

2011

Police Vehicle Tire Evaluation



**State of Michigan
Department of State Police
and
Department of Technology,
Management and Budget**

**2011 Police Vehicle
Tire Evaluation**

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Michigan State Police Vehicle Test Team

Lt. Keith Wilson.
Sgt. James Flegel.
Sgt. Ronald Gromak.
Sgt. Matthew Rogers.

Introduction

It is the privilege of the Michigan State Police (MSP) to provide the law enforcement community with results of the 2011 Police Tire Evaluation. The project, conducted in June 2011, provides law enforcement agencies across North America with information to assist them in making informed decisions regarding replacement tires.

Using recommendations from automotive engineers within Chrysler, General Motors and Ford in addition to Internet research, we developed a list of tire manufacturers. We contacted each tire manufacturer and offered the opportunity to participate in the evaluation.

Only Goodyear, Firestone and Pirelli manufacture tires used by auto manufacturers for full service police vehicle applications. The manufacturers of the three additional brands tested during this evaluation state their tires are suitable for police vehicle applications. However, they do not conduct police-specific durability testing.

Tire manufacturers included in this evaluation:

Goodyear.
Firestone.
Cooper.
Nokian.
Nitto.
Pirelli.

All tires used in this evaluation were purchased from a retail tire store to ensure each model was an actual production version. Goodyear, Firestone, Pirelli and Nitto categorized their entries as “High Performance All Season” tires, Nokian labels its model as an “All Weather Plus” tire and the Cooper tire is a “Premium Luxury Touring” tire.

When considering replacements, it is important to purchase tires the same size and speed rating as the original equipment tire. Tire size information can be found on the driver’s door placard. Speed ratings are not part of the door placard information.

Test Overview

To minimize variables in testing, all vehicles began each candidate tire test with new OE brake pads, and rotors and tires were inflated to the manufacturer's recommended pressure (per door placard). Candidate tires were photographed and tread depth was measured.

The tire testing program was a 12-stage process conducted at the MSP Precision Driving Facility in Lansing, Mich. The tire testing program was conducted using a series of whole vehicle tests to assess straight line stopping distance, maximum lateral acceleration in a steady state turn, wet jennite stopping distance and braking in a turn on wet asphalt.

The tires were tested in both a new tire condition and worn tire condition after 100 laps around a one-mile road course simulating pursuit or emergency driving conditions. All vehicle tests were also conducted with the original equipment (OE) tires for comparison purposes. A Ford CVPI with new tires was used as a "control vehicle" for the purpose of monitoring any changes in the test surfaces over the course of the two-week testing program.

The dry asphalt stopping distance testing evaluates the compatibility of various replacement tires offered for police service with each vehicle's brake and chassis control systems. Likewise, the wet jennite stopping distance tests simulate the compatibility of the replacement tires in lower coefficient road conditions. The braking-in-a-turn (BIT) testing on wet asphalt provides the basis for evaluating the compatibility of the various replacement tires with the vehicle chassis control systems including anti-lock brake system (ABS) and stability control.

Finally, the steady-state turning testing addresses the lateral adhesion and stability of the vehicles fitted with the various replacement tires being offered for police service. This same set of testing protocols was also conducted on the tires after 100 laps of simulated pursuit or emergency driving to evaluate these same tires in a worn condition.

Thus, this testing protocol permits comparative assessments of various replacement tires offered for police service in each vehicle configuration evaluated, and also permits similar assessments of these same tires in a new vs. worn condition. Therefore, relevant comparisons of performance between tires offered for the same vehicle will be addressed. In addition, comparisons of performance of the same tire in a new vs. worn condition were compiled to assess the significance of this aspect of tire performance.

Measurements of tire wear at each vehicle wheel position were also quantified. Although not specifically relevant to 'normal' tire wear life estimates, a directly comparable measure of tire wear by tire position and vehicle model was compiled from the testing program results.

Test Equipment

The following test equipment was used during Stage 2 of the testing.

KISTLER-CORRSYS DATRON SENSOR SYSTEMS, INC., 40000 Grand River, Ste. 503, Novi, MI 48375

DLS Smart Sensor – Optical noncontact speed and distance sensor.

Correxit S-350 2 Axis Optical Sensor.

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

Law Enforcement Helmet – Model RJ-Air LE.

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

AMB TranX extended loop decoder.

Mains adapter 230 V AC/12 V DC.

AMB TranX260 transponders.

PYROMETER

Raytek, hand-held optical pyrometer, Model Raymx2U.

Photographs Arranged By Manufacturer

Cooper CS4

Vehicle Platforms Tested

Ford CVPI, Chevrolet Impala, Dodge Charger



Firestone Firehawk GT Pursuit

Vehicle Platforms Tested

Dodge Charger, Ford CVPI, Chevrolet Tahoe



Nitto NT 850

Vehicle Platforms Tested

Chevrolet Caprice



Nokian WR G2

Vehicle Platforms Tested

Chevrolet Caprice, Chevrolet Impala, Ford CVPI



Pirelli Pzero Nero

Vehicle Platforms Tested

Ford CVPI



Pirelli P6

Vehicle Platforms Tested

Chevrolet Impala



Tire Test Summaries By Vehicle Platform

Tire Summary

Vehicle: 2011 Chevrolet Caprice
Tire Manufacturer: Goodyear
Tire Model / Size: Eagle RSA
P235/50R18

Average Stopping Distances (SD)

	<u>New Tires</u>	<u>Worn Tires</u>
<u>Dry Asphalt</u>	135.94	143.21
SD feet 60-0 mph	1.44	2.23
Standard Deviation		
 <u>Wet Jennite</u>	 99.16	 105.29
SD feet 35-0 mph	3.1	4.52
Standard Deviation		
 <u>Wet Asphalt Braking In Turn</u>	 72.28	 76
SD feet 40-0 mph	3.21	4.76
Standard Deviation		

Steady State Turn

Maximum Lateral Acceleration (g)	clockwise	1.05	0.93
<i>with</i> Electronic Stability Control	counter clockwise	0.97	0.99
	Average	1.01	0.96
 Maximum Lateral Acceleration (g)	 clockwise	 0.91	 0.93
<i>without</i> Electronic Stability Control	counter clockwise	1.05	1.01
	Average	0.98	0.97

Wear Sequence Lap Times

		<u>1st 50</u>	
		<u>Laps</u>	
Counter Clockwise	Average, seconds	62.37	
	Standard Deviation	0.34	
		 <u>2nd 50</u>	
		<u>Laps</u>	
Clockwise	Average, seconds	62.69	
	Standard Deviation	0.25	

Percentage of Tread Consumed During Testing

Average wear by tire position	LF	27.27%	
	RF	32.39%	
	LR	31.82%	
	RR	30.68%	

Goodyear Eagle RSA

Chevrolet Caprice

Tire showing greatest wear-RF



Tire Summary

Vehicle: 2011 Chevrolet Caprice

Tire Manufacturer: Nitto

Tire Model / Size: NT850 Plus 372-120

Average Stopping Distances (SD)

