered in pursuit or emergency driving situations in the field, with the exception of other traffic. The evaluation is a true test of the success or failure of the vehicle manufacturers to offer vehicles that provide the optimum balance between handling (suspension components), acceleration (usable horsepower), and braking characteristics.

TEST METHODOLOGY

Each vehicle is driven over the course a total of 32 timed laps, using four separate drivers, each driving an 8 lap series. The final score for the vehicle is the combined average (from the 4 drivers) of the 5 fastest laps for each driver during the 8 lap series.

Grattan Raceway Park

7201 Lessiter
Belding, Michigan 48809



Arrows indicate Michigan State Police Road Test Course and Direction of Travel.

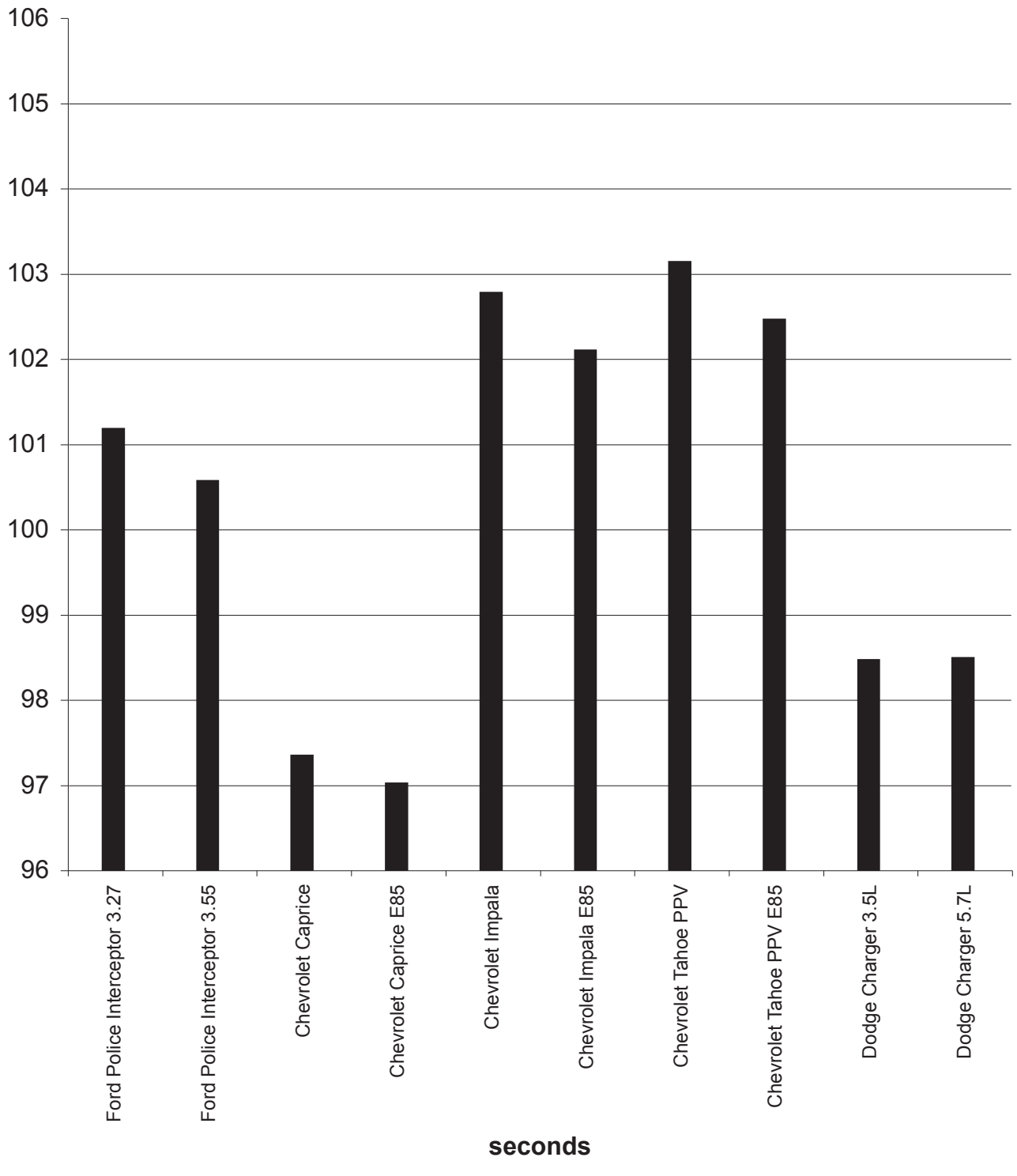
VEHICLE DYNAMICS TESTING

Vehicles	Drivers	Lap 1	Lap 2	Lap 3	Lap 4	Lap 5	Average
Ford CVPI 3.27 4.6L	GROMAK	01:40.90	01:41.10	01:41.10	01:41.20	01:41.20	01:41.10
	ROGERS	01:40.60	01:41.00	01:41.40	01:41.40	01:41.50	01:41.18
	MCCARTHY	01:40.70	01:41.40	01:41.50	01:41.60	01:41.70	01:41.38
	FLEGEL	01:40.60	01:41.10	01:41.10	01:41.20	01:41.30	01:41.06
Overall Average							**01:41.18**
Ford CVPI 3.55 4.6L	GROMAK	01:39.80	01:39.80	01:39.90	01:40.00	01:40.30	01:39.96
	ROGERS	01:40.70	01:40.90	01:40.90	01:41.00	01:41.00	01:40.90
	MCCARTHY	01:41.00	01:41.10	01:41.30	01:41.30	01:41.40	01:41.22
	FLEGEL	01:39.90	01:39.90	01:40.30	01:40.40	01:40.40	01:40.18
Overall Average							**01:40.57**
Chevrolet Caprice 9C1 6.0L	GROMAK	01:35.80	01:36.40	01:36.40	01:36.40	01:37.20	01:36.44
	ROGERS	01:37.00	01:37.30	01:37.30	01:37.60	01:37.60	01:37.36
	MCCARTHY	01:37.80	01:37.90	01:37.90	01:38.00	01:38.10	01:37.94
	FLEGEL	01:37.00	01:37.40	01:37.50	01:38.20	01:38.30	01:37.68
Overall Average							**01:37.35**
Chevrolet Caprice 9C1 6.0L E85	GROMAK	01:36.40	01:36.70	01:36.80	01:36.90	01:36.90	01:36.74
	ROGERS	01:36.50	01:36.60	01:36.60	01:36.80	01:36.80	01:36.66
	MCCARTHY	01:36.60	01:37.50	01:37.80	01:37.80	01:37.90	01:37.52
	FLEGEL	01:36.60	01:36.80	01:37.30	01:37.60	01:37.60	01:37.18
Overall Average							**01:37.02**
Chevrolet Impala 9C1 3.9L	GROMAK	01:42.40	01:42.80	01:42.90	01:43.10	01:43.10	01:42.86
	ROGERS	01:43.00	01:43.20	01:43.20	01:43.30	01:43.40	01:43.22
	MCCARTHY	01:42.50	01:42.50	01:42.50	01:42.60	01:42.70	01:42.56
	FLEGEL	01:42.20	01:42.40	01:42.50	01:42.50	01:42.90	01:42.50
Overall Average							**01:42.78**
Chevrolet Impala 9C1 3.9L E85	GROMAK	01:41.70	01:41.90	01:41.90	01:42.20	01:42.30	01:42.00
	ROGERS	01:41.90	01:42.00	01:42.10	01:42.30	01:42.50	01:42.16
	MCCARTHY	01:42.60	01:42.70	01:42.90	01:43.20	01:43.20	01:42.92
	FLEGEL	01:41.20	01:41.20	01:41.40	01:41.40	01:41.40	01:41.32
Overall Average							**01:42.10**

VEHICLE DYNAMICS TESTING

Vehicles	Drivers	Lap 1	Lap 2	Lap 3	Lap 4	Lap 5	Average
Chevrolet Tahoe PPV 5.3L	GROMAK	01:42.60	01:42.70	01:43.00	01:43.00	01:43.00	01:42.86
	ROGERS	01:42.70	01:43.20	01:43.30	01:43.60	01:43.60	01:43.28
	MCCARTHY	01:43.20	01:43.60	01:43.60	01:43.70	01:44.00	01:43.62
	FLEGEL	01:42.20	01:42.40	01:43.10	01:43.10	01:43.20	01:42.80
							01:43.14
Chevrolet Tahoe PPV 5.3L E85	GROMAK	01:41.60	01:41.70	01:42.20	01:42.20	01:42.20	01:41.98
	ROGERS	01:42.20	01:42.30	01:42.40	01:42.70	01:42.80	01:42.48
	MCCARTHY	01:42.90	01:43.10	01:43.20	01:43.20	01:43.30	01:43.14
	FLEGEL	01:41.90	01:42.00	01:42.30	01:42.40	01:42.60	01:42.24
Overall Average							**01:42.46**
Dodge Charger 5.7L	GROMAK	01:39.10	01:39.20	01:39.40	01:39.50	01:39.80	01:39.40
	ROGERS	01:36.80	01:37.60	01:38.00	01:39.00	01:39.30	01:38.14
	MCCARTHY	01:36.70	01:37.00	01:37.00	01:37.10	01:37.80	01:37.12
	FLEGEL	01:39.00	01:39.20	01:39.20	01:39.40	01:39.40	01:39.24
Overall Average							**01:38.47**
Dodge Charger 3.6L	GROMAK	01:37.50	01:37.80	01:38.00	01:38.30	01:38.40	01:38.00
	ROGERS	01:37.90	01:38.10	01:38.30	01:38.30	01:38.90	01:38.30
	MCCARTHY	01:38.40	01:38.80	01:38.90	01:38.90	01:39.00	01:38.80
	FLEGEL	01:38.70	01:38.80	01:38.90	01:39.00	01:39.00	01:38.88
Overall Average							**01:38.49**

2011 Vehicle Dynamics



ACCELERATION AND TOP SPEED TESTING

ACCELERATION TEST OBJECTIVE

Determine the ability of each test vehicle to accelerate from a standing start to 60 mph, 80 mph, and 100 mph, and determine the distance to reach 110 mph and 120 mph.

ACCELERATION TEST METHODOLOGY

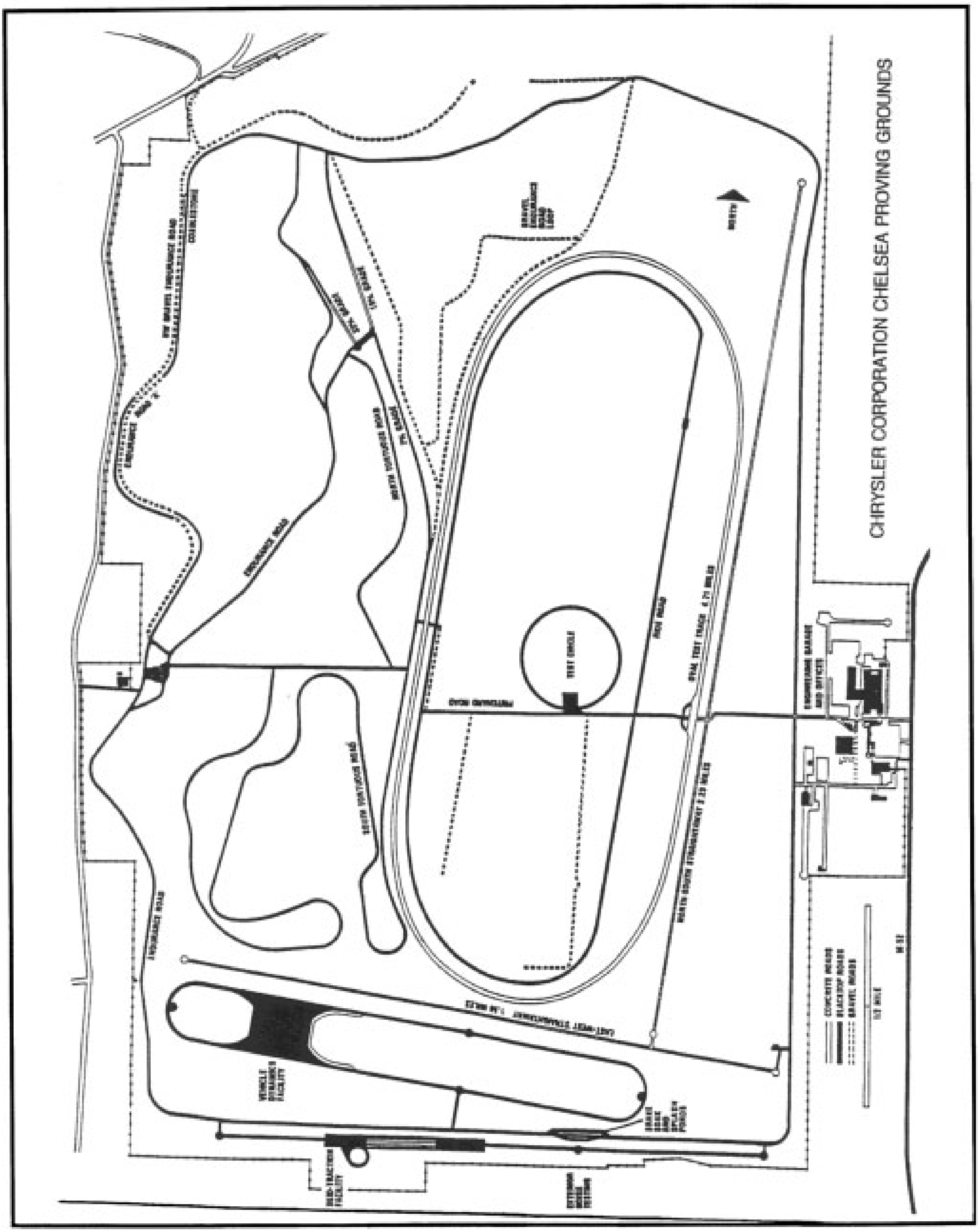
Using a DLS Smart Sensor – Optical non-contact Speed and Distance Sensor in conjunction with a lap top computer, each vehicle is driven through four acceleration sequences, two northbound and two southbound, to allow for wind direction. The four resulting times for each target speed are averaged and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

TOP SPEED TEST OBJECTIVE

Determine the actual top speed attainable by each test vehicle within a distance of 14 miles from a standing start.

TOP SPEED TEST METHODOLOGY

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


CHRYSLER CORPORATION CHELSEA PROVING GROUNDS

ACCELERATION AND TOP SPEED TESTS

TEST LOCATION: Chrysler Proving Grounds **DATE:** September 18, 2010

MAKE & MODEL: Ford Interceptor 4.6L 3.27 **BEGINNING TIME:** 3:47 p.m..

WIND VELOCITY: 4.2 mph **WIND DIRECTION**: 156° **TEMPERATURE:** 68°

ACCELERATION

SPEEDS	TIME REQUIREMENTS*	RUN#1	RUN#2	RUN#3	RUN#4	AVERAGE
0 – 60	**9.6 sec**	9.17	9.01	8.97	8.88	**9.01**
0 – 80	**16.4 sec.**	14.79	14.52	14.75	14.40	**14.61**
0 – 100	**27.1 sec.**	24.84	24.10	24.88	23.78	**24.40**

DISTANCE TO REACH: **110 MPH** .64 mile **120 MPH** 1.00 mile

TOP SPEED ATTAINED: 129 mph

MAKE & MODEL: Ford Police Interceptor 4.6L 3.55 **BEGINNING TIME:** 2:16 p.m.

WIND VELOCITY: 2.4 mph **WIND DIRECTION:** 221° **TEMPERATURE:** 69.8°

ACCELERATION

SPEEDS	TIME REQUIREMENTS*	RUN#1	RUN#2	RUN#3	RUN#4	AVERAGE
0 – 60	**9.6 sec**	8.88	8.88	8.95	8.78	**8.87**
0 – 80	**16.4 sec.**	14.57	14.62	14.69	14.54	**14.60**
0 – 100	**27.1 sec.**	24.48	24.28	24.74	23.99	**24.37**

DISTANCE TO REACH: **110 MPH** .66 mile **120 MPH** _____

TOP SPEED ATTAINED: 119 mph

*Michigan State Police minimum requirement.