	<u>New Tires</u>	<u>Worn Tires</u>
<u>Dry Asphalt</u>		
SD feet 60-0 mph	126.33	131.03
Standard Deviation	0.96	1.4
<u>Wet Jennite</u>		
SD feet 35-0 mph	88.68	107.22
Standard Deviation	13.16	3.14
<u>Wet Asphalt Braking In Turn</u>		
SD feet 40-0 mph	74.06	77.10
Standard Deviation	7.92	5.24

Steady State Turn

Maximum Lateral Acceleration (g) <i>with</i> Electronic Stability Control	clockwise	0.89	1.01
	counter clockwise	0.85	0.96
	Average	0.87	0.985
Maximum Lateral Acceleration (g) <i>without</i> Electronic Stability Control	clockwise	0.88	1.01
	counter clockwise	0.86	0.91
	Average	0.87	0.96

Wear Sequence Lap Times

Counter Clockwise		<u>1st 50</u>	
	Average, seconds	<u>Laps</u>	63.38
	Standard Deviation		0.44
Clockwise		<u>2nd 50</u>	
	Average, seconds	<u>Laps</u>	62.52
	Standard Deviation		0.67

Percentage of Tread Consumed During Testing

Average wear by tire position	LF	57.66%	
	RF	71.49%	
	LR	55.57%	
	RR	68.02%	

Nitto NT850 Plus

Chevrolet Caprice

Tire showing greatest wear-RF



Tire Summary

Vehicle: 2011 Chevrolet Caprice

Tire Manufacturer: Nokian

Tire Model / Size: WRG2 235/50R18

Average Stopping Distances (SD)

	<u>New Tires</u>	<u>Worn Tires</u>
<u>Dry Asphalt</u>		
SD feet 60-0 mph	148.64	139.65
Standard Deviation	1.92	1.26
<u>Wet Jennite</u>		
SD feet 35-0 mph	96.06	112.79
Standard Deviation	2.14	3.13
<u>Wet Asphalt Braking In Turn</u>		
SD feet 40-0 mph	70.24	74.35
Standard Deviation	4.58	2.27

Steady State Turn

Maximum Lateral Acceleration (g) <i>with</i> Electronic Stability Control	clockwise	0.97	0.85
	counter clockwise	1.02	0.091
	Average	1.00	0.88
Maximum Lateral Acceleration (g) <i>without</i> Electronic Stability Control	clockwise	1.00	0.96
	counter clockwise	0.94	0.93
	Average	0.97	0.95

Wear Sequence Lap Times

Counter Clockwise	Average, seconds	<u>1st 50 Laps</u>
	Standard Deviation	61.86
		0.37
Clockwise	Average, seconds	<u>2nd 50 Laps</u>
	Standard Deviation	61.01
		0.51

Percentage of Tread Consumed During Testing

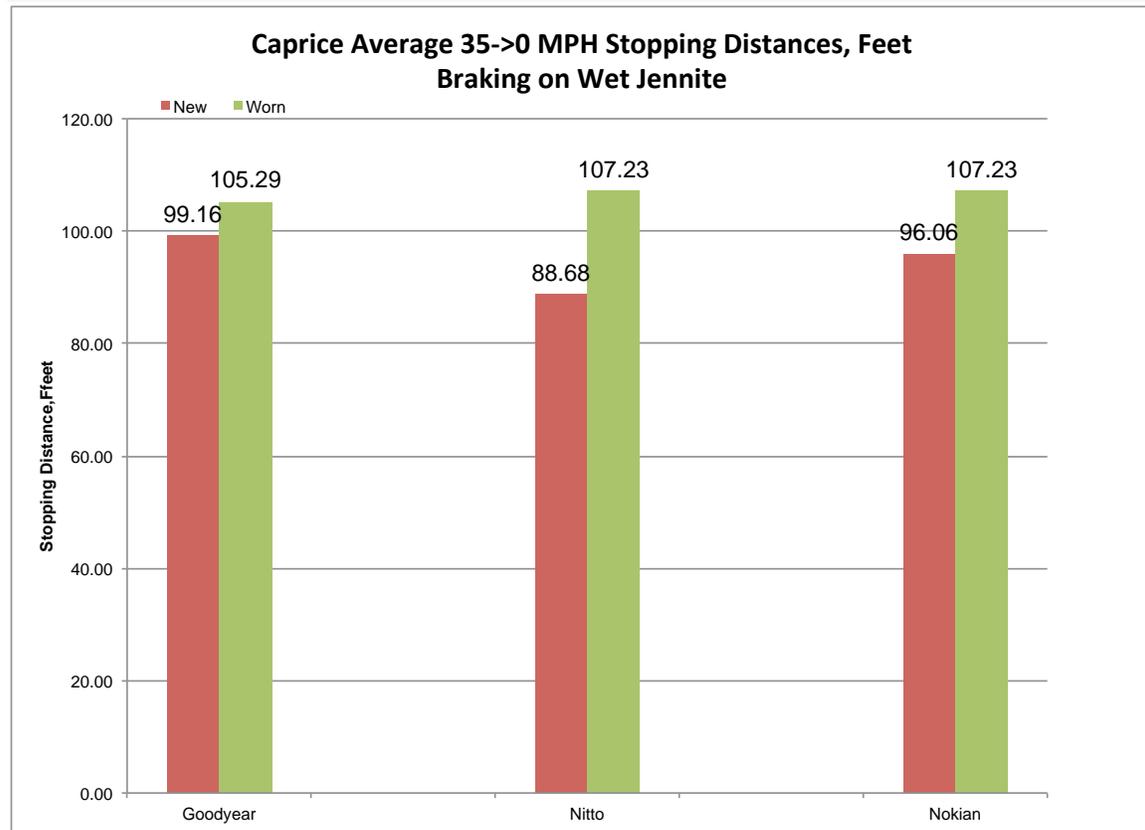
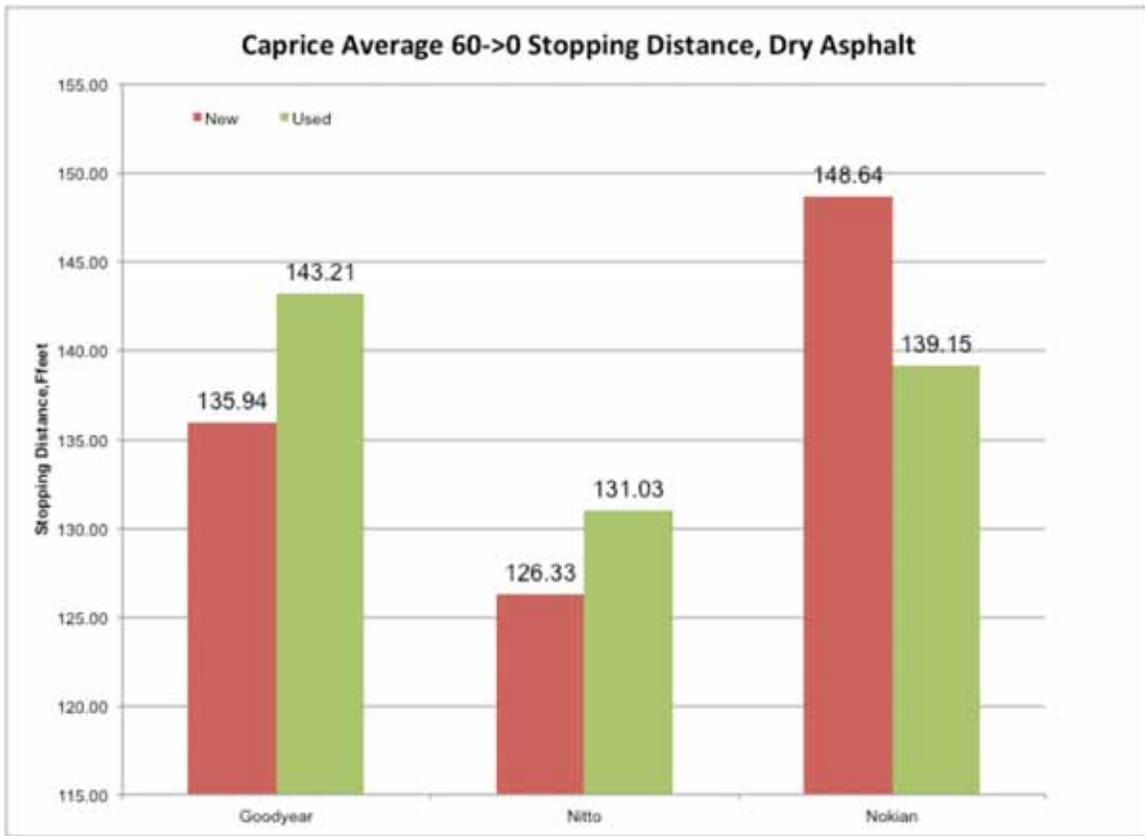
Average wear by tire position	LF	38.07%
	RF	36.08%
	LR	44.60%
	RR	42.90%