ACCELERATION AND TOP SPEED TESTS

TEST LOCATION: Chrysler Proving Grounds **DATE:** September 18, 2010

MAKE & MODEL: Chevrolet Caprice 9C1 **BEGINNING TIME:** 3:29 p.m.

WIND VELOCITY: 1.5 mph **WIND DIRECTION:** 119° **TEMPERATURE:** 68°

ACCELERATION

SPEEDS	TIME REQUIREMENTS*	RUN#1	RUN#2	RUN#3	RUN#4	AVERAGE
0 – 60	**9.6 sec**	6.32	6.23	6.02	6.14	**6.18**
0 – 80	**16.4 sec.**	10.22	10.00	9.87	9.95	**10.01**
0 – 100	**27.1 sec.**	15.01	14.81	14.62	14.65	**14.77**

DISTANCE TO REACH: **110 MPH** .35 mile **120 MPH** .48 mile

TOP SPEED ATTAINED: 148 mph

MAKE & MODEL: Chevrolet Caprice 9C1 E85 **BEGINNING TIME:** 12:43 p.m.

WIND VELOCITY: 4.7 mph **WIND DIRECTION:** 219° **TEMPERATURE:** 66.7°

ACCELERATION

SPEEDS	TIME REQUIREMENTS*	RUN#1	RUN#2	RUN#3	RUN#4	AVERAGE
0 – 60	**9.6 sec**	6.32	6.16	6.09	6.01	**6.15**
0 – 80	**16.4 sec.**	10.21	9.91	9.82	9.69	**9.91**
0 – 100	**27.1 sec.**	14.96	14.56	14.55	14.25	**14.58**

DISTANCE TO REACH: **110 MPH** .34 mile **120 MPH** .45 mile

TOP SPEED ATTAINED: 148 mph

*Michigan State Police minimum requirement.

ACCELERATION AND TOP SPEED TESTS

TEST LOCATION: Chrysler Proving Grounds **DATE:** September 18, 2010

MAKE & MODEL: Chevrolet Impala 9C1 **BEGINNING TIME:** 8:03 a.m.

WIND VELOCITY: 6.4 mph **WIND DIRECTION:** 180° **TEMPERATURE:** 55.1°

ACCELERATION

SPEEDS	TIME REQUIREMENTS*	RUN#1	RUN#2	RUN#3	RUN#4	AVERAGE
0 – 60	**9.6 sec**	8.98	8.77	8.86	8.53	**8.78**
0 – 80	**16.4 sec.**	14.27	14.01	13.98	13.68	**13.99**
0 – 100	**27.1 sec.**	24.39	23.28	24.43	22.86	**23.74**

DISTANCE TO REACH: **110 MPH** .60 mile **120 MPH** .85 mile

TOP SPEED ATTAINED: 138 mph

MAKE & MODEL: Chevrolet Impala 9C1 E85 **BEGINNING TIME:** 5:07 p.m.

WIND VELOCITY: 2.4 mph **WIND DIRECTION:** 230° **TEMPERATURE:** 69.4°

ACCELERATION

SPEEDS	TIME REQUIREMENTS*	RUN#1	RUN#2	RUN#3	RUN#4	AVERAGE
0 – 60	**9.6 sec**	8.83	8.64	8.65	8.60	**8.68**
0 – 80	**16.4 sec.**	14.12	13.83	13.90	13.76	**13.90**
0 – 100	**27.1 sec.**	23.30	22.82	23.01	22.64	**22.94**

DISTANCE TO REACH: **110 MPH** .58 mile **120 MPH** .83 mile

TOP SPEED ATTAINED: 139 mph

*Michigan State Police minimum requirement.

ACCELERATION AND TOP SPEED TESTS

TEST LOCATION: Chrysler Proving Grounds **DATE:** September 18, 2010

MAKE & MODEL: Dodge Charger 5.7L **BEGINNING TIME:** 2:01 p.m.

WIND VELOCITY: 2.8 mph **WIND DIRECTION:** 269° **TEMPERATURE:** 70.4°

ACCELERATION

SPEEDS	TIME REQUIREMENTS*	RUN#1	RUN#2	RUN#3	RUN#4	AVERAGE
0 – 60	**9.6 sec**	6.09	6.22	6.22	6.42	**6.24**
0 – 80	**16.4 sec.**	9.64	9.66	9.76	9.86	**9.73**
0 – 100	**27.1 sec.**	14.90	14.83	14.99	15.24	**14.99**

DISTANCE TO REACH: **110 MPH** .35 mile **120 MPH** .45 mile

TOP SPEED ATTAINED: 146 mph

MAKE & MODEL: Dodge Charger 3.6L **BEGINNING TIME:** 2:43 p.m.

WIND VELOCITY: 2.6 mph **WIND DIRECTION:** 18° **TEMPERATURE:** 68.8°

ACCELERATION

SPEEDS	TIME REQUIREMENTS*	RUN#1	RUN#2	RUN#3	RUN#4	AVERAGE
0 – 60	**9.6 sec**	8.51	8.51	8.63	8.94	**8.65**
0 – 80	**16.4 sec.**	14.27	13.93	14.17	14.65	**14.26**
0 – 100	**27.1 sec.**	24.06	23.05	23.93	24.37	**23.85**

DISTANCE TO REACH: **110 MPH** .63 mile **120 MPH** .89 mile

TOP SPEED ATTAINED: 130 mph

*Michigan State Police minimum requirement.

ACCELERATION AND TOP SPEED TESTS

TEST LOCATION: Chrysler Proving Grounds **DATE:** September 18, 2010

MAKE & MODEL: Chevrolet Tahoe PPV **BEGINNING TIME:** 4:26 p.m.

WIND VELOCITY: 1.0 mph **WIND DIRECTION:** 160° **TEMPERATURE:** 68.7°

ACCELERATION

SPEEDS	TIME REQUIREMENTS*	RUN#1	RUN#2	RUN#3	RUN#4	AVERAGE
0 – 60	**10.0 sec**	8.62	8.71	8.80	8.68	**8.70**
0 – 80	**16.0 sec.**	14.38	14.31	14.48	14.47	**14.41**
0 – 100	**27.0 sec.**	22.71	22.17	22.59	22.22	**22.42**

DISTANCE TO REACH: **110 MPH** .58 mile **120 MPH** .86 mile

TOP SPEED ATTAINED: 139 mph

MAKE & MODEL: Chevrolet Tahoe PPV E85 **BEGINNING TIME:** 4:05 p.m.

WIND VELOCITY: 4.2 mph **WIND DIRECTION:** 198° **TEMPERATURE:** 68°

ACCELERATION

SPEEDS	TIME REQUIREMENTS*	RUN#1	RUN#2	RUN#3	RUN#4	AVERAGE
0 – 60	**10.0 sec**	8.18	8.22	8.28	8.27	**8.24**
0 – 80	**16.0 sec.**	14.00	13.72	14.01	13.67	**13.85**
0 – 100	**27.0 sec.**	22.11	21.24	21.96	21.42	**21.68**

DISTANCE TO REACH: **110 MPH** .56 mile **120 MPH** .84 mile

TOP SPEED ATTAINED: 139 mph

*Michigan State Police minimum requirement.

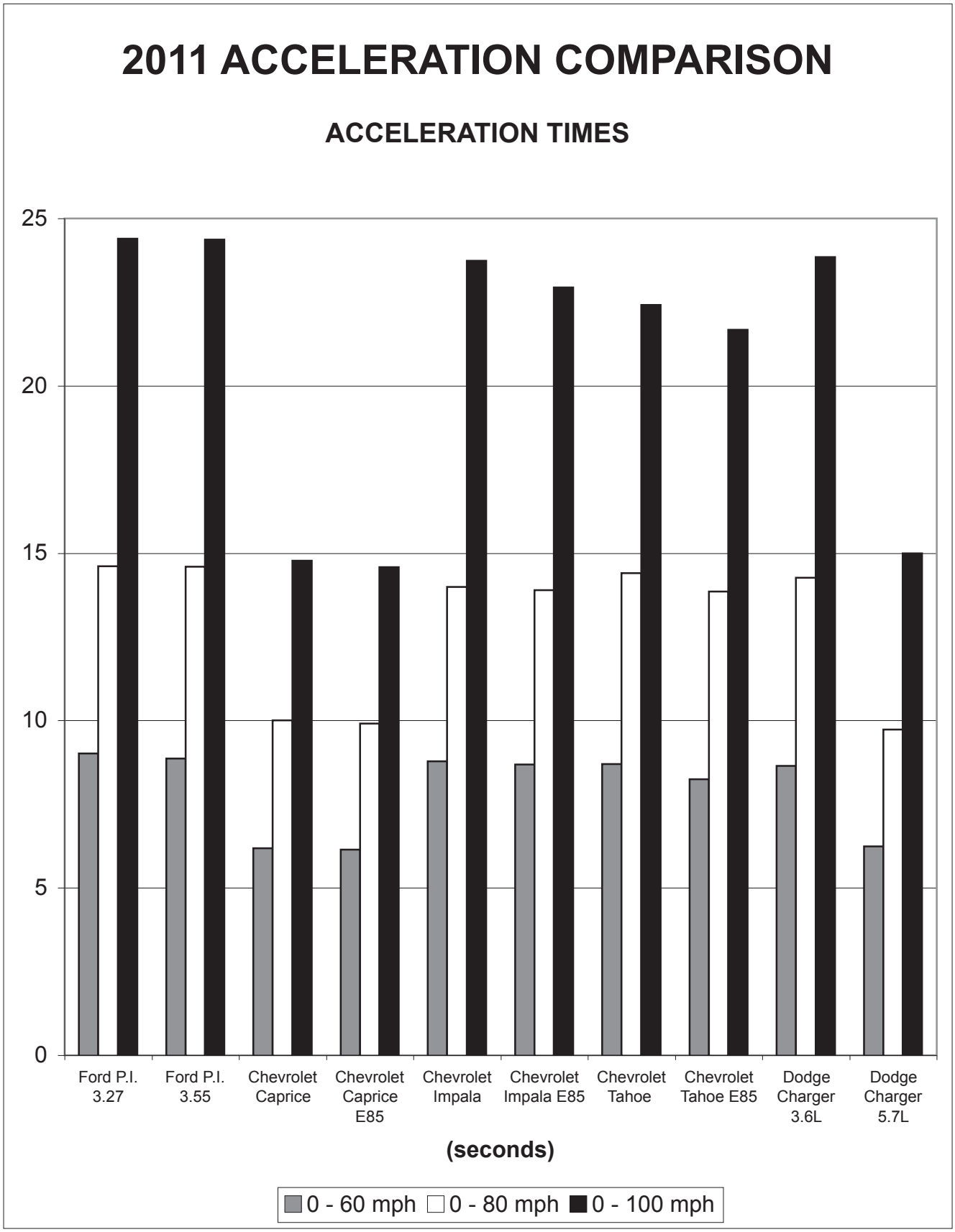
SUMMARY OF ACCELERATION AND TOP SPEED

ACCELERATION*		Ford Police Interceptor 4.6 L 3.27	Ford Police Interceptor 4.6 L 3.55	Chevrolet Caprice 9C1 6.0L	Chevrolet Caprice 9C1 6.0L E85	Chevrolet Impala 9C1 3.9L	Chevrolet Impala 9C1 3.9L E85
0 – 20 mph	(sec.)	1.95	1.90	1.66	1.62	2.05	2.01
0 – 30 mph	(sec.)	3.27	3.16	2.54	2.49	3.33	3.27
0 – 40 mph	(sec.)	4.70	4.62	3.61	3.55	4.63	4.60
0 – 50 mph	(sec.)	6.69	6.70	4.83	4.78	6.39	6.31
0 – 60 mph	(sec.)	9.01	8.87	6.18	6.15	8.78	8.68
0 – 70 mph	(sec.)	11.55	11.39	8.06	7.94	11.28	11.20
0 – 80 mph	(sec.)	14.61	14.60	10.01	9.91	13.99	13.90
0 – 90 mph	(sec.)	18.95	19.12	12.19	12.02	17.82	17.65
0 – 100 mph	(sec.)	24.40	24.37	14.77	14.58	23.74	22.94
TOP SPEED	(mph)	129	119	148	148	138	139
DISTANCE TO REACH							
110 mph	(miles)	.64	.66	.35	.34	.60	.58
120 mph	(miles)	1.00		.48	.45	.85	.83
QUARTER MILE							
Time	(sec.)	16.82	16.75	14.71	14.64	16.46	16.60
Speed	(miles)	85.78	84.80	99.85	100.26	88.09	87.72

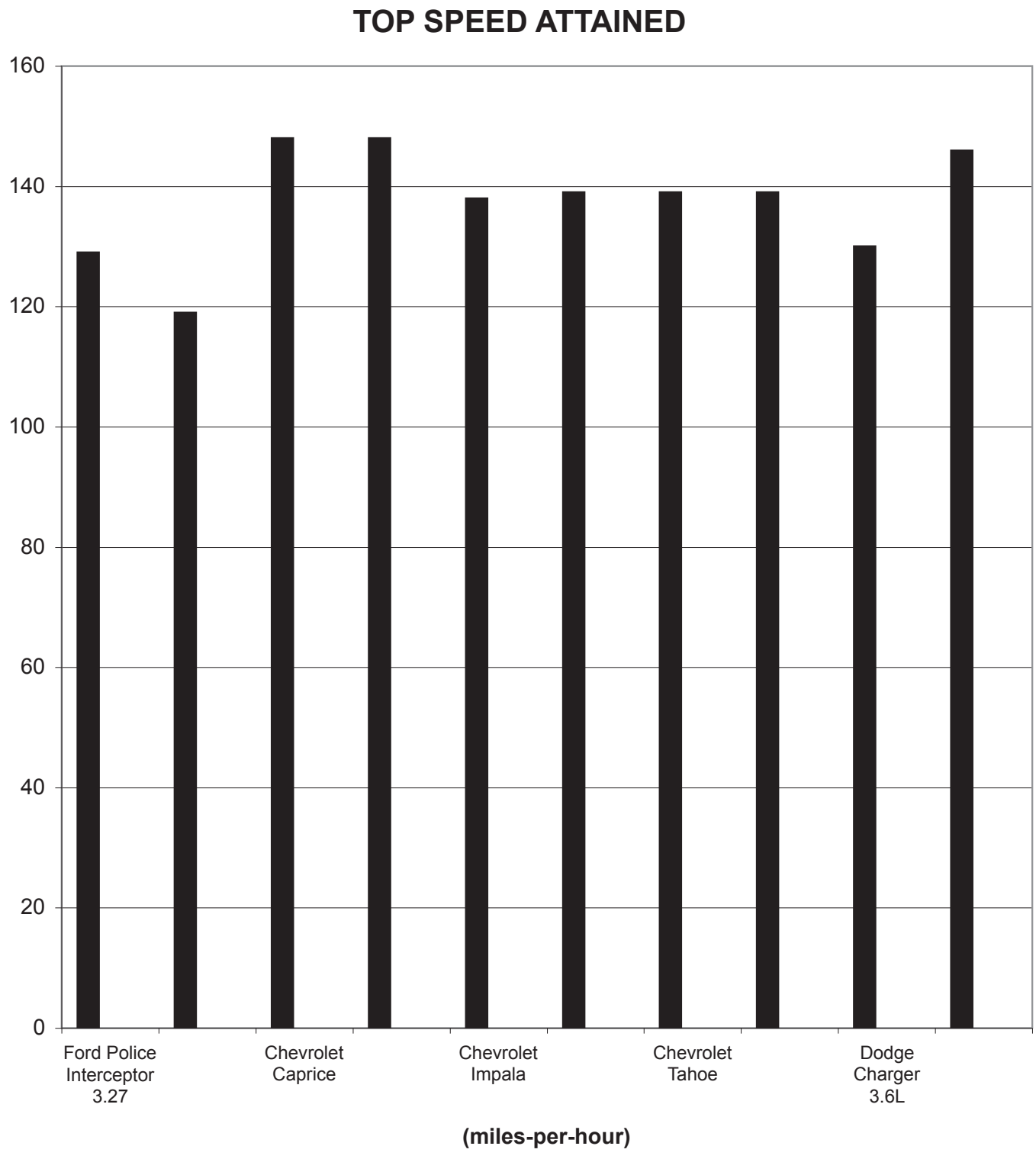
SUMMARY OF ACCELERATION AND TOP SPEED

ACCELERATION*		Dodge Charger 5.7L	Dodge Charger 3.6L	Chevrolet Tahoe PPV	Chevrolet Tahoe PPV E85
0 – 20 mph	(sec.)	1.64	2.00	2.16	2.02
0 – 30 mph	(sec.)	2.60	3.44	3.41	3.20
0 – 40 mph	(sec.)	3.55	4.89	4.93	4.59
0 – 50 mph	(sec.)	4.76	6.47	6.76	6.36
0 – 60 mph	(sec.)	6.24	8.65	8.70	8.24
0 – 70 mph	(sec.)	7.78	11.33	11.33	10.86
0 – 80 mph	(sec.)	9.73	14.26	14.41	13.85
0 – 90 mph	(sec.)	12.30	17.86	17.94	17.20
0 – 100 mph	(sec.)	14.99	23.85	22.42	21.68
TOP SPEED	(mph)	146	130	139	139
DISTANCE TO REACH					
110 mph	(miles)	.35	.63	.58	.56
120 mph	(miles)	.45	.89	.86	.84
QUARTER MILE					
Time	(sec.)	14.67	16.71	16.80	16.49
Speed	(miles)	98.63	86.86	87.07	87.82

2011 ACCELERATION COMPARISON



2011 TOP SPEED COMPARISON



BRAKE TESTING

BRAKE TEST OBJECTIVE

Determine the deceleration rate attained by each test vehicle on twelve 60 – 0 mph impending skid (threshold) stops, with ABS in operation if the vehicle is so equipped. Each vehicle is scored on the average deceleration rate it attains.