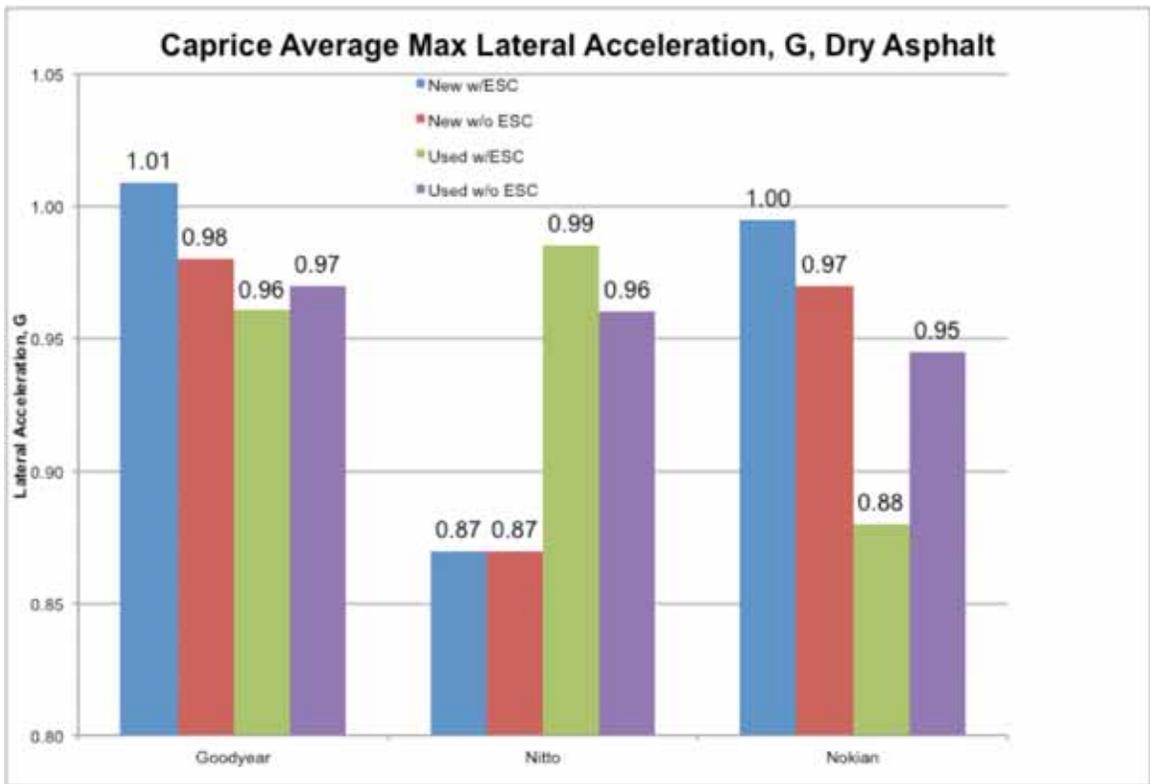
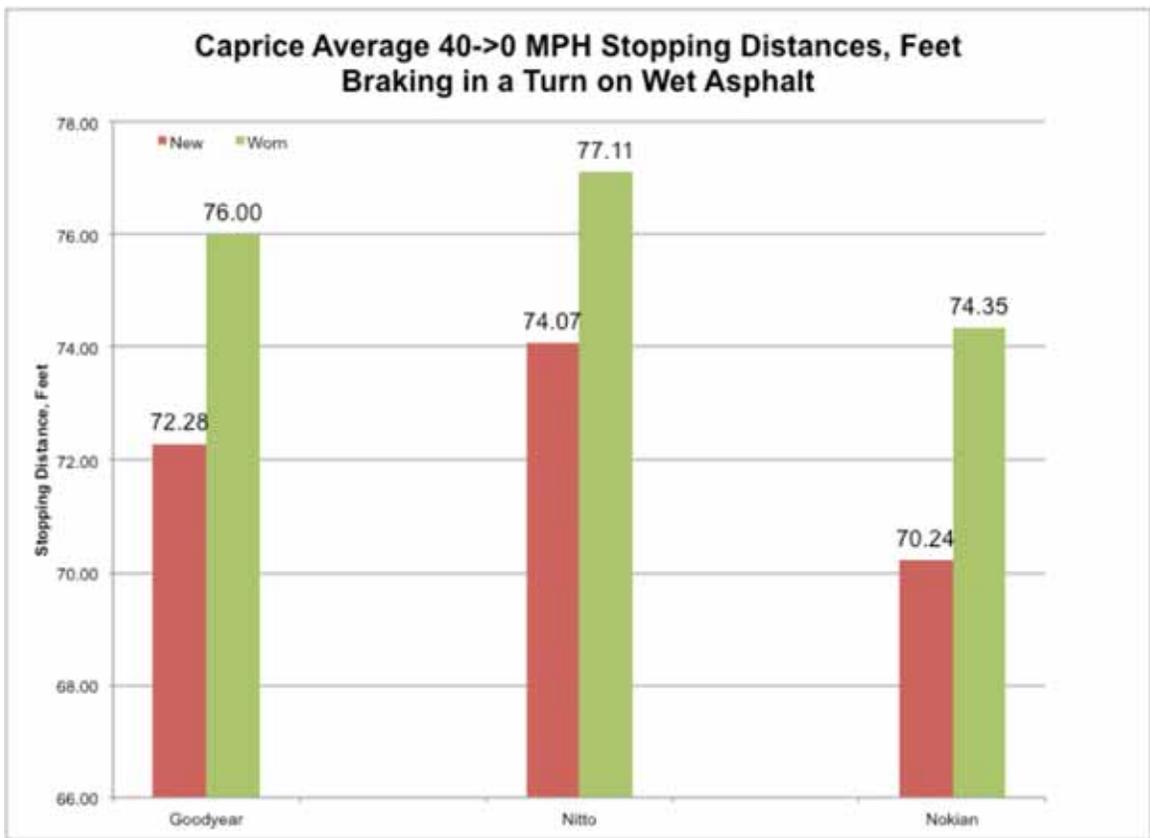
Nokian WRG2