BRAKE TEST METHODOLOGY

Each vehicle makes two decelerations at specific predetermined points on the test road from 90 – 0 mph at 22 ft/s^2, with the driver using a decelerometer to maintain the deceleration rate. Immediately after these "heat-up" stops are completed, the vehicle is turned around and makes six measured 60 – 0 mph impending skid (threshold) stops with ABS in operation, if so equipped, at specific predetermined points. Following a four (4) minute heat soak, the entire sequence is repeated. The exact initial velocity at the beginning of each of the 60 – 0 mph decelerations, and the exact distance required to make each stop is recorded by means of a non contact optical sensor in conjunction with electronic speed and distance meters. The data resulting from the twelve total stops is used to calculate the average deceleration rate which is the vehicle's score for this test.

DECELERATION RATE FORMULA

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

EXAMPLE:

Initial Velocity = 89.175 ft/s (60.8 mph x 1.4667*)
Stopping Distance = 171.4 ft.

$$DR = \frac{(IV)^2}{2(SD)} = \frac{(89.175)^2}{2(171.4)} = \frac{7952.24}{342.8} = 23.198 \text{ ft/s}^2$$

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

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

EXAMPLE:

60 mph = 88.002 ft/s x 88.002 = 7744.352 / 2 = 3872.176 / 23.198 ft/s^2 = 166.9 ft.

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

BRAKE TESTING

TEST LOCATION: Chrysler Proving Grounds **DATE:** September 18, 2010

BEGINNING Time: 2:05 p.m. **TEMPERATURE:** 70.2°F

MAKE & MODEL: Ford Police Interceptor 4.6L **BRAKE SYSTEM:** Anti-lock

Phase I

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.$^{2)}$
TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	59.87 mph	139.95 feet	27.55 ft/s^2
Stop #2	59.87 mph	139.80 feet	27.58 ft/s^2
Stop #3	60.05 mph	140.52 feet	27.60 ft/s^2
Stop #4	60.13 mph	140.95 feet	27.59 ft/s^2
Stop #5	59.71 mph	141.95 feet	27.02 ft/s^2
Stop #6	59.51 mph	136.60 feet	27.88 ft/s^2

AVERAGE DECELERATION RATE 27.54 ft/s^2

HEAT SOAK (4 minutes)

Phase II

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.$^{2)}$
TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	60.29 mph	140.16 feet	27.90 ft/s^2
Stop #2	60.30 mph	144.98 feet	26.97 ft/s^2
Stop #3	59.97 mph	143.69 feet	26.92 ft/s^2
Stop #4	60.31 mph	146.07 feet	26.78 ft/s^2
Stop #5	60.09 mph	145.15 feet	26.76 ft/s^2
Stop #6	60.49 mph	142.64 feet	27.59 ft/s^2

AVERAGE DECELERATION RATE 27.15 ft/s^2

Phase III

	Yes/No
Evidence of severe fading?	No
Vehicle stopped in straight line?	Yes
Vehicle stopped within correct lane?	Yes

OVERALL AVERAGE DECEL. RATE: 27.35 ft/s^2

Projected Stopping Distance from 60.0 mph 141.6 feet

BRAKE TESTING

TEST LOCATION: Chrysler Proving Grounds **DATE:** September 18, 2010

BEGINNING Time: 1:36 p.m. **TEMPERATURE:** 70.3°F

MAKE & MODEL: Chevrolet Caprice 9C1 6.0 **BRAKE SYSTEM:** Anti-lock

Phase I

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.$^{2)}$
TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	59.78 mph	124.35 feet	30.91 ft/s^2
Stop #2	60.97 mph	129.04 feet	30.98 ft/s^2
Stop #3	60.23 mph	130.14 feet	29.98 ft/s^2
Stop #4	60.22 mph	125.84 feet	31.00 ft/s^2
Stop #5	59.87 mph	127.82 feet	30.17 ft/s^2
Stop #6	59.38 mph	124.70 feet	30.42 ft/s^2

AVERAGE DECELERATION RATE 30.58 ft/s^2

HEAT SOAK (4 minutes)

Phase II

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.$^{2)}$
TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	59.75 mph	127.17 feet	30.20 ft/s^2
Stop #2	59.70 mph	127.26 feet	30.12 ft/s^2
Stop #3	60.58 mph	132.23 feet	29.85 ft/s^2
Stop #4	59.89 mph	130.48 feet	29.57 ft/s^2
Stop #5	60.09 mph	131.84 feet	29.46 ft/s^2
Stop #6	60.41 mph	132.62 feet	29.60 ft/s^2

AVERAGE DECELERATION RATE 29.80 ft/s^2

Phase III

	Yes/No
Evidence of severe fading?	No
Vehicle stopped in straight line?	Yes
Vehicle stopped within correct lane?	Yes

OVERALL AVERAGE DECEL. RATE: 30.19 ft/s^2

Projected Stopping Distance from 60.0 mph 128.3 feet

BRAKE TESTING

TEST LOCATION: Chrysler Proving Grounds

DATE: September 18, 2010

BEGINNING Time: 8:50 a.m.

TEMPERATURE: 57.9°F

MAKE & MODEL: Chevrolet Impala 9C1 3.9L

BRAKE SYSTEM: Anti-lock

Phase I

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.[2)]
TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	59.89 mph	142.46 feet	27.08 ft/s^2
Stop #2	60.53 mph	140.98 feet	27.95 ft/s^2
Stop #3	60.36 mph	139.98 feet	27.99 ft/s^2
Stop #4	60.60 mph	143.77 feet	27.48 ft/s^2
Stop #5	60.00 mph	139.74 feet	27.71 ft/s^2
Stop #6	59.86 mph	138.56 feet	27.82 ft/s^2

AVERAGE DECELERATION RATE 27.67 ft/s^2

HEAT SOAK (4 minutes)

Phase II

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.[2)]
TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	59.58 mph	138.01 feet	27.67 ft/s^2
Stop #2	60.58 mph	142.52 feet	27.70 ft/s^2
Stop #3	60.84 mph	146.44 feet	27.19 ft/s^2
Stop #4	60.08 mph	140.35 feet	27.66 ft/s^2
Stop #5	59.91 mph	138.41 feet	27.89 ft/s^2
Stop #6	59.79 mph	135.92 feet	28.29 ft/s^2

AVERAGE DECELERATION RATE 27.73 ft/s^2

Phase III

	Yes/No
Evidence of severe fading?	No
Vehicle stopped in straight line?	Yes
Vehicle stopped within correct lane?	Yes

OVERALL AVERAGE DECEL. RATE: 27.70 ft/s^2

Projected Stopping Distance from 60.0 mph 139.8 feet

BRAKE TESTING

TEST LOCATION: Chrysler Proving Grounds **DATE:** September 18, 2010

BEGINNING Time: 5:02 p.m. **TEMPERATURE:** 69.3°F

MAKE & MODEL: Dodge Charger 3.6L **BRAKE SYSTEM:** Anti-lock

Phase I

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.$^{2)}$
TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	59.91 mph	133.84 feet	28.84 ft/s^2
Stop #2	60.31 mph	133.37 feet	29.33 ft/s^2
Stop #3	59.88 mph	133.23 feet	28.94 ft/s^2
Stop #4	60.43 mph	136.47 feet	28.78 ft/s^2
Stop #5	59.60 mph	132.32 feet	28.88 ft/s^2
Stop #6	60.57 mph	134.43 feet	29.35 ft/s^2

AVERAGE DECELERATION RATE 29.02 ft/s^2

HEAT SOAK (4 minutes)

Phase II

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.$^{2)}$
TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	60.53 mph	137.45 feet	28.67 ft/s^2
Stop #2	60.34 mph	134.90 feet	29.03 ft/s^2
Stop #3	60.18 mph	135.85 feet	28.68 ft/s^2
Stop #4	60.45 mph	133.48 feet	29.44 ft/s^2
Stop #5	60.32 mph	134.37 feet	29.12 ft/s^2
Stop #6	60.68 mph	132.69 feet	29.85 ft/s^2

AVERAGE DECELERATION RATE 29.13 ft/s^2

Phase III

	Yes/No
Evidence of severe fading?	No
Vehicle stopped in straight line?	Yes
Vehicle stopped within correct lane?	Yes

OVERALL AVERAGE DECEL. RATE: 29.08 ft/s^2

Projected Stopping Distance from 60.0 mph 133.2 feet

BRAKE TESTING

TEST LOCATION: Chrysler Proving Grounds **DATE:** September 18, 2010

BEGINNING Time: 3:32 p.m. **TEMPERATURE:** 68°F

MAKE & MODEL: Dodge Charger 5.7L **BRAKE SYSTEM:** Anti-lock

Phase I

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.$^{2)}$
TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	60.24 mph	134.73 feet	28.97 ft/s^2
Stop #2	60.20 mph	133.63 feet	29.17 ft/s^2
Stop #3	60.07 mph	133.81 feet	29.00 ft/s^2
Stop #4	60.60 mph	136.58 feet	28.92 ft/s^2
Stop #5	60.59 mph	138.23 feet	28.57 ft/s^2
Stop #6	59.67 mph	131.66 feet	29.08 ft/s^2

AVERAGE DECELERATION RATE 28.95 ft/s^2

HEAT SOAK (4 minutes)

Phase II

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.$^{2)}$
TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	60.44 mph	136.09 feet	28.87 ft/s^2
Stop #2	60.92 mph	136.26 feet	29.30 ft/s^2
Stop #3	60.36 mph	136.59 feet	28.69 ft/s^2
Stop #4	59.95 mph	130.71 feet	29.58 ft/s^2
Stop #5	59.70 mph	133.89 feet	28.63 ft/s^2
Stop #6	60.38 mph	139.07 feet	28.20 ft/s^2

AVERAGE DECELERATION RATE 28.88 ft/s^2

Phase III

	Yes/No
Evidence of severe fading?	No
Vehicle stopped in straight line?	Yes
Vehicle stopped within correct lane?	Yes

OVERALL AVERAGE DECEL. RATE: 28.92 ft/s^2

Projected Stopping Distance from 60.0 mph 133.9 feet

BRAKE TESTING

TEST LOCATION: Chrysler Proving Grounds **DATE:** September 18, 2010

BEGINNING Time: 1:15 p.m. **TEMPERATURE:** 69.7°F

MAKE & MODEL: Chevrolet Tahoe 5.3L PPV 2WD **BRAKE SYSTEM:** Anti-lock

Phase I

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.$^{2)}$
TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	59.94 mph	134.70 feet	28.69 ft/s^2
Stop #2	60.43 mph	139.25 feet	28.21 ft/s^2
Stop #3	59.91 mph	143.21 feet	26.96 ft/s^2
Stop #4	60.76 mph	142.31 feet	27.91 ft/s^2
Stop #5	60.05 mph	141.39 feet	27.44 ft/s^2
Stop #6	59.82 mph	140.41 feet	27.41 ft/s^2

AVERAGE DECELERATION RATE 27.77 ft/s^2

HEAT SOAK (4 minutes)

Phase II

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.$^{2)}$
TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	59.60 mph	135.76 feet	28.14 ft/s^2
Stop #2	60.36 mph	142.21 feet	27.55 ft/s^2
Stop #3	60.53 mph	146.04 feet	26.98 ft/s^2
Stop #4	59.45 mph	141.29 feet	26.90 ft/s^2
Stop #5	59.69 mph	146.64 feet	26.13 ft/s^2
Stop #6	59.96 mph	144.79 feet	26.71 ft/s^2

AVERAGE DECELERATION RATE 27.07 ft/s^2

Phase III

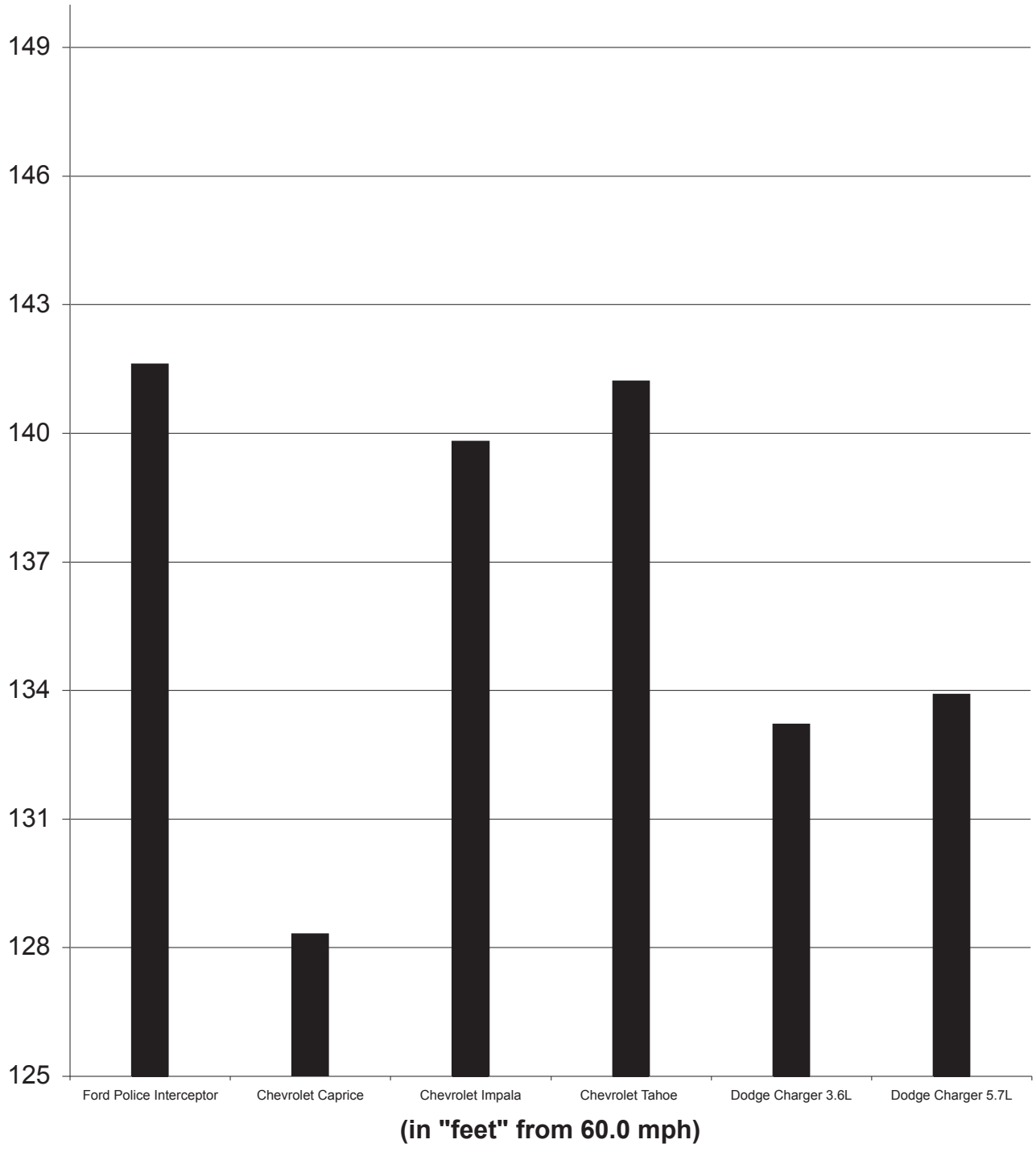
	Yes/No
Evidence of severe fading?	No
Vehicle stopped in straight line?	Yes
Vehicle stopped within correct lane?	Yes

OVERALL AVERAGE DECEL. RATE: 27.42 ft/s^2

Projected Stopping Distance from 60.0 mph 141.2 feet

2011 Brake Testing

STOPPING DISTANCE



ERGONOMICS AND COMMUNICATIONS

TEST OBJECTIVE

Rate each test vehicle's ability to:

1. Provide a suitable environment for the patrol officer in the performance of his/her assigned tasks.

2. Accommodate the required communications and emergency warning equipment and assess the relative difficulty of such installations.