Chevrolet Caprice

Tire showing greatest wear-LR







Tire Summary

Vehicle: 2010 Dodge Charger

Tire Manufacturer: Cooper

Tire Model / Size: CS4 225/60R18

Unable to complete test due to excess tire wear

Average Stopping Distances (SD)

	<u>New Tires</u>	<u>Worn Tires</u>
<u>Dry Asphalt</u>		
SD feet 60-0 mph	135.78	
Standard Deviation	1.09	
<u>Wet Jennite</u>		
SD feet 35-0 mph	91.21	
Standard Deviation	6.67	
<u>Wet Asphalt Braking In Turn</u>		
SD feet 40-0 mph	79.61	
Standard Deviation	9.27	

Steady State Turn

Maximum Lateral Acceleration (g)	clockwise	0.83
<i>with</i> Electronic Stability Control	counter clockwise	0.88
	Average	0.855
Maximum Lateral Acceleration (g)	clockwise	
<i>without</i> Electronic Stability Control	counter clockwise	
	Average	

Wear Sequence Lap Times

		<u>1st 50 Laps</u>
Counter Clockwise	Average, seconds	
	Standard Deviation	
		<u>2nd 50 Laps</u>
Clockwise	Average, seconds	
	Standard Deviation	

Percentage of Tread Consumed During Testing

Average wear by tire position	LF
	RF
	LR
	RR

Cooper CS4

Dodge Charger

Tire showing greatest wear-RR



Tire Summary

Vehicle: 2010 Dodge Charger
Tire Manufacturer: Firestone
Tire Model / Size: Firehawk GT Pursuit
226/60R18

Average Stopping Distances (SD)

	<u>New Tires</u>	<u>Worn Tires</u>
<u>Dry Asphalt</u>		
SD feet 60-0 mph	139.35	150.48
Standard Deviation	0.92	2.14

<u>Wet Jennite</u>		
SD feet 35-0 mph	94.67	118.16
Standard Deviation	5.26	5.21

<u>Wet Asphalt Braking In Turn</u>		
SD feet 40-0 mph	80.37	86.79
Standard Deviation	9.12	8.1

Steady State Turn

Maximum Lateral Acceleration (g)	clockwise	1.05	0.97
<i>with</i> Electronic Stability Control	counter clockwise	0.99	0.95
	Average		

Maximum Lateral Acceleration (g)	clockwise	0.94	1.05
<i>without</i> Electronic Stability Control	counter clockwise	0.99	1.03
	Average		

Wear Sequence Lap Times

		<u>1st 50 Laps</u>
Counter Clockwise	Average, seconds	63.42
	Standard Deviation	0.53

		<u>2nd 50 Laps</u>
Clockwise	Average, seconds	62.44
	Standard Deviation	0.31

Percentage of Tread Consumed During Testing

Average wear by tire position	LF	63.47%
	RF	56.49%
	LR	53.08%
	RR	72.71%

Firestone Firehawk GT Pursuit

Dodge Charger

Tire showing greatest wear-RR



Tire Summary

Vehicle: 2010 Dodge Charger

Tire Manufacturer: Goodyear

Tire Model / Size: Eagle RSA

226/60R18

Average Stopping Distances (SD)