TEST METHODOLOGY

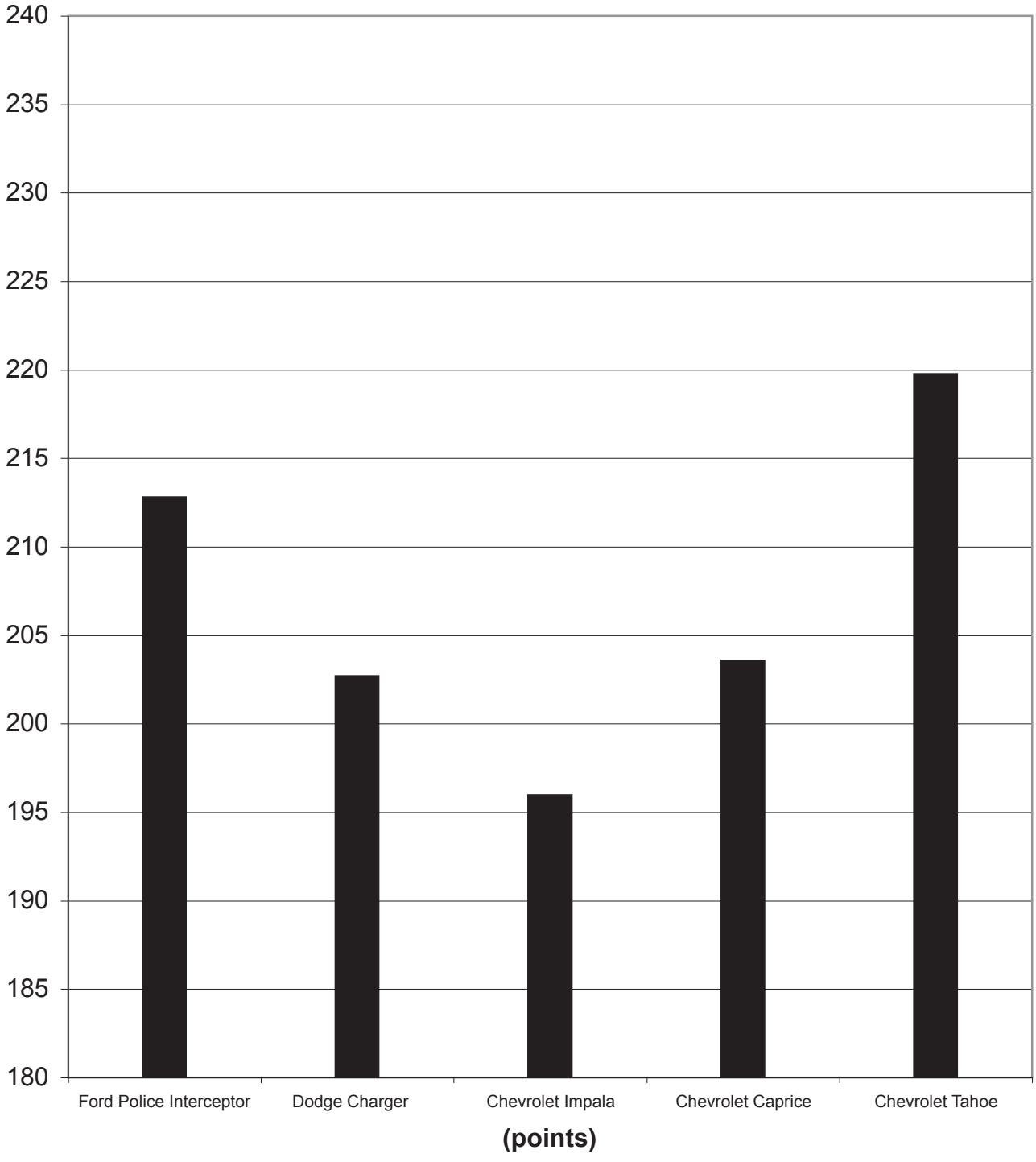
Utilizing the ergonomics portion of the form, a minimum of four officers (in this case 9) individually and independently compare and score each test vehicle on the various comfort, instrumentation, and visibility items. The installation and communications portion of the evaluation is conducted by personnel from DIT Communications, based upon the relative difficulty of the necessary installations. Each factor is graded on a 1 to 10 scale, with 1 representing "totally unacceptable," 5 representing "average," and 10 representing "superior." The scores are averaged to minimize personal prejudice for or against any given vehicle.

ERGONOMICS AND COMMUNICATIONS

ERGONOMICS	Ford Police Interceptor	Dodge Charger	Chevrolet Impala 9C1	Chevrolet Caprice	Chevrolet Tahoe PPV
FRONT SEAT					
Padding	7.78	7.56	7.11	7.56	7.33
Depth of Bucket Seat	7.56	7.56	7.11	7.00	7.89
Adjustability – Front to Rear	8.00	8.67	8.22	7.75	7.89
Upholstery	7.11	7.44	7.00	7.89	6.89
Bucket Seat Design	7.11	7.89	7.44	7.56	7.67
Headroom	8.78	8.44	7.78	6.89	9.78
Seatbelts	6.44	8.00	7.78	5.78	8.11
Ease of Entry and Exit	7.56	7.67	7.11	7.33	8.89
Overall Comfort Rating	7.00	8.22	7.00	7.78	8.11
REAR SEAT					
Leg room – Front seat back	6.33	4.78	4.44	9.22	7.44
Ease of Entry and Exit	6.78	4.56	4.89	7.78	7.33
INSTRUMENTATION					
Clarity	7.33	7.44	8.00	7.33	7.89
Placement	7.56	7.11	8.11	7.78	7.56
VEHICLE CONTROLS					
Pedals, Size and Position	7.63	7.89	7.78	7.44	8.33
Power Window Switch	8.22	8.44	8.11	7.22	8.56
Inside Door Lock Switch	7.11	8.11	6.89	6.56	8.56
Automatic Door Lock Switch	8.11	7.67	6.22	6.56	8.00
Outside Mirror Controls	7.00	8.11	6.89	7.22	8.56
Steering Wheel, Size, Tilt Release, and Surface	8.00	6.33	7.78	7.78	8.11
Heat/AC Vent Placement and Adjustability	8.00	7.78	7.56	7.22	7.78
VISIBILITY					
Front (Windshield)	8.67	8.11	8.33	8.00	8.56
Rear (Back Window)	7.33	6.11	5.67	6.67	6.00
Left Rear Quarter	7.67	5.44	6.33	7.11	6.00
Right Rear Quarter	7.11	5.56	6.33	7.22	4.56
Outside Rear View Mirrors	7.22	6.89	4.56	5.56	9.33
COMMUNICATIONS					
Dashboard Accessibility	8.55	7.25	7.75	5.05	8.40
Trunk Accessibility	8.53	7.25	6.93	7.25	8.08
Engine Compartment	8.33	6.42	6.83	9.08	8.17
TOTAL SCORES	**212.81**	**202.70**	**195.95**	**203.57**	**219.76**

2011 ERGONOMICS/COMMUNICATIONS

VEHICLE SCORES



FUEL ECONOMY

TEST OBJECTIVE

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

TEST METHODOLOGY

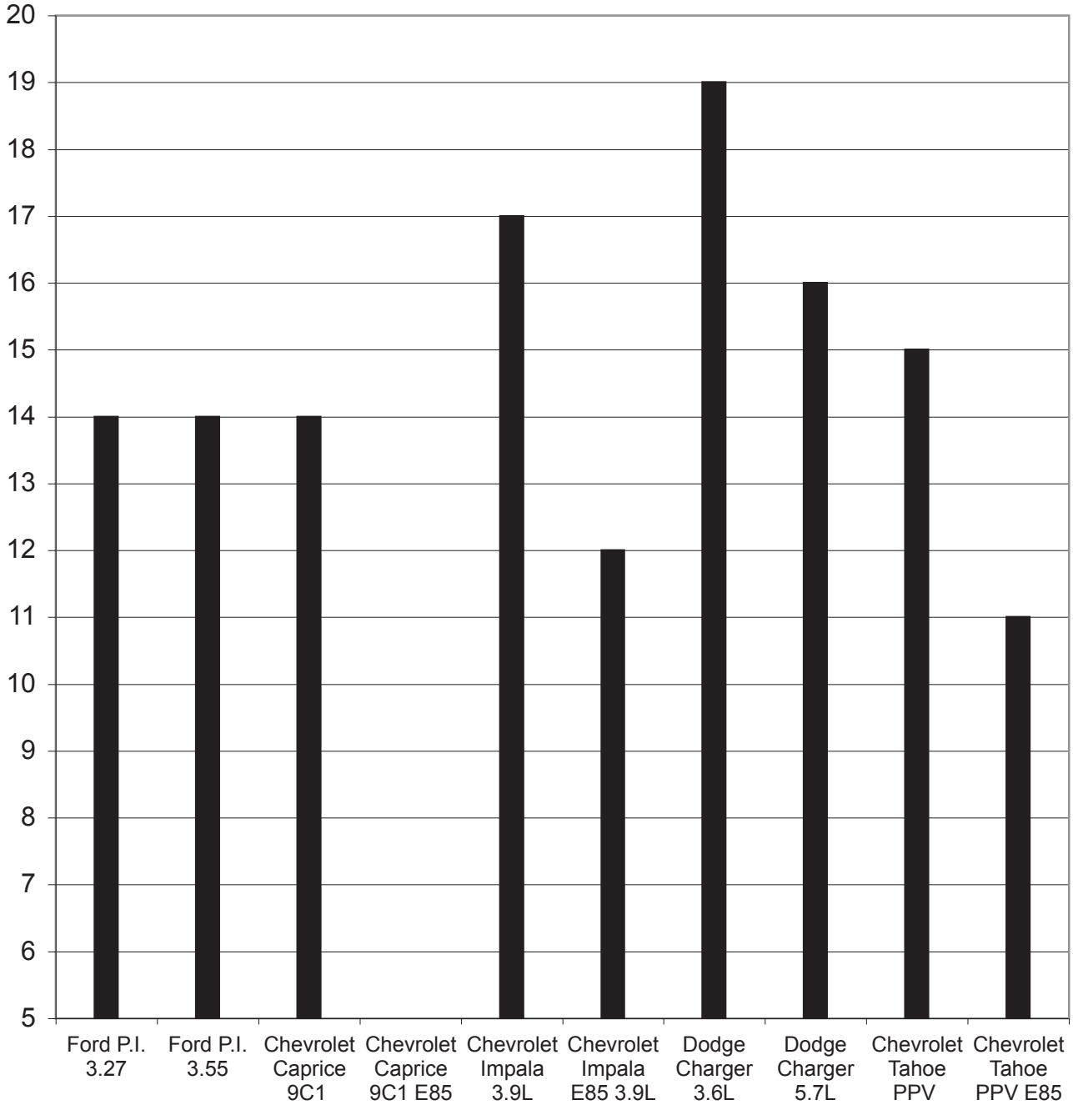
The vehicles will be scored based on estimates for city fuel economy to the nearest 1/10th mile per gallon (mpg) developed from data supplied by the vehicle manufacturer and certified by the Environmental Protection Agency.

Vehicles Make/Model/Engine	E.P.A. Miles Per Gallon					
	City		Highway		Combined	
	Label	Unadjusted	Label	Unadjusted	Label	Unadjusted
Ford Police Interceptor 3.27 4.6L SPFI	14	17.9	21	29.7	17	21.7
Ford Police Interceptor 3.55 4.6L SPFI	14	17.9	21	29.7	17	21.7
Chevrolet Caprice 9C1* 6.0L SPFI	14	17.3	22	30.5	17	21.5
Chevrolet Caprice 9C1*E85 6.0L SPFI	14	17.3	22	30.5	17	21.5
Chevrolet Impala 3.9L SPFI	17	21.2	24	33.8	20	25.5
Chevrolet Impala E85 3.9L SPFI	12	15.5	18	24.7	14	18.6
Dodge Charger 3.6L SPFI	19	23.2	26	36.6	21	27.8
Dodge Charger 5.7L SPFI	16	19.3	25	34.6	19	24.1
Chevrolet Tahoe PPV 5.3L SPFI	15	18.3	21	29.4	17	22.1
Chevrolet Tahoe E85 PPV 5.3L SPFI	11	13.4	16	22.2	13	16.3

*Official fuel economy available January 2011 @ gmfleet.com

2011 FUEL ECONOMY COMPARISON

"CITY" EPA ESTIMATES



(miles-per-gallon)

MICHIGAN STATE POLICE
SCORING AND BID ADJUSTMENT METHODOLOGY*

STEP I: RAW SCORES

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

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

STEP II: DEVIATION FACTOR

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

CAR MAKE MODEL	TOP SPEED
CAR "A"	115.000 **.042**
CAR "B"	118.800 **.010**
CAR "C"	117.900 **.018**
CAR "D"	120.000 **0**

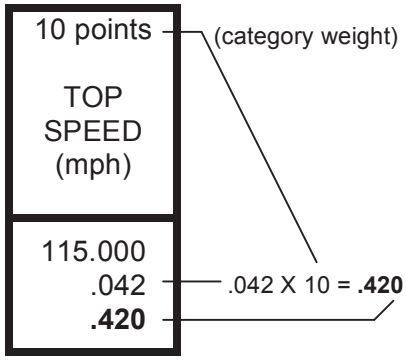
EXAMPLE:

Best Score (Car "D")		Other Vehicle Score (Car "A")		Absolute Difference		Best Score		Deviation Factor (Car "A")
120.000	-	115.000	=	5	/	120.000	=	**.042**

STEP III: WEIGHTED CATEGORY SCORE

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

RAW SCORE
DEVIATION FACTOR
WEIGHTED CATEGORY SCORE



*All mathematical computations are to be rounded to the third decimal place.

STEP IV: TOTAL WEIGHTED SCORE

Adding together the six (6) weighted category scores for that vehicle derives the total weighted score for each vehicle.