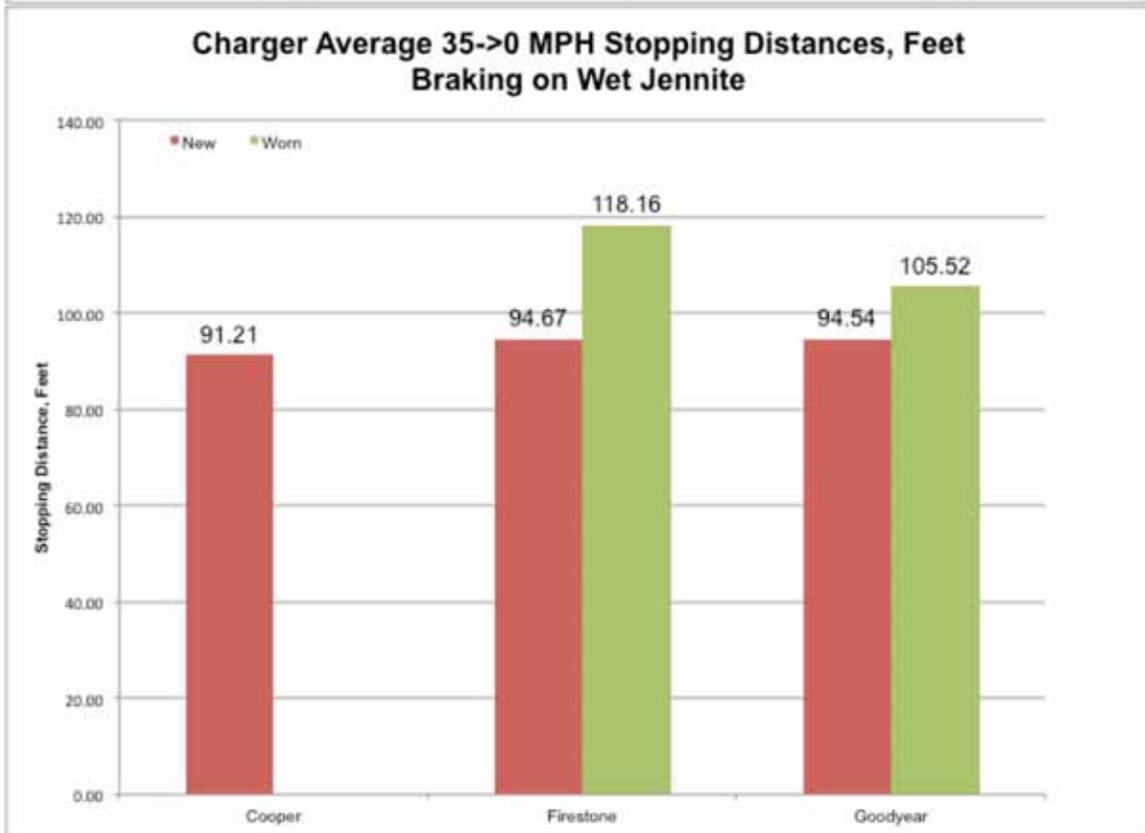
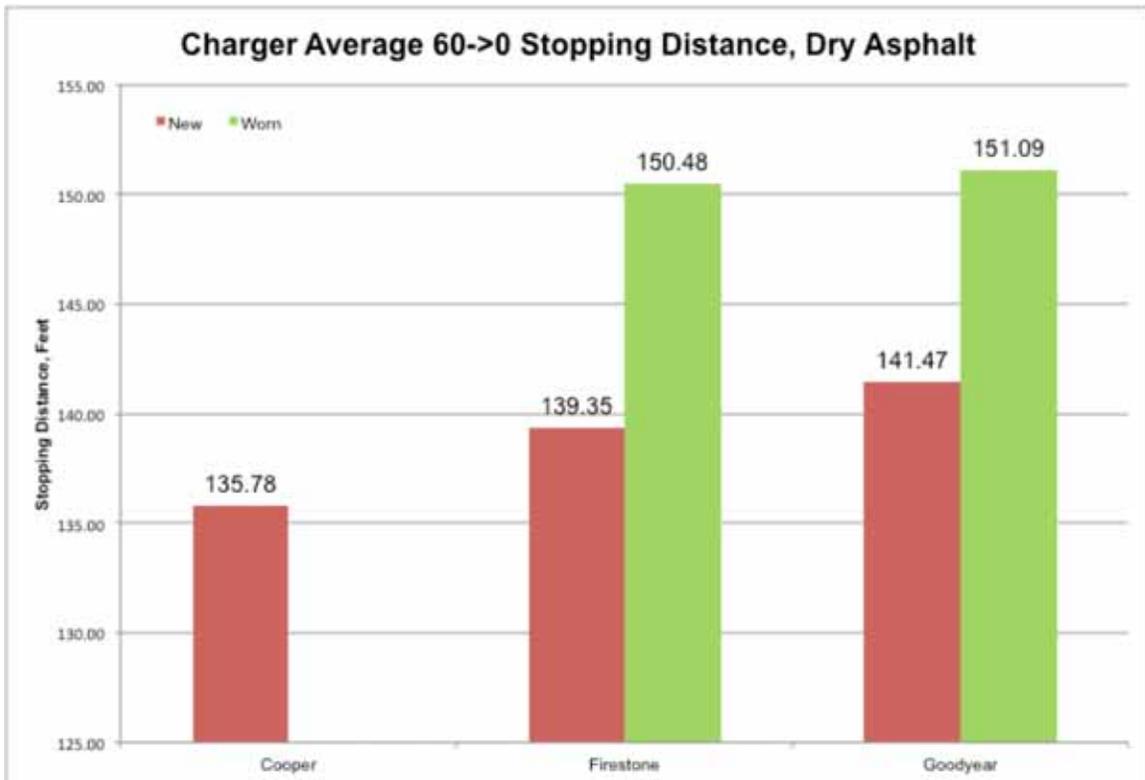
		<u>New Tires</u>	<u>Worn Tires</u>
<u>Dry Asphalt</u>			
SD feet 60-0 mph		141.47	151.09
Standard Deviation		1.51	2.35
<u>Wet Jennite</u>			
SD feet 35-0 mph		94.54	105.52
Standard Deviation		2.03	2.43
<u>Wet Asphalt Braking In Turn</u>			
SD feet 40-0 mph		82.93	84.47
Standard Deviation		8.67	4.15
<u>Steady State Turn</u>			
Maximum Lateral Acceleration (g)	clockwise	0.94	0.99
<i>with</i> Electronic Stability Control	counter clockwise	0.96	0.89
	Average		
Maximum Lateral Acceleration (g)	clockwise	0.89	0.92
<i>without</i> Electronic Stability Control	counter clockwise	0.99	0.93
	Average		
		<u>1st 50</u>	
<u>Wear Sequence Lap Times</u>		<u>Laps</u>	
Counter Clockwise	Average, seconds	62.4	
	Standard Deviation	0.44	
		<u>2nd 50</u>	
		<u>Laps</u>	
Clockwise	Average, seconds	61.94	
	Standard Deviation	0.28	
<u>Percentage of Tread Consumed During Testing</u>			
Average wear by tire position	LF	29.03%	
	RF	29.96%	
	LR	21.36%	
	RR	24.38%	