EXAMPLE:

CAR	30 pts. VEH. DYN. (seconds)	25 pts. BRAKE DECEL. (ft/sec^2)	20 pts. ACCEL. (seconds)	10 pts. TOP SPEED (mph)	10 pts. ERGO/ COMM. (points)	5 pts. FULE ECON. (mpg)	TOTAL WEIGHTED SCORE
Car "A"	92.210 .018 .540	45.790 .163 4.075	26.380 0 0	115.000 .042 .420	173.900 .184 1.840	14.300 0 0	**6.875**

STEP V: BID ADJUSTMENT FIGURE

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

STEP VI: ACTUAL DOLLAR ADJUSTMENT

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

TOTAL WTD. SCORE	BID ADJ. FIGURE	ACTUAL DOLLAR ADJ.
	X	**=**
6.875	$152.38	**$1,047.61**

STEP VII: ADJUSTED BID PRICE

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

ACTUAL DOLLAR ADJ.	ACTUAL BID PRICE	ADJ. BID PRICE
	+	**=**
$955.42	$15,473.00	**$16,520.61**

PERFORMANCE COMPARISONS OF 2010 AND 2011 TEST VEHICLES

The following charts illustrate the scores achieved by each make and model of vehicle tested for model years 2010 and 2011. The charts presented are for the following performance categories:

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

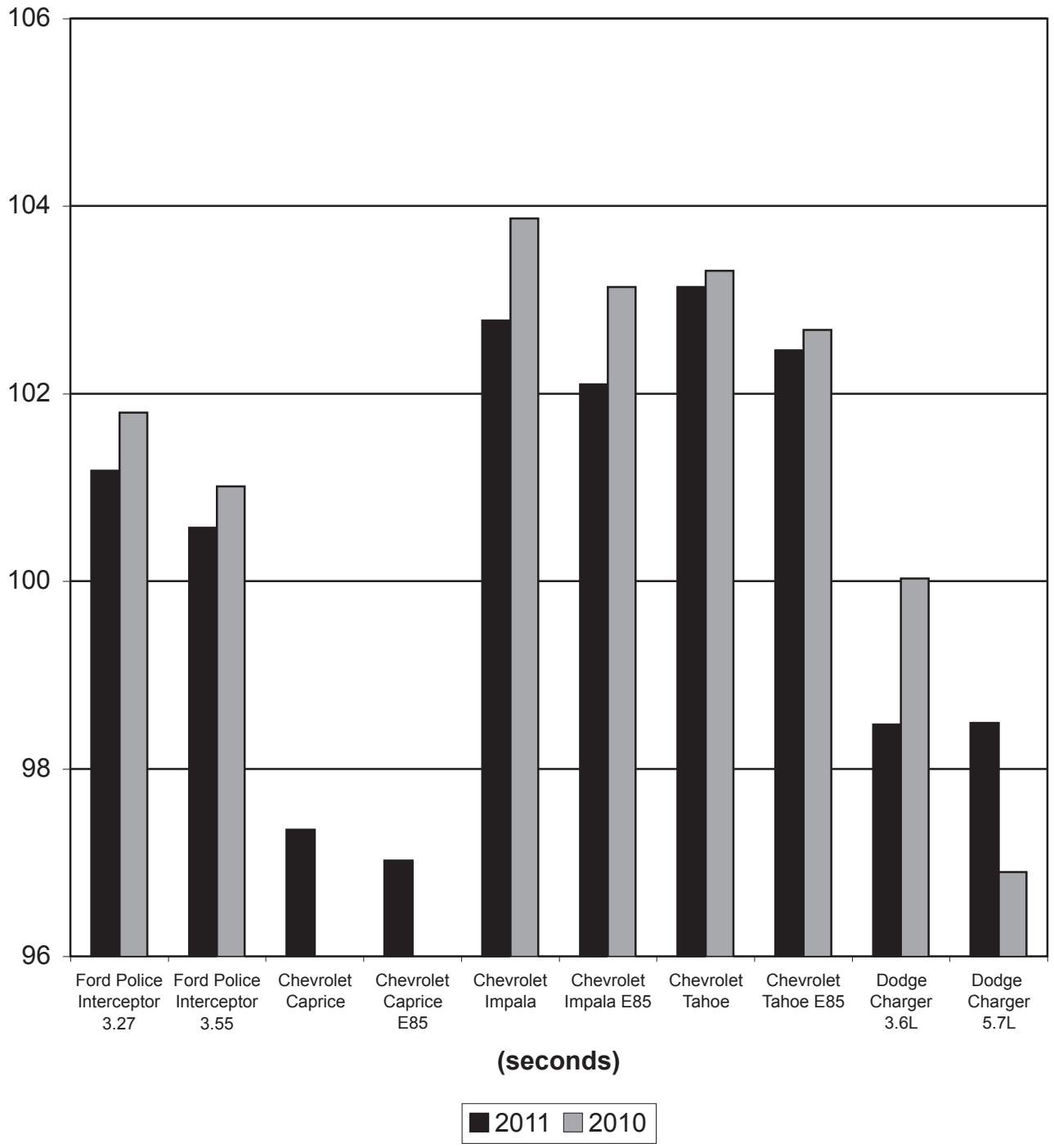
The reader should bear in mind the following information regarding variables when reviewing the 2010 – 2011 performance comparison charts. While as many variables as possible are eliminated from a given year's testing, those that occur over the span of a full year are sometimes impossible to eliminate.

The acceleration, top speed, and brake testing of both the 2010 and 2011 model year vehicles were conducted in the latter half of September. Temperatures on the test day in September of 2009 ranged between 39.8° F at the start of testing to a high of approximately 57.5° F during the afternoon. Temperatures during the testing this year varied, ranging between 61° F when testing started, to an afternoon high of 75° F. Such things as temperature, humidity, and barometric pressure affect the performance of internal combustion engines and brake components, and may cause minor differences from one year's evaluation to the next.

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

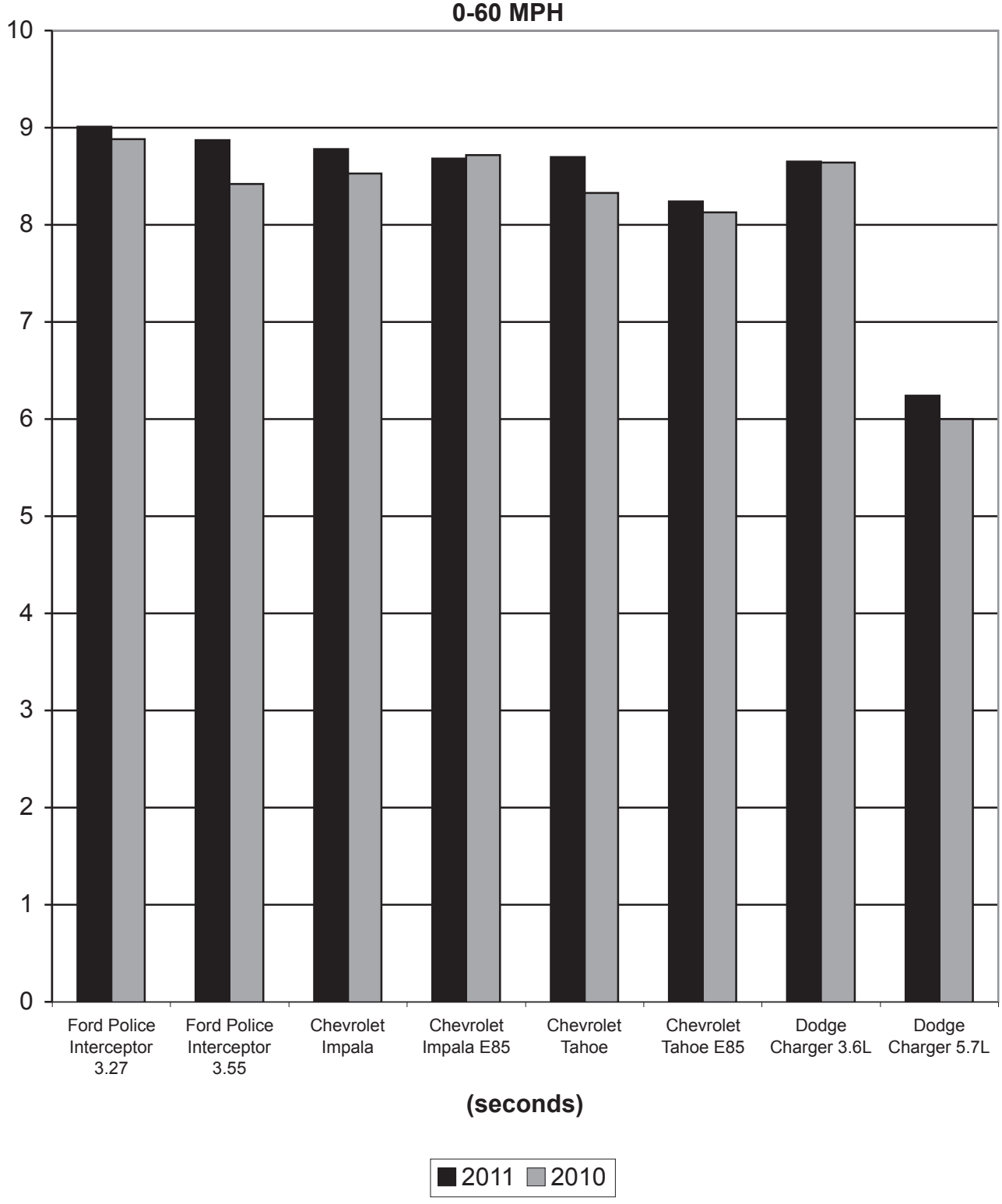
2010-11 Vehicle Dynamics Comparison

LAP TIMES

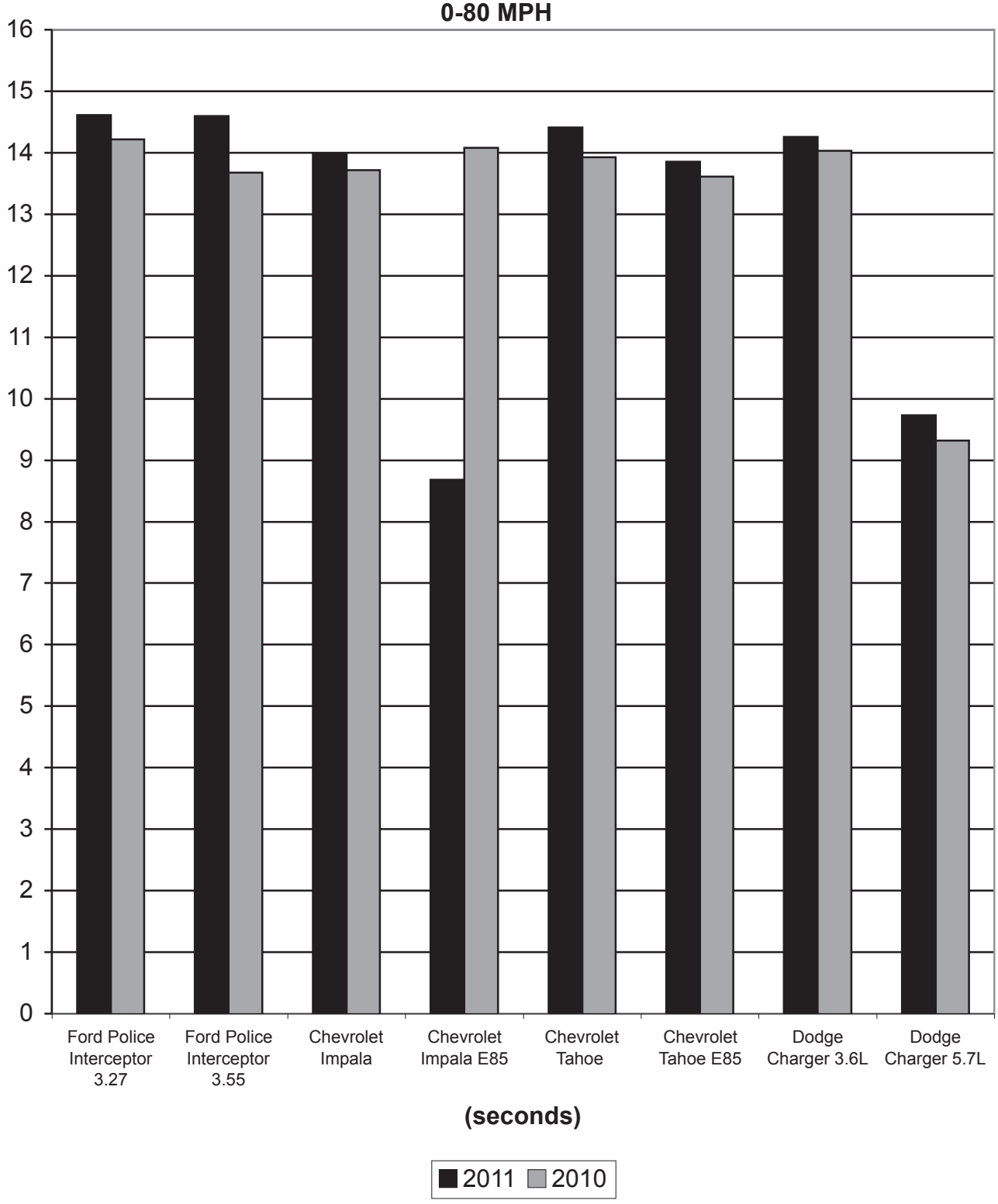


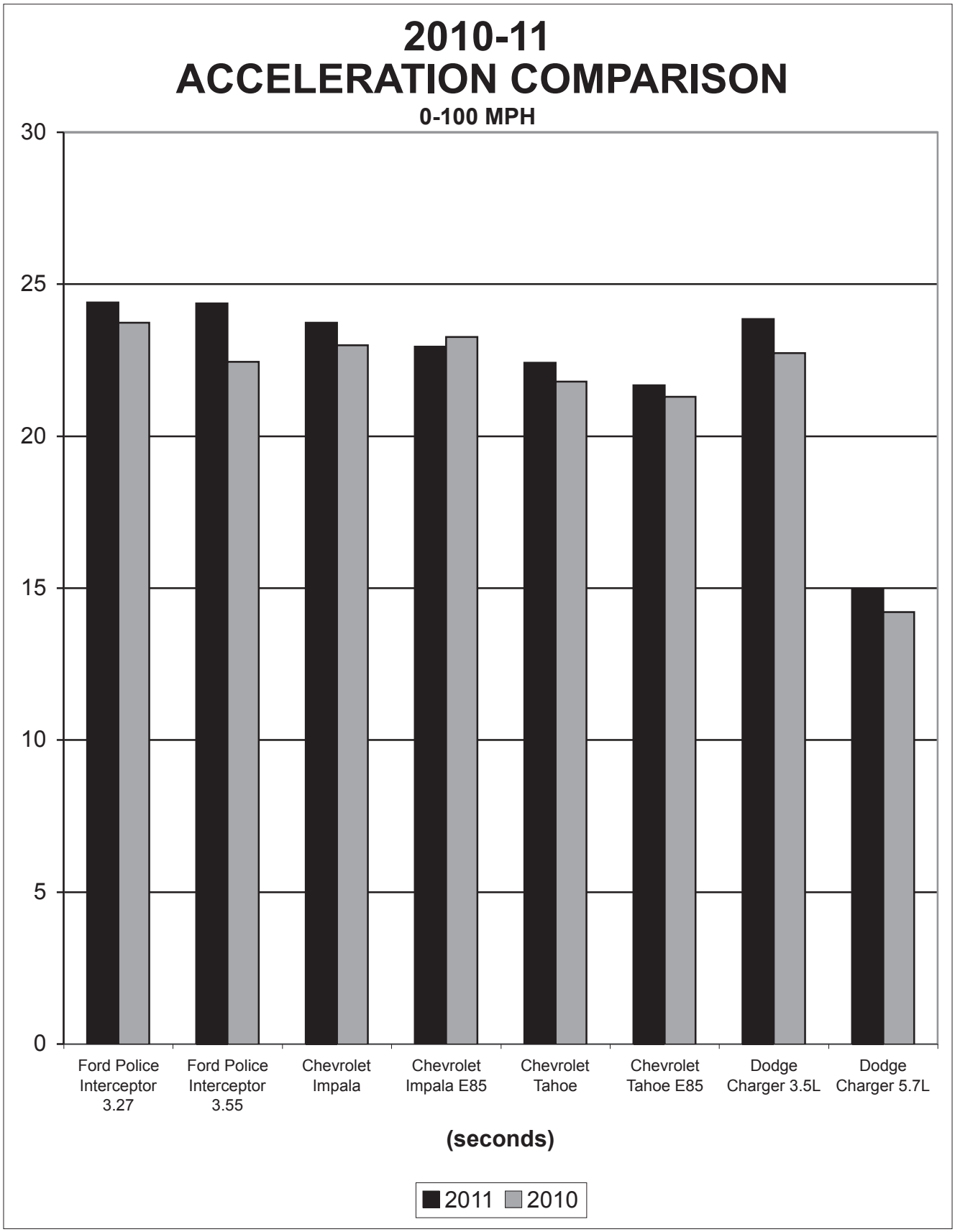
2010-11
ACCELERATION COMPARISON

0-60 MPH

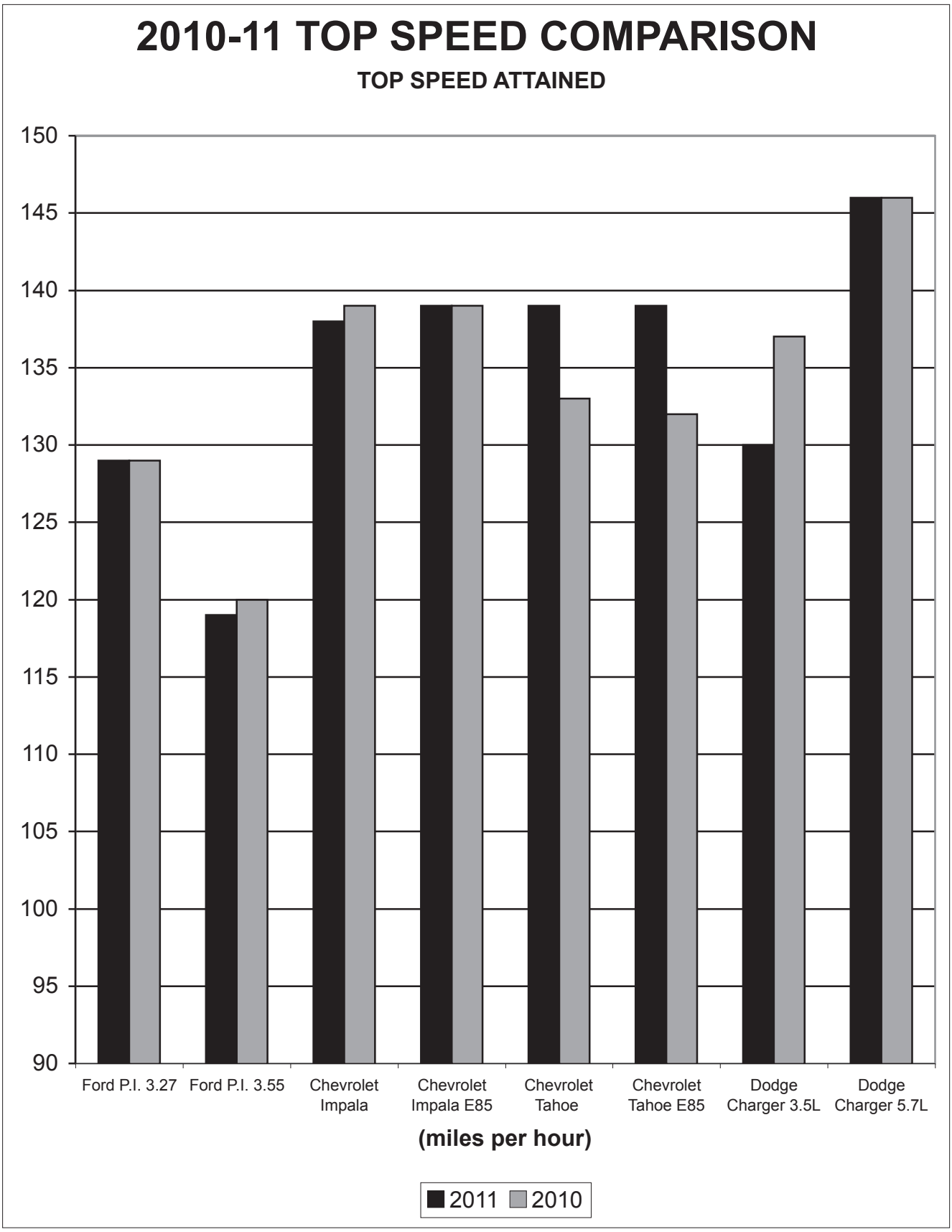


2010-11 ACCELERATION COMPARISON

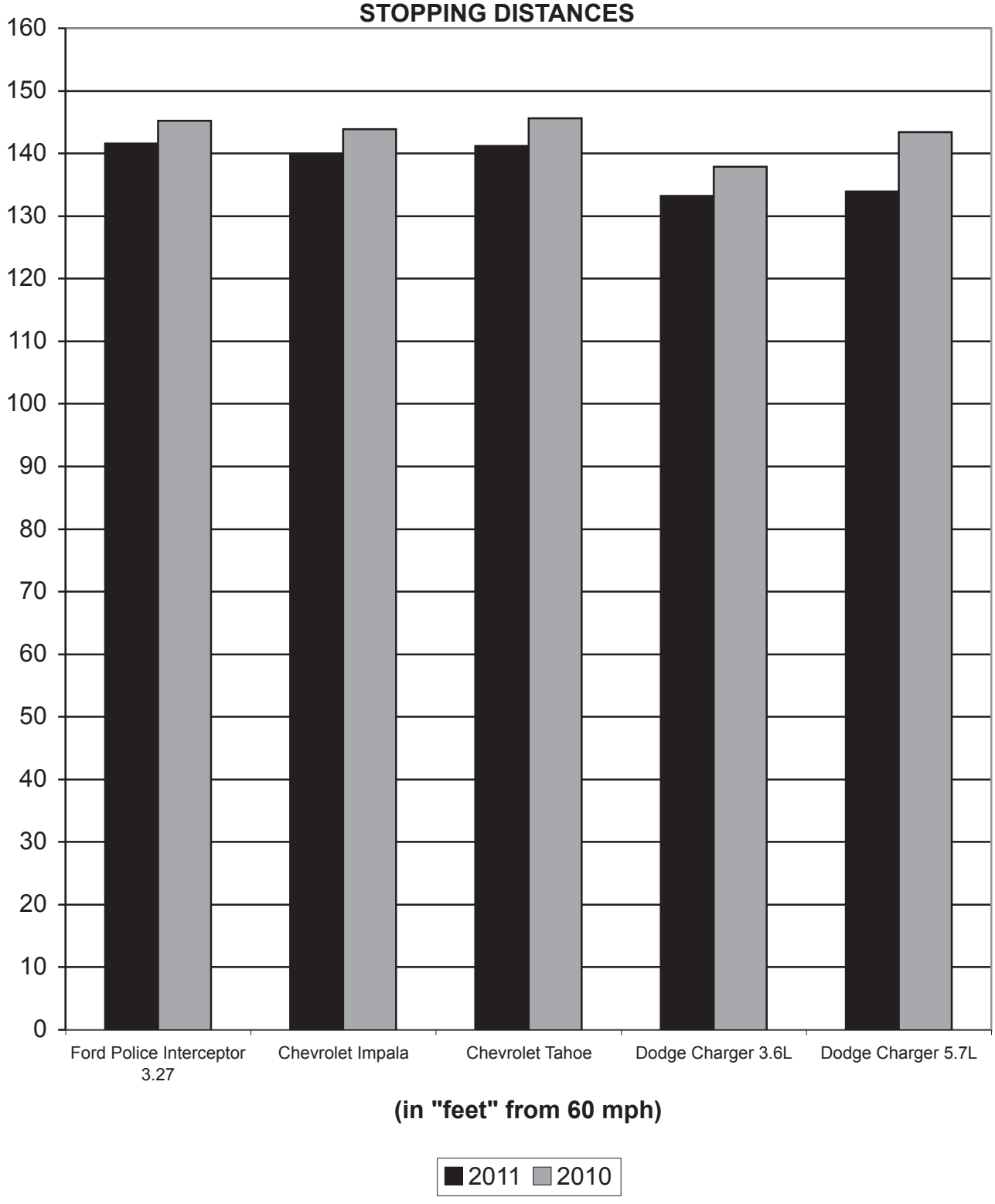



2010-11
ACCELERATION COMPARISON
0-100 MPH
30
25
20
15
10
5
0
Ford Police Interceptor 3.27
Ford Police Interceptor 3.55
Chevrolet Impala
Chevrolet Impala E85
Chevrolet Tahoe
Chevrolet Tahoe E85
Dodge Charger 3.5L
Dodge Charger 5.7L
(seconds)
2011
2010

2010-11 TOP SPEED COMPARISON



2010-11
BRAKE TESTING COMPARISON



MOTORCYCLES

Like many law enforcement agencies, the Michigan State Police used motorcycles until late 1941 and then switched to automobiles. The Michigan State Police rekindled interest in motorcycles for day to day patrol operations in 1993. In 2004, Michigan State Police headquarters asked if we had additional information as a resource for our purchasing decisions regarding motorcycles. During that time, we were given direction to expand vehicle testing to include motorcycle testing. We would like to thank Harley-Davidson, BMW, and Kawasaki for participating and providing their assistance in preparation for this year's successful testing program.

We are constantly evaluating our various tests with the manufacturers and the law enforcement industry to provide you with the most objective test data available. While there are many similarities to automobiles, there are also quite a few differences.

This year we conducted motorcycle brake testing on our track at the Precision Driving Unit in Lansing. Our facility provides a very flat and consistent surface for this type of testing. Thus, better information is provided to the reader as to the braking capabilities of each motorcycle.

During brake testing the BMW R1200 RTP displayed rear wheel lift. Each stop during the test is a full ABS stop using both brakes. On several runs the rear wheel of the motorcycle would lift from the pavement as the motorcycle slowed near the end of the stop. On one occasion the rider had to abort a run because of the severity. The BMW R 1200 RTP completed the brake test with no other issues. It should be noted the rear wheel lift displayed during brake testing, was not an issue during the dynamics portion of the testing.

When looking at the data, it is very important for the reader to apply your mission requirements to the motorcycle you are considering so you may make an appropriate decision. This report is not an endorsement of products, but a means of learning what's available for your officers so they can do their job more effectively and safely. If anything in this report requires further explanation or clarification, please call or write the Michigan State Police Precision Driving Unit.

Harley-Davidson Road King

TEST VEHICLE DESCRIPTION

MAKE Harley-Davidson	**MODEL** FLHP		**SALES CODE NO.** N/A
ENGINE DISPLACEMENT	**CUBIC CENTIMETERS** 1690		**CUBIC INCHES** 103
FUEL SYSTEM	EFI		**EXHAUST** Crossover Dual
BORE & STROKE	3.875 x 4.375 in		**ALTERNATOR** 50 amp
TORQUE	102 ft-lbs @ 3500 RPM		**BATTERY** 28 Amp Hour 270 CCA
COMPRESSION RATIO	9.6:1		
TRANSMISSION	**PRIMARY DRIVE** 34/46		**FINAL DRIVE** 32/68
GEAR RATIO	2.875 overall		
LEAN ANGLE	**LEFT** 31 Deg		**RIGHT** 33 Deg
CLUTCH	Wet multiple plate		
WHEELS/TIRES	Wheels/Slotted Disk Cast Aluminum front and rear / Front 17 x 3 / Rear 16 x 5 Tires / Front Dunlop D407F 130/80B17 Rear Dunlop D407 180/65B16		
FRONT SUSPENSION	**FORK ANGLE** 29.25°		**RAKE** 26°
REAR SUSPENSION	Swing Arm w/ Air Adjustable Shocks		
SUSPENSION TRAVEL	**FRONT** 4.6 in.		**REAR** 3.0 in.
GROUND CLEARANCE, MINIMUM	5.1 in.		
BRAKE SYSTEM	Hydraulic Disc / Independent Front & Rear ABS		
BRAKES, FRONT	**TYPE** Dual Disc		**SWEPT AREA** 180sq in.
BRAKES, REAR	**TYPE** Single Disc		**SWEPT AREA** 90sq in.
FUEL CAPACITY	**GALLONS** 6		**LITERS** 22.71
OIL CAPACITY	4 Qts		
GENERAL MEASUREMENTS	**WHEELBASE** 63.54 in.		**LENGTH** 95.14 in.
	TEST WEIGHT 845 lbs.		**OVERALL HEIGHT** 55.1 in.
	SEAT HEIGHT 27.3 in. laden		
EPA MILEAGE EST. (MPG)	**CITY** 35	**HIGHWAY** 54	**COMBINED** **44.5**

Harley-Davidson Electra Glide

TEST VEHICLE DESCRIPTION

MAKE Harley-Davidson	**MODEL** FLHTP		**SALES CODE NO.** N/A
ENGINE DISPLACEMENT	**CUBIC CENTIMETERS** 1690		**CUBIC INCHES** 103
FUEL SYSTEM	EFI		**EXHAUST** Crossover Dual
BORE & STROKE	3.875 x 4.375 in		**ALTERNATOR** 50 amp
TORQUE	102 ft-lbs @ 3500 RPM		**BATTERY** 28 amp hour 270 CCA
COMPRESSION RATIO	9.6:1		
TRANSMISSION	**PRIMARY DRIVE** 34/46		**FINAL DRIVE** 32/68
GEAR RATIO	2.875 overall		
LEAN ANGLE	**LEFT** 31°		**RIGHT** 33°
CLUTCH	Wet multiple plate		
WHEELS/TIRES	Wheels / Slotted Disk Cast Aluminum front and rear / Front 17 x 3 / Rear 16 x 5 Tires / Front Dunlop D407F 130/80B 17 Rear Dunlop D407 180/65B16		
FRONT SUSPENSION	**FORK ANGLE** 29.25°		**RAKE** 26°
REAR SUSPENSION	Swing Arm w/ Air Adjustable Shocks		
SUSPENSION TRAVEL	**FRONT** 4.6 in.		**REAR** 3.0 in.
GROUND CLEARANCE, MINIMUM	5.1 in.		
BRAKE SYSTEM	Hydraulic Disc / Independent Front & Rear ABS		
BRAKES, FRONT	**TYPE** Dual Disc		**SWEPT AREA** 180sq in.
BRAKES, REAR	**TYPE** Single Disc		**SWEPT AREA** 90sq in.
FUEL CAPACITY	**GALLONS** 6.0		**LITERS** 22.71
OIL CAPACITY	4.0 Qts		
GENERAL MEASUREMENTS	**WHEELBASE** 63.54 in.		**LENGTH** 95.14 in.
	TEST WEIGHT 849 lbs.		**OVERALL HEIGHT** 61 in.
	SEAT HEIGHT 27.3 in. laden		
EPA MILEAGE EST. (MPG)	**CITY** 35	**HIGHWAY** 54	**COMBINED** 44.5

BMW R1200 RTP

TEST VEHICLE DESCRIPTION

MAKE BMW	**MODEL** R1200RT-P		**SALES CODE NO.** 08RB
ENGINE DISPLACEMENT	**CUBIC CENTIMETERS** 1170		**Engine** 2-Cylinder
FUEL SYSTEM	BMSK-P Injection		**EXHAUST** Stainless Steel with Catalytic Converter
BORE & STROKE	101 mm. x 73 mm.		**ALTERNATOR** 720 W
TORQUE	85 ft-lbs @ 6,000 rpm.		**BATTERY** 2 19 Amp Ah Gel Maintenance-Free
COMPRESSION RATIO	12.0:1		
TRANSMISSION	**PRIMARY DRIVE** Gear 1:1.882		**FINAL DRIVE** Shaft w/ring & pinion gear
GEAR RATIO	1:2.75 rear drive ratio		
LEAN ANGLE	**LEFT** 46°		**RIGHT** 46°
CLUTCH	Self-adjusting Hydraulic Actuating Single Plate Dry Clutch		
WHEELS/TIRES	Die-cast Aluminum MTH2 Rim Profile fitted with Run-Flat Tires (meets California Highway Patrol Run-Flat Protocol)/Tires Dunlop Sport Max F-120/70 ZR17 R-180/55 ZR17		
FRONT SUSPENSION	**FORK ANGLE** 63.4 BMW Telelever		**RAKE** Castor in normal position 4.3 in.
REAR SUSPENSION	BMW Evo Paralever		
SUSPENSION TRAVEL	**FRONT** 4.7 in.		**REAR** 5.3 in.
GROUND CLEARANCE, MINIMUM	5.125 in.		
BRAKE SYSTEM	BMW/ABS Partially Integrated Brake System		
BRAKES, FRONT	**TYPE** Dual 12.6 in. Disc		**SWEPT AREA** 186 sq. in.
BRAKES, REAR	**TYPE** Single 10.4in. Disc		**SWEPT AREA** 62 sq. in.
FUEL CAPACITY	**GALLONS** 7.1		**LITERS** 27
OIL CAPACITY	4.0 Qts.		
GENERAL MEASUREMENTS	**WHEELBASE** 58.4 in.		**LENGTH** 87.8 in.
	TEST WEIGHT 677		**OVERALL HEIGHT** 56.3 in.
	***SEAT HEIGHT** 32.2 in.		
EPA MILEAGE EST. (MPG) (Based on DIN standard test)	**CITY** N/A	**HIGHWAY** 48 @ 75mph 65 @ 55mph	**COMBINED** N/A

*Seat height has two adjustment positions. A low seat is available making the seat height 31".