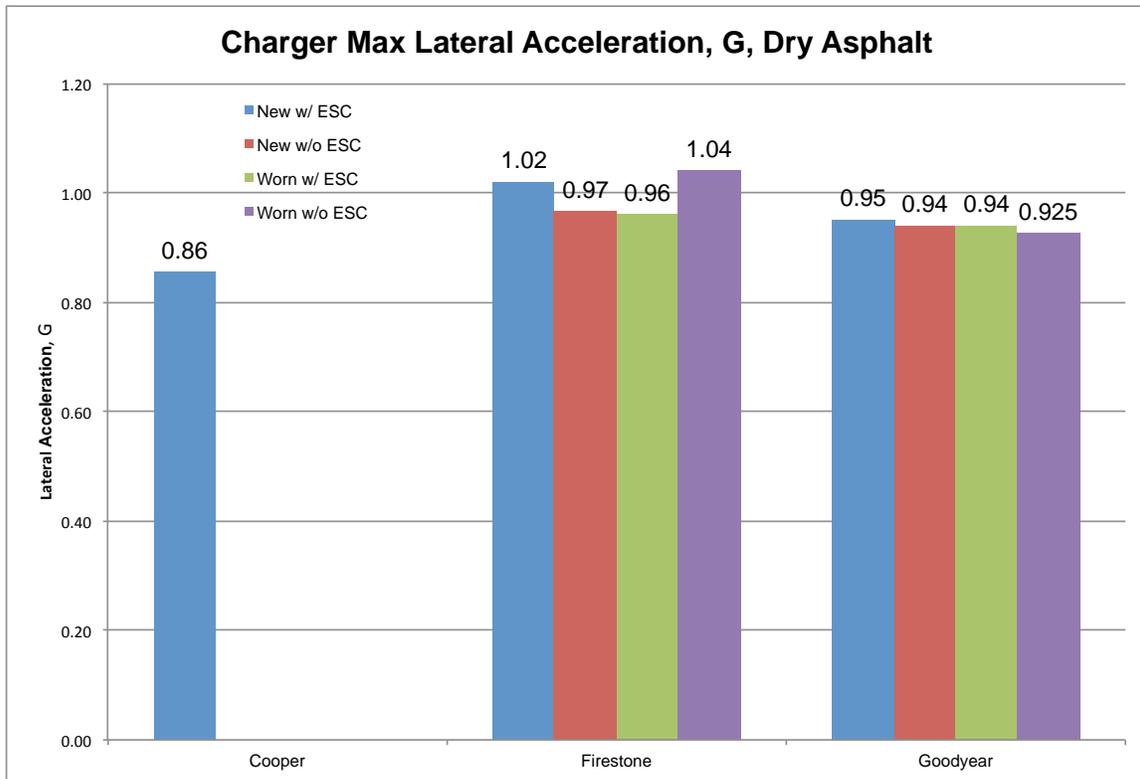
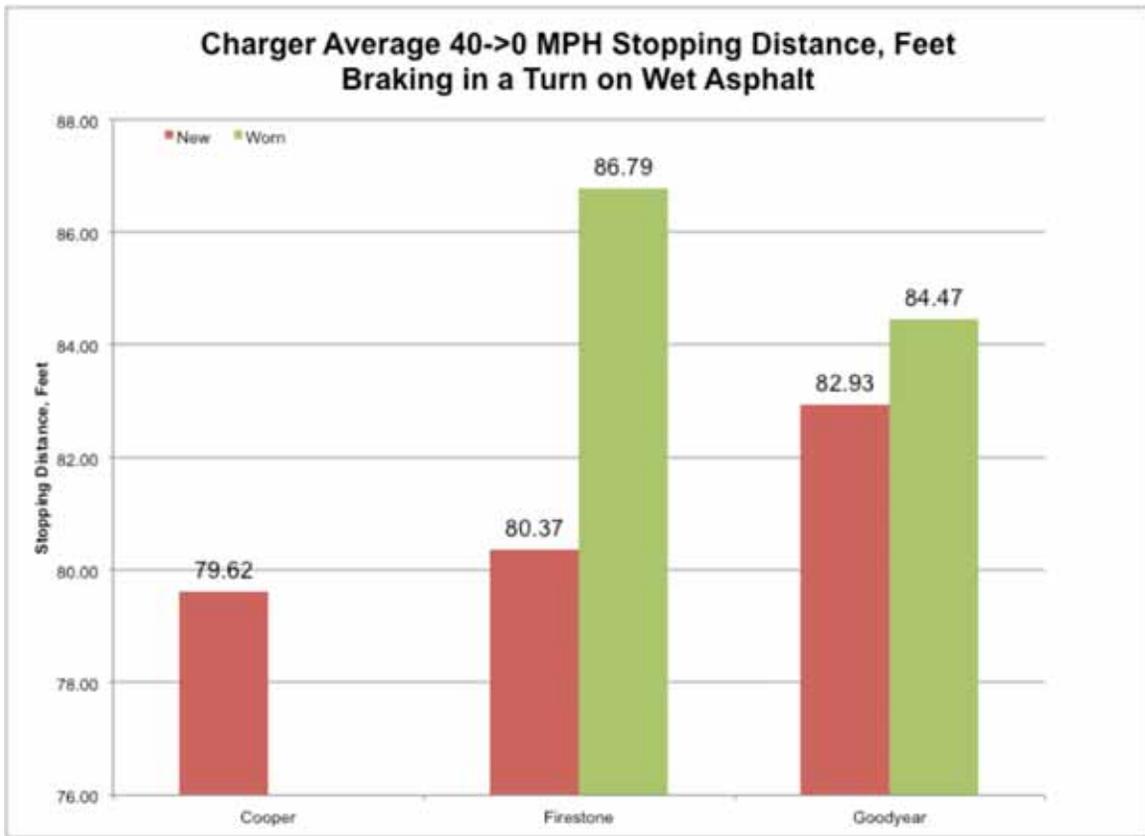
Goodyear Eagle RSA

Dodge Charger

Tire showing greatest wear-RF







Tire Summary

Vehicle: 2010 Chevrolet Tahoe
Tire Manufacturer: Firestone
Tire Model / Size: Firehawk GT Pursuit
265/60R17

Average Stopping Distances (SD)

	New Tires	Worn Tires
<u>Dry Asphalt</u>		
SD feet 60-0 mph	133.84	146.79
Standard Deviation	1.36	3.16

<u>Wet Jennite</u>		
SD feet 35-0 mph	96.84	113.33
Standard Deviation	10.26	7.96

<u>Wet Asphalt Braking In Turn</u>		
SD feet 40-0 mph	73.74	86.73
Standard Deviation	5.51	10.25

Steady State Turn

Maximum Lateral Acceleration (g)	clockwise	0.87	0.85
<i>with</i> Electronic Stability Control	counter clockwise	0.85	0.86
	Average	0.86	0.855

Maximum Lateral Acceleration (g)	clockwise	0.92	0.84
<i>without</i> Electronic Stability Control	counter clockwise	1.04	0.89
	Average	0.98	0.865

Wear Sequence Lap Times

		1st 50 Laps
Counter Clockwise	Average, seconds	68.35
	Standard Deviation	0.36

		2nd 50 Laps
Clockwise	Average, seconds	68.5
	Standard Deviation	0.88

Percentage of Tread Consumed During Testing

Average wear by tire position	LF	25.65%
	RF	21.48%
	LR	19.79%
	RR	35.90%

Firestone Firehawk GT Pursuit

Chevrolet Tahoe

Tire showing greatest wear-RR



Tire Summary

Vehicle: 2010 Chevrolet Tahoe

Tire Manufacturer: Goodyear

**Tire Model / Size: Eagle RSA
265/60/R17**

Unable to complete test due to excess tire wear

Average Stopping Distances (SD)

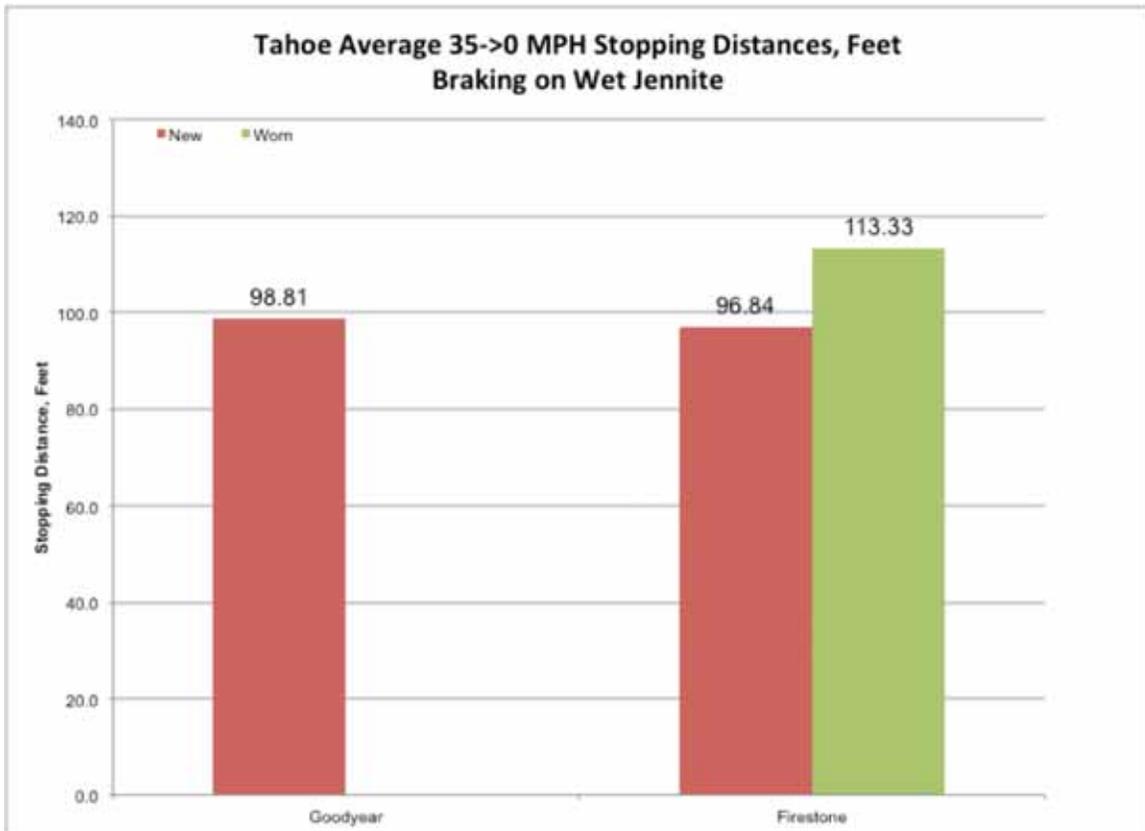
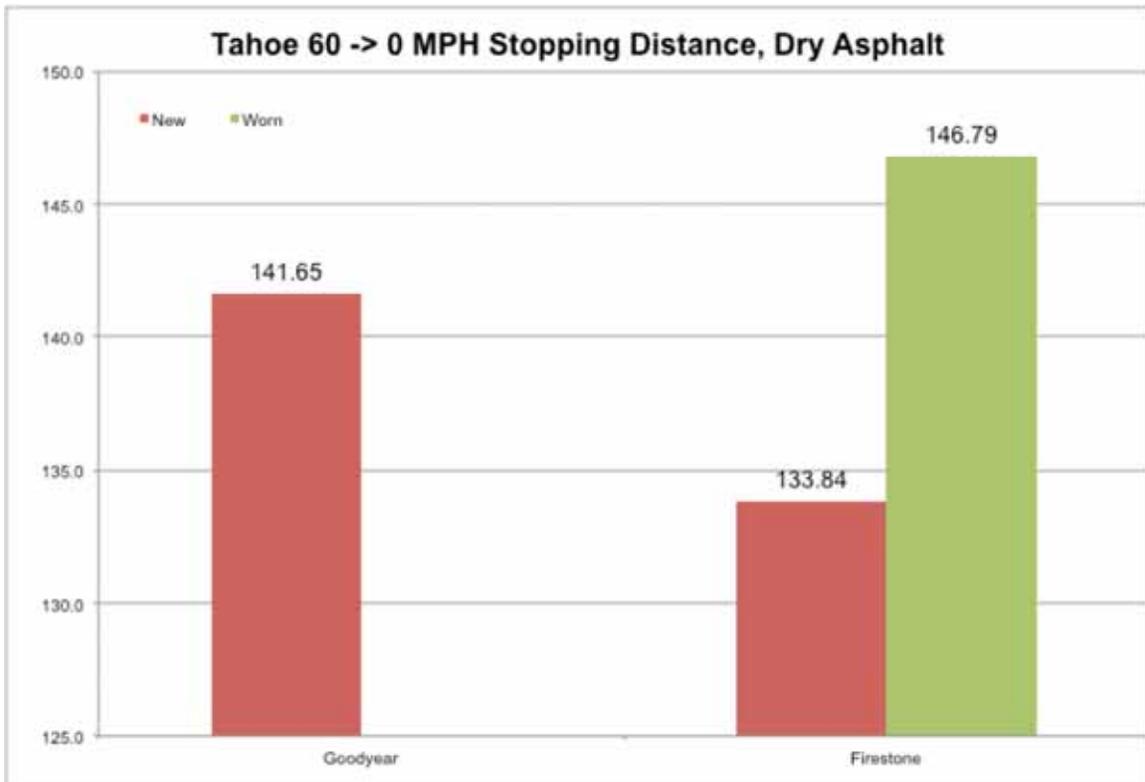
		<u>New Tires</u>	<u>Worn Tires</u>
<u>Dry Asphalt</u>			
SD feet 60-0 mph		141.65	
Standard Deviation		1.12	
<u>Wet Jennite</u>			
SD feet 35-0 mph		98.81	
Standard Deviation		3.29	
<u>Wet Asphalt Braking In Turn</u>			
SD feet 40-0 mph		82.07	
Standard Deviation		4.13	
<u>Steady State Turn</u>			
Maximum Lateral Acceleration (g)	clockwise	0.88	
<i>with</i> Electronic Stability Control	counter clockwise	0.95	
	Average		
Maximum Lateral Acceleration (g)	clockwise	0.90	
<i>without</i> Electronic Stability Control	counter clockwise	0.99	
	Average		
		<u>1st 50</u>	
		<u>Laps</u>	
<u>Wear Sequence Lap Times</u>	Average, seconds	67.04	
Counter Clockwise	Standard Deviation	0.41	
		<u>2nd 50</u>	
		<u>Laps</u>	
Clockwise	Average, seconds	66.30	
	Standard Deviation	0.38	
<u>Percentage of Tread Consumed During Testing</u>			
Average wear by tire position	LF	46.11%	
	RF	39.41%	
	LR	35.65%	
	RR	26.68%	