Kawasaki Concours 14 ABS P

TEST DESCRIPTION SHEET

MAKE Kawasaki	**MODEL** Concours 14 ABS Police		**SALES CODE NO.**
ENGINE DISPLACEMENT	**CUBIC CENTIMETERS** 1352		**ENGINE** Inline 4-Cyl.
FUEL SYSTEM	FI, Mikuni 40EIDW x 4		**EXHAUST** 4 into 1
BORE & STROKE	84.0 mm x 61.0 mm		**ALTERNATOR** 581 watts
TORQUE	102 lb/ft @ 6,200 rpm		**BATTERY** 2 x 14 Amp Ah Maintenance-Free
COMPRESSION RATIO	10.7:1		
TRANSMISSION	**PRIMARY DRIVE** Gear 1:1.556		**FINAL DRIVE** Shaft
GEAR RATIO	1 : 2.036 rear drive ratio		
LEAN ANGLE	**LEFT** 47 degrees		**RIGHT** 48 degrees
CLUTCH	Wet, multi disc		
WHEELS/TIRES	Cast aluminum rims, Bridgestone BT021 120/70ZR17, 190/50ZR17 (passed California Highway Patrol run flat protocol)		
FRONT SUSPENSION	**FORK ANGLE**		**RAKE** 26.1°
REAR SUSPENSION	Tetra lever and Uni Trak®		
SUSPENSION TRAVEL	**FRONT** 4.4 inches		**REAR** 5.3 inches
GROUND CLEARANCE, MINIMUM	4.92 inches		
BRAKE SYSTEM	K-ACT ABS – 2 link settings, non-linked below 13 mph		
BRAKES, FRONT	**TYPE** Dual floating 310mm petal discs, 4 piston, radial mount calipers		**SWEPT AREA** 164 in/sq.
BRAKES, REAR	**TYPE** Single 250mm petal disc		**SWEPT AREA** 65 in/sq.
FUEL CAPACITY	**GALLONS** 5.8 Gal.		LITERS **22 L.**
OIL CAPACITY	5 qts.		
GENERAL MEASUREMENTS	**WHEELBASE** 59.8 inches		**LENGTH** 87.8 inches
	TEST WEIGHT 767.		**OVERALL HEIGHT** 52.9”
	SEAT HEIGHT 31.0 inches		
EPA MILEAGE EST. (MPG)	**CITY**	**HIGHWAY**	**COMBINED** 36*

Note: * FTP (Federal Test Procedure) mileage figures indicate 36 mpg during exhaust emission test.

TEST VEHICLE DESCRIPTION SUMMARY

	Harley-Davidson FLHP	Harley-Davidson FLHTP	BMW R-1200 RT-P	Kawasaki Concours
CUBIC CENTIMETERS	1690	1690	1170	1352
ENGINE DISPLACEMENT–CU. IN.	103	103	72	83
ENGINE FUEL SYSTEM	EFI	EFI	Injection	EFI
EXHAUST	Crossover Dual	Crossover Dual	Stainless Steel	4 into 1
BORE & STROKE	3.875x4.375 (inches)	3.875x4.375 (inches)	101x73 (mm)	84.0 x 61.0 (mm)
ALTERNATOR	50 amp	50 amp	720 watts	581 watts
TORQUE - FT. LBS.	102	102	85	102
BATTERY	12v 28 amp/hour	12v 28 amp/hour	(2) 12v 19 amp/hour	(2) 12v 14 amp/hour
COMPRESSION RATIO	9.6:1	9.6:1	12.0:1	10.7:1
TRANSMISSION	6-Speed	6-Speed	6-Speed	6-Speed
PRIMARY DRIVE	34/46	34/46	1:1.882	1:1.556
FINAL DRIVE	32/68	32/68	Shaft w/ring & pinion	Shaft
GEAR RATIO	2.875	2.875	1:2.75	1:2.036
LEAN ANGLE - LEFT	31°	31°	46°	47°
LEAN ANGLE – RIGHT	33°	33°	46°	48°
CLUTCH	Wet multi plate	Wet multi plate	Dry single plate	Wet, multi disc
WHEELS	3x16 MT/90-16 72H	3x16 MT/90-16 72H	Alum. MTH2	Cast Alum
FORK ANGLE	29.25°	29.25°	63.4°	
RAKE	26°	26°	4.3 in.	26.1°
REAR SUSPENSION	Swing Arm	Swing Arm	EVO Paralever	Tetra Lever
SUSPENSION TRAVEL – FRONT	4.6 in.	4.6 in.	4.7 in.	4.4 in.
SUSPENSION TRAVEL – BACK	3.0 in.	3.0 in.	5.3 in.	5.3 in.
GROUND CLEARANCE-MINIMUM	5.1 in.	5.1 in.	5.125 in.	4.92 in.
BRAKE SYSTEM	Disc.	Disc.	IABS	K-ACT ABS
FRONT SWEPT AREA (sq. in.)	180	180	186	164
REAR SWEPT AREA (sq. in.)	90	90	62	65
FUEL CAPACITY – GALLONS	6	6	7.1	5.8
FUEL CAPACITY – LITERS	22.71	22.71	27	22
OIL CAPACITY – QUARTS	4	4	4	5
WHEELBASE	63.54	63.54	58.4	59.8
LENGTH	95.14	95.14	87.8	87.8
WEIGHT	845	849	677	767
OVERALL HEIGHT	55.1	61	56.3	52.9
SEAT HEIGHT	27.3	27.3	32.2	31
EPA MILEAGE – CITY	35	35	N/A	N/A
EPA MILEAGE - HIGHWAY	54	54	48 @ 75mph 65 @ 55mph	Combined 36

MOTORCYCLE DYNAMICS TESTING

MOTORCYCLE DYNAMICS TEST OBJECTIVE

Determine each motorcycle's high speed handling characteristics and performance in comparison to other motorcycles. The course used contains 9 turns and curves (including a 90 degree left turn, a switch back, a sweeping turn, a high speed turn and a decreasing radius, with different braking requirements) and is 1 mile in length. The course simulates actual conditions encountered in pursuit or emergency driving situations in the field, with the exception of other traffic. The evaluation is a true test of the vehicle manufacturers in offering balanced packages of acceleration capabilities, suspension components, and braking characteristics.

MOTORCYCLE DYNAMICS TEST METHODOLOGY

Each motorcycle is driven using four separate riders for a six lap series. The best 5 out of six laps for each rider will be totaled for a cumulative time. The cumulative time is the score for each driver. The final score of each motorcycle is the combined average from the four rider's cumulative times.

2011 MOTORCYCLE DYNAMICS		
VEHICLES	**DRIVERS**	**COMBINED CUMMULATIVE***
Harley-Davidson	GROMAK	06:07.20
FLHTP	JOHNSON	06:03.60
Electra Glide	TRAMMEL	06:16.40
	FLEGEL	06:04.70
Overall Average		**06:07.98**
Harley-Davidson	GROMAK	06:09.80
FLHP	JOHNSON	06:06.70
Road King	TRAMMEL	06:14.00
	FLEGEL	06:04.10
Overall Average		**06:08.65**
BMW	GROMAK	05:35.00
R1200 RTP	JOHNSON	05:40.30
	TRAMMEL	05:41.90
	FLEGEL	05:31.50
Overall Average		**05:37.18**
Kawasaki	GROMAK	05:41.10
Concours	JOHNSON	05:41.60
14 ABS Police	TRAMMEL	05:46.20
	FLEGEL	05:35.30
Overall Average		**05:41.05**

MOTORCYCLE ACCELERATION AND TOP SPEED TESTING

ACCELERATION TEST OBJECTIVE

Determine the ability of each test motorcycle to accelerate from a standing start to 60 mph, 80 mph, and 100 mph.

ACCELERATION TEST METHODOLOGY

Using a Correvit L-350 1 Axis Optical Sensor, each motorcycle is driven through four acceleration sequences, two northbound and two southbound, to allow for wind direction. The four resulting times for each target speed are averaged and the average times used to derive scores on the competitive test for acceleration.

TOP SPEED TEST OBJECTIVE

Determine the actual top speed attainable by each test motorcycle within a distance of 10 miles from a standing start.

TOP SPEED TEST METHODOLOGY

Following the fourth acceleration run, each test motorcycle will continue to accelerate to the top speed attainable within 10 miles from the start of the run. The highest speed attained within the 10-mile distance will be the vehicle's score on the competitive test for top speed.

SUMMARY OF ACCELERATION & TOP SPEED

ACCELERATION*		Harley-Davidson Electra Glide	Harley-Davidson Road King	BMW RTP	Kawasaki Concours
0 – 20 mph	(sec.)	1.31	1.26	1.52	1.73
0 – 30 mph	(sec.)	2.18	2.08	2.15	2.41
0 – 40 mph	(sec.)	3.11	2.97	2.85	3.00
0 – 50 mph	(sec.)	4.43	4.23	3.81	3.58
0 – 60 mph	(sec.)	5.97	5.76	4.70	4.50
0 – 70 mph	(sec.)	8.03	7.63	5.88	5.32
0 – 80 mph	(sec.)	10.63	10.11	7.22	6.54
0 – 90 mph	(sec.)	15.34	14.11	9.10	7.74
0 – 100 mph	(sec.)	24.94	21.36	11.46	9.70
TOP SPEED	**(mph)**	106	108	127	131
QUARTER MILE					
Time	(sec.)	14.85	14.61	13.21	12.66
Speed	(mph)	89.28	91.02	105.95	112.17

BRAKE TESTING

BRAKE TEST OBJECTIVE

Determine the deceleration rate attained by each test motorcycle on twenty 60 – 0 mph impending skid (threshold) stops, with ABS in operation if the motorcycle is so equipped. Each bike will be scored on the average deceleration rate it attains.

BRAKE TEST METHODOLOGY

Each motorcycle makes ten measured 60 – 0 mph impending skid (threshold) stops with ABS in operation, if so equipped, at specific predetermined points. After a one-mile lap to cool the brakes, the entire sequence is repeated. The exact initial velocity at the beginning of each of the 60 – 0 mph decelerations, and the exact distance required to make each stop, is recorded by means of a non contact optical sensor in conjunction with electronic speed and distance meters. The data resulting from the twenty total stops is used to calculate the average deceleration rate which is the motorcycle's score for this test.

DECELERATION RATE FORMULA

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

EXAMPLE:

Initial Velocity = 89.175 ft/s (60.8 mph x 1.4667*)
Stopping Distance = 171.4 ft.

$$DR = \frac{(IV)^2}{2(SD)} = \frac{(89.175)^2}{2(171.4)} = \frac{7952.24}{342.8} = 23.198 \text{ ft/s}^2$$

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

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

EXAMPLE:

60 mph = 88.002 ft/s x 88.002 = 7744.352 / 2 = 3872.176 / 23.198 ft/s^2 = 166.9 ft.

BRAKE TESTING

TEST LOCATION: MSP Precision Drive Track **DATE:** September 17, 2010

BEGINNING Time: 9:23 a.m. **TEMPERATURE:** 58.8°F

MAKE & MODEL: Harley-Davidson Road King FLHP **BRAKE SYSTEM:** Anti-lock

Phase I

TEST: Ten 60 – mph impending skid (ABS) maximum deceleration rate stops

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	59.93 mph	148.21 feet	26.06 ft/s^2
Stop #2	59.62 mph	149.12 feet	25.64 ft/s^2
Stop #3	60.04 mph	143.75 feet	26.97 ft/s^2
Stop #4	59.47 mph	153.51 feet	24.78 ft/s^2
Stop #5	60.76 mph	152.82 feet	25.99 ft/s^2
Stop #6	59.05 mph	132.00 feet	28.41 ft/s^2
Stop #7	59.10 mph	142.43 feet	26.38 ft/s^2
Stop #8	58.93 mph	147.39 feet	25.34 ft/s^2
Stop #9	59.79 mph	141.07 feet	27.26 ft/s^2
Stop #10	60.46 mph	150.09 feet	26.20 ft/s^2

AVERAGE DECELERATION RATE 26.30 ft/s^2

Phase II

TEST: Ten 60 – mph impending skid (ABS) maximum deceleration rate stops

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	60.79 mph	158.96 feet	25.00 ft/s^2
Stop #2	60.15 mph	146.26 feet	26.61 ft/s^2
Stop #3	60.72 mph	153.53 feet	25.83 ft/s^2
Stop #4	61.11 mph	152.56 feet	26.33 ft/s^2
Stop #5	60.34 mph	148.69 feet	26.33 ft/s^2
Stop #6	59.85 mph	145.60 feet	26.46 ft/s^2
Stop #7	59.87 mph	148.94 feet	25.89 ft/s^2
Stop #8	60.45 mph	150.19 feet	26.17 ft/s^2
Stop #9	60.44 mph	156.15 feet	25.16 ft/s^2
Stop #10	59.87 mph	147.18 feet	26.20 ft/s^2

AVERAGE DECELERATION RATE 26.00 ft/s^2

Phase III

	Yes/No
Evidence of severe fading?	No
Vehicle stopped in straight line?	Yes
Vehicle stopped within correct lane?	Yes

OVERALL AVERAGE DECEL. RATE: 26.15 ft/s^2

Projected Stopping Distance from 60.0 mph 148.1 feet

BRAKE TESTING

TEST LOCATION: MSP Precision Drive Track **DATE:** September 17, 2010

BEGINNING Time: 10:03 a.m. **TEMPERATURE:** 58.8°F

MAKE & MODEL: Harley-Davidson Electra Glide FLHTP **BRAKE SYSTEM:** Anti-lock

Phase I

TEST: Ten 60 – mph impending skid (ABS) maximum deceleration rate stops

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	60.80 mph	151.01 feet	26.33 ft/s^2
Stop #2	61.60 mph	161.17 feet	25.32 ft/s^2
Stop #3	60.91 mph	151.29 feet	26.38 ft/s^2
Stop #4	59.96 mph	147.09 feet	26.29 ft/s^2
Stop #5	59.54 mph	151.15 feet	25.22 ft/s^2
Stop #6	59.79 mph	160.95 feet	23.89 ft/s^2
Stop #7	59.57 mph	141.43 feet	26.99 ft/s^2
Stop #8	60.72 mph	146.93 feet	26.99 ft/s^2
Stop #9	60.51 mph	150.57 feet	26.15 ft/s^2
Stop #10	59.99 mph	148.34 feet	26.10 ft/s^2

AVERAGE DECELERATION RATE 25.97 ft/s^2

Phase II

TEST: Ten 60 – mph impending skid (ABS) maximum deceleration rate stops

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	59.44 mph	148.83 feet	25.53 ft/s^2
Stop #2	60.24 mph	154.26 feet	25.30 ft/s^2
Stop #3	60.89 mph	162.69 feet	24.51 ft/s^2
Stop #4	60.54 mph	157.35 feet	25.06 ft/s^2
Stop #5	60.23 mph	153.71 feet	25.38 ft/s^2
Stop #6	60.33 mph	152.92 feet	25.60 ft/s^2
Stop #7	60.49 mph	151.37 feet	26.00 ft/s^2
Stop #8	60.16 mph	154.25 feet	25.24 ft/s^2
Stop #9	60.40 mph	150.07 feet	26.15 ft/s^2
Stop #10	60.10 mph	149.14 feet	26.05 ft/s^2

AVERAGE DECELERATION RATE 25.48 ft/s^2

Phase III

	Yes/No
Evidence of severe fading?	No
Vehicle stopped in straight line?	Yes
Vehicle stopped within correct lane?	Yes

OVERALL AVERAGE DECEL. RATE: 25.72 ft/s^2

Projected Stopping Distance from 60.0 mph 150.5 feet

BRAKE TESTING

TEST LOCATION: MSP Precision Drive Track **DATE:** September 17, 2010

BEGINNING Time: 11:29 a.m. **TEMPERATURE:** 62.8°F

MAKE & MODEL: BMW R 1200 RTP **BRAKE SYSTEM:** Anti-lock

Phase I

TEST: Ten 60 – mph impending skid (ABS) maximum deceleration rate stops

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	60.23 mph	141.91 feet	27.50 ft/s^2
Stop #2	60.54 mph	140.18 feet	28.12 ft/s^2
Stop #3	60.08 mph	140.36 feet	27.66 ft/s^2
Stop #4	61.74 mph	148.72 feet	27.57 ft/s^2
Stop #5	59.79 mph	148.99 feet	25.81 ft/s^2
Stop #6	60.34 mph	149.63 feet	26.17 ft/s^2
Stop #7	59.36 mph	144.86 feet	26.16 ft/s^2
Stop #8	60.21 mph	149.44 feet	26.09 ft/s^2
Stop #9	60.74 mph	141.47 feet	28.05 ft/s^2
Stop #10	61.17 mph	146.80 feet	27.41 ft/s^2

AVERAGE DECELERATION RATE 27.05 ft/s^2

Phase II

TEST: Ten 60 – mph impending skid (ABS) maximum deceleration rate stops

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	60.18 mph	146.08 feet	26.67 ft/s^2
Stop #2	60.09 mph	146.70 feet	26.48 ft/s^2
Stop #3	60.03 mph	136.81 feet	28.33 ft/s^2
Stop #4	60.58 mph	146.11 feet	27.02 ft/s^2
Stop #5	60.52 mph	151.28 feet	26.04 ft/s^2
Stop #6	60.19 mph	147.57 feet	26.40 ft/s^2
Stop #7	60.40 mph	148.69 feet	26.39 ft/s^2
Stop #8	60.29 mph	143.65 feet	27.22 ft/s^2
Stop #9	60.73 mph	138.75 feet	28.59 ft/s^2
Stop #10	59.88 mph	135.79 feet	28.40 ft/s^2

AVERAGE DECELERATION RATE 27.15 ft/s^2

Phase III

	Yes/No
Evidence of severe fading?	No
Vehicle stopped in straight line?	Yes
Vehicle stopped within correct lane?	Yes

OVERALL AVERAGE DECEL. RATE: 27.10 ft/s^2

Projected Stopping Distance from 60.0 mph 142.9 feet

BRAKE TESTING

TEST LOCATION: MSP Precision Drive Track **DATE:** September 17, 2010

BEGINNING Time: 10:40 a.m. **TEMPERATURE:** 60.7°F

MAKE & MODEL: Kawasaki Concours **BRAKE SYSTEM:** Anti-lock

Phase I

TEST: Ten 60 – mph impending skid (ABS) maximum deceleration rate stops

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	59.79 mph	137.28 feet	28.01 ft/s^2
Stop #2	60.21 mph	143.21 feet	27.23 ft/s^2
Stop #3	60.69 mph	139.73 feet	28.35 ft/s^2
Stop #4	59.99 mph	143.03 feet	27.06 ft/s^2
Stop #5	59.17 mph	133.50 feet	28.20 ft/s^2
Stop #6	60.68 mph	146.70 feet	26.99 ft/s^2
Stop #7	59.65 mph	139.19 feet	27.50 ft/s^2
Stop #8	60.60 mph	144.49 feet	27.34 ft/s^2
Stop #9	60.49 mph	141.19 feet	27.88 ft/s^2
Stop #10	60.62 mph	143.80 feet	27.49 ft/s^2

AVERAGE DECELERATION RATE 27.60 ft/s^2

Phase II

TEST: Ten 60 – mph impending skid (ABS) maximum deceleration rate stops

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	60.89 mph	146.73 feet	27.18 ft/s^2
Stop #2	60.55 mph	143.25 feet	27.52 ft/s^2
Stop #3	60.12 mph	146.87 feet	26.47 ft/s^2
Stop #4	60.15 mph	138.67 feet	28.06 ft/s^2
Stop #5	59.92 mph	145.83 feet	26.48 ft/s^2
Stop #6	59.70 mph	135.86 feet	28.21 ft/s^2
Stop #7	60.34 mph	147.23 feet	26.60 ft/s^2
Stop #8	59.97 mph	141.14 feet	27.41 ft/s^2
Stop #9	60.52 mph	142.64 feet	27.62 ft/s^2
Stop #10	60.44 mph	142.23 feet	27.62 ft/s^2

AVERAGE DECELERATION RATE 27.32 ft/s^2

Phase III

	Yes/No
Evidence of severe fading?	No
Vehicle stopped in straight line?	Yes
Vehicle stopped within correct lane?	Yes

OVERALL AVERAGE DECEL. RATE: 27.46 ft/s^2

Projected Stopping Distance from 60.0 mph 141.0 feet

COMMUNICATIONS

TEST OBJECTIVE

Rate each test motorcycle's ability to accommodate the required communications and emergency warning equipment and assess the relative difficulty of such installations.

TEST METHODOLOGY

The installation and communications portion of the evaluation will be conducted by personnel from DIT Communications based upon the relative difficulty of the necessary installations. Each factor will be graded on a 1 to 10 scale, with 1 representing "totally unacceptable," 5 representing "average," and 10 representing "superior." The scores will be averaged to minimize personal prejudice for or against any given motorcycle.

	FLHP ROAD KING	FLHTP ELECTRA GLIDE	BMW R1200RTP	KAWASAKI CONCOURS
Dash Access				
Ignition Fuse terminal block	6.67	6.67	6.33	9.00
Radio-Siren Mounting location	8.33	8.67	8.33	9.00
Radio-Installation	7.00	7.00	7.33	8.00
Radio Box Position	7.67	7.67	8.00	8.67
Emergency Lights	7.00	7.00	7.33	6.33
Radio Interference	8.00	8.00	6.00	6.00
Radio Box				
Radio Installation	7.33	8.00	6.33	8.00
Antenna Installation	8.33	8.33	7.67	9.00
Emergency Lights Installation	7.67	7.67	7.33	7.33
Engine Access				
Radio Power Conn.	6.00	6.00	6.67	8.67
Power/Cont.Cable	6.33	6.33	7.00	9.00
Accessibility to Battery	7.33	7.33	8.67	8.67
TOTAL	**87.67**	**88.67**	**86.99**	**97.67**

For Your Information

About the National Institute of Justice

A component of the Office of Justice Programs, NIJ is the research, development and evaluation agency of the U.S. Department of Justice. NIJ's mission is to advance scientific research, development and evaluation to enhance the administration of justice and public safety. NIJ's principal authorities are derived from the Omnibus Crime Control and Safe Streets Act of 1968, as amended (see 42 USC §§ 3721–3723).

The NIJ Director is appointed by the President and confirmed by the Senate. The Director establishes the Institute's objectives, guided by the priorities of the Office of Justice Programs, the U.S. Department of Justice, and the needs of the field. The Institute actively solicits the views of criminal justice and other professionals and researchers to inform its search for the knowledge and tools to guide policy and practice.

Strategic Goals

NIJ has seven strategic goals grouped into three categories:

Creating relevant knowledge and tools

1. Partner with state and local practitioners and policymakers to identify social science research and technology needs.

2. Create scientific, relevant and reliable knowledge — with a particular emphasis on terrorism, violent crime, drugs and crime, cost-effectiveness and community-based efforts — to enhance the administration of justice and public safety.

3. Develop affordable and effective tools and technologies to enhance the administration of justice and public safety.

Dissemination

4. Disseminate relevant knowledge and information to practitioners and policymakers in an understandable, timely and concise manner.

5. Act as an honest broker to identify the information, tools and technologies that respond to the needs of stakeholders.

Agency management

6. Practice fairness and openness in the research and development process.

7. Ensure professionalism, excellence, accountability, cost-effectiveness and integrity in the management and conduct of NIJ activities and programs.

Program Areas

In addressing these strategic challenges, the Institute is involved in the following program areas: crime control and prevention, including policing; drugs and crime; justice systems and offender behavior, including corrections; violence and victimization; communications and information technologies; critical incident response; investigative and forensic sciences, including DNA; less lethal technologies; officer protection; education and training technologies; testing and standards; technology assistance to law enforcement and corrections agencies; field testing of promising programs; and international crime control.

In addition to sponsoring research and development and technology assistance, NIJ evaluates programs, policies and technologies. NIJ communicates its research and evaluation findings through conferences and print and electronic media.

About the Law Enforcement and Corrections Standards and Testing Program

The Law Enforcement and Corrections Standards and Testing Program is sponsored by the Office of Science and Technology of the National Institute of Justice (NIJ), Office of Justice Programs, U.S. Department of Justice. The program responds to the mandate of the Justice System Improvement Act of 1979, which directed NIJ to encourage research and development to improve the criminal justice system and to disseminate the results to federal, state and local agencies.

The Law Enforcement and Corrections Standards and Testing Program is an applied research effort that determines the technological needs of justice system agencies, sets minimum performance standards for specific devices, tests commercially available equipment against those standards, and disseminates the standards and the test results to criminal justice agencies nationwide and internationally.

The program operates through the following:

- The **Law Enforcement and Corrections Technology Advisory Council** (LECTAC), consisting of nationally recognized criminal justice practitioners from federal, state and local agencies, assesses technological needs and sets priorities for research programs and items to be evaluated and tested.

- The **Office of Law Enforcement Standards** (OLES) at the National Institute of Standards and Technology develops voluntary national performance standards for compliance testing to ensure that individual items of equipment are suitable for use by criminal justice agencies. The equipment standards developed by OLES are based on laboratory evaluation of commercially available products in order to devise precise test methods that can be universally applied by any qualified testing laboratory and to establish minimum performance requirements for each attribute of a piece of equipment that is essential to how it functions. OLES-developed standards can serve as design criteria for manufacturers or as the basis for equipment evaluation. The application of the standards, which are highly technical in nature, is augmented through the publication of equipment performance reports and user guides. Individual jurisdictions may use the standards in their own laboratories to test equipment, have equipment tested on their behalf using the standards, or cite the standards in procurement specifications.

- The **National Law Enforcement and Corrections Technology Center** (NLECTC)-National, operated by a grantee, supervises a national compliance testing program conducted by independent laboratories. The standards developed by OLES serve as performance benchmarks against which commercial equipment is measured. In addition, NIJ has begun a new process for developing some standards using Special Technical Committees (STCs), which include practitioners, scientists and subject matter experts. OLES participates in the STC process. The facilities, personnel and testing capabilities of the independent laboratories are evaluated by OLES prior to testing each item of equipment. In addition, OLES helps NLECTC staff review and analyze data. Test results are published in consumer product reports designed to help justice system procurement officials make informed purchasing decisions.

Publications are available at no charge through NLECTC. Some documents are also available online through the Justice Technology Information Network (JUSTNET), the center's World Wide Web site. To request a document or additional information, call (800) 248-2742 or (301) 519-5069 or write:

National Law Enforcement and Corrections Technology Center-National
2277 Research Boulevard
Mail Stop 8J
Rockville, MD 20850
E-mail: asknlectc@nlectc.org
World Wide Web address: http://www.justnet.org

About the National Law Enforcement and Corrections Technology Center System

The National Law Enforcement and Corrections Technology Center (NLECTC) system recently completed a reorganization that will better enable the system to carry out its critical mission to assist state, major city and county, rural, tribal and border, as well as federal law enforcement, corrections and other criminal justice agencies in addressing their technology needs and challenges. Originally created in 1994 as a program of the National Institute of Justice's (NIJ's) Office of Science and Technology, the NLECTC system has realigned its outreach efforts into three new centers: the States, Major Cities and Counties Regional Center; the Small, Rural, Tribal and Border Regional Center; and the Alaska Regional Center.

The States, Major Cities and Counties Regional Center offers a resource and outreach mechanism for state, major city and county criminal justice system partners, with a mission of ensuring that larger criminal justice agencies (those having 50 or more sworn personnel) have unbiased access to a full range of relevant scientific and technology-related information. The Small, Rural, Tribal and Border Regional Center publicizes its programs and services to small, rural, tribal and border agencies across the country. The Alaska Regional Center serves as a conduit for agencies in Alaska.

The efforts of these centers complement those of NLECTC-National, which coordinates NIJ's Compliance Testing program and standards development efforts for a variety of equipment used in the public safety arena, and the Centers of Excellence (CoEs), which support NIJ's research, development, testing and evaluation (RDT&E) efforts in specific portfolio areas. The CoEs focus on the following topic areas: Communications Technologies; Electronic Crime Technology; Forensics Technology; Information and Sensor Systems; and Weapons and Protective Systems. The National Institute of Standards and Technology's Office of Law Enforcement Standards provides scientific and research support to these efforts.

As a whole, the NLECTC system provides:

- Scientific and technical support to NIJ's RDT&E projects.
- Support for the transfer and adoption of technology into practice by law enforcement and corrections agencies, courts and crime laboratories.
- Assistance in developing and disseminating equipment performance standards and technology guides.
- Assistance in the demonstration, testing and evaluation of criminal justice tools and technologies.
- Technology information and general and specialized technology assistance.
- Assistance in setting NIJ's research agenda by convening practitioner-based advisory groups to help identify criminal justice technology needs and gaps.

The NLECTC system supports NIJ's RDT&E process and goal of setting research priorities based on practitioner needs by sponsoring a series of Technology Working Groups and Constituent Advisory Groups, who provide input to the Law Enforcement and Corrections Technology Advisory Council. Together, these groups form a bridge between the criminal justice community and the NIJ Office of Science and Technology.

For more information, call (800) 248-2742, e-mail asknlectc@nlectc.org or visit http://www.justnet.org.

About the Office of Law Enforcement Standards

The Office of Law Enforcement Standards (OLES) was established as a matrix management organization in 1971 through a Memorandum of Understanding between the U.S. Departments of Justice and Commerce based on the recommendations of the President's Commission on Crime. OLES' mission is to apply science and technology to the needs of the criminal justice community, including law enforcement, corrections, forensic science and the fire service. While its major objective is to develop minimum performance standards, which are promulgated as voluntary national standards, OLES also undertakes studies leading to the publication of technical reports and user guides.

The areas of research investigated by OLES include clothing, communication systems, emergency equipment, investigative aids, protective equipment, security systems, vehicles, weapons, and analytical techniques and standard reference materials used by the forensic science community. The composition of OLES' projects varies depending on priorities of the criminal justice community at any given time and, as necessary, draws on the resources of the National Institute of Standards and Technology.

OLES assists law enforcement and criminal justice agencies in acquiring, on a cost-effective basis, the high-quality resources they need to do their jobs. To accomplish this, OLES:

- Develops methods for testing equipment performance and examining evidentiary materials.
- Develops standards for equipment and operating procedures.
- Develops standard reference materials.
- Performs other scientific and engineering research as required.

Since the program began in 1971, OLES has coordinated the development of standards, user guides and advisory reports on topics that range from performance parameters of police patrol vehicles, to performance reports on various speed-measuring devices, to soft body armor testing, to analytical procedures for developing DNA profiles.

The application of technology to enhance the efficiency and effectiveness of the criminal justice community continues to increase. The proper adoption of the products resulting from emerging technologies and the assessment of equipment performance, systems, methodologies, etc., used by criminal justice practitioners constitute critical issues having safety and legal ramifications. The consequences of inadequate equipment performance or inadequate test methods can range from inconvenient to catastrophic. In addition, these deficiencies can adversely affect the general population when they increase public safety costs, preclude arrest or result in evidence found to be inadmissible in court.

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