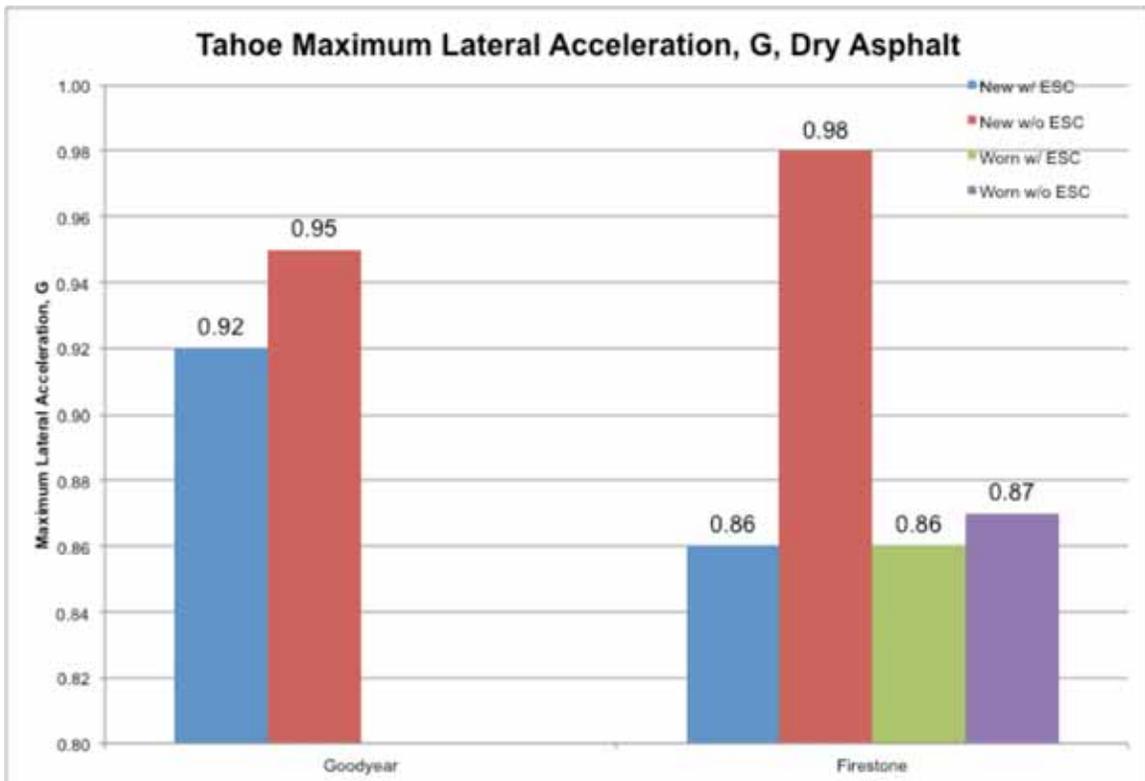
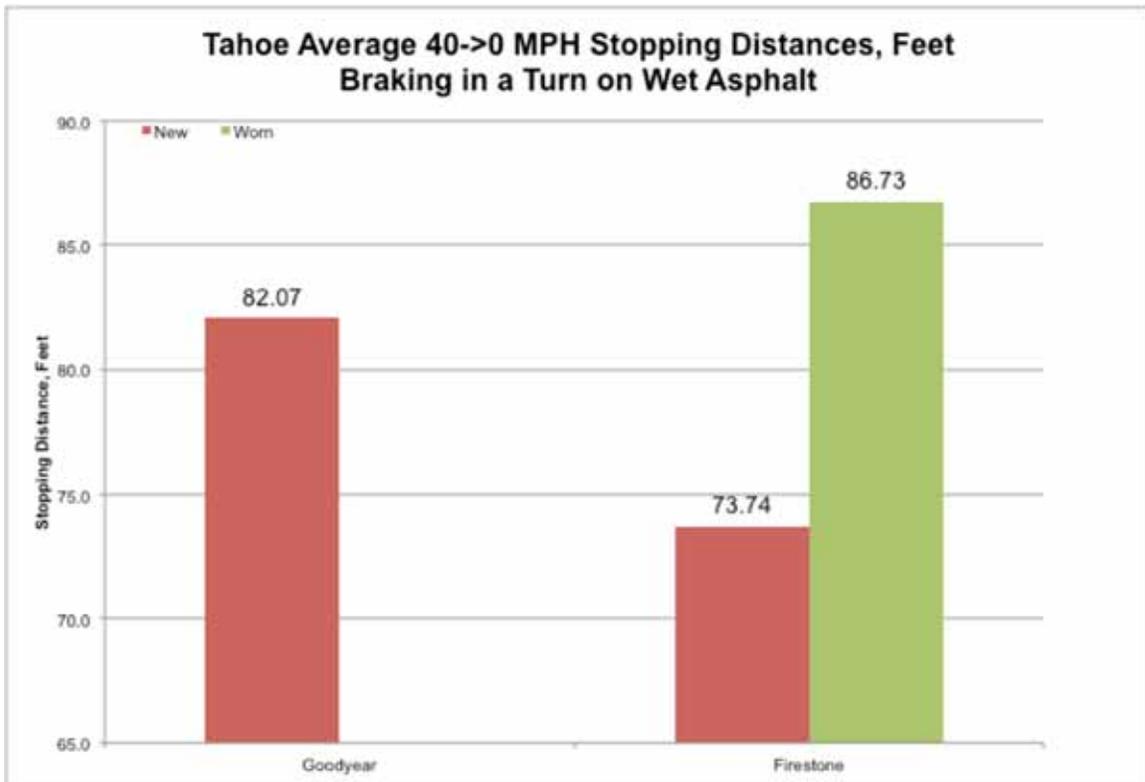
Goodyear Eagle RSA

Chevrolet Tahoe

Tire showing greatest wear-LF







Tire Summary

Vehicle: 2010 Chevrolet Impala

Tire Manufacturer: Goodyear

Tire Model / Size: Eagle RSA

225/60R18

Average Stopping Distances (SD)

		<u>New Tires</u>	<u>Worn Tires</u>
<u>Dry Asphalt</u>			
SD feet 60-0 mph		158.48	155.81
Standard Deviation		3.18	2.04
<u>Wet Jennite</u>			
SD feet 35-0 mph		105.44	109.97
Standard Deviation		7.22	6.03
<u>Wet Asphalt Braking In Turn</u>			
SD feet 40-0 mph		84.97	88.24
Standard Deviation		5.74	11.84
<u>Steady State Turn</u>			
Maximum Lateral Acceleration (g)	clockwise	N/A	N/A
<i>with</i> Electronic Stability Control	counter clockwise		
	Average		
Maximum Lateral Acceleration (g)	clockwise	0.96	1.02
<i>without</i> Electronic Stability Control	counter clockwise	0.98	1.06
	Average	0.97	1.04
<u>Wear Sequence Lap Times</u>			
		<u>1st 50</u>	
		<u>Laps</u>	
Counter Clockwise	Average, seconds	65.25	
	Standard Deviation	0.29	
		<u>2nd 50</u>	
		<u>Laps</u>	
Clockwise	Average, seconds	65.19	
	Standard Deviation	0.54	
<u>Percentage of Tread Consumed During Testing</u>			
Average wear by tire position	LF	68.76%	
	RF	62.67%	
	LR	7.92%	
	RR	10.81%	

Goodyear Eagle RSA

Chevrolet Impala

Tire showing greatest wear-LF



Tire Summary

Vehicle: 2010 Chevrolet Impala

Tire Manufacturer: Pirelli

Tire Model / Size: P6 4 Season

225/60R16

Average Stopping Distances (SD)

		<u>New Tires</u>	<u>Worn Tires</u>
<u>Dry Asphalt</u>			
SD feet 60-0 mph		148.88	155.68
Standard Deviation		2.42	2.31
<u>Wet Jennite</u>			
SD feet 35-0 mph		103.44	111.82
Standard Deviation		7.17	3.81
<u>Wet Asphalt Braking In Turn</u>			
SD feet 40-0 mph		82.41	89.23
Standard Deviation		1.44	2.58
<u>Steady State Turn</u>			
Maximum Lateral Acceleration (g)	clockwise	N/A	N/A
<i>with</i> Electronic Stability Control	counter clockwise		
	Average		
Maximum Lateral Acceleration (g)	clockwise	1.03	0.97
<i>without</i> Electronic Stability Control	counter clockwise	1.01	0.99
	Average	1.02	0.98
<u>Wear Sequence Lap Times</u>			
		<u>1st 50</u>	
		<u>Laps</u>	
Counter Clockwise	Average, seconds	64.18	
	Standard Deviation	0.31	
		<u>2nd 50</u>	
		<u>Laps</u>	
Clockwise	Average, seconds	64.27	
	Standard Deviation	0.32	
<u>Percentage of Tread Consumed During Testing</u>			
Average wear by tire position	LF	49.88%	
	RF	61.18%	
	LR	8.73%	
	RR	9.81%	

Pirelli P6 4 Season

Chevrolet Impala

Tire showing greatest wear-RF



Tire Summary

Vehicle: 2010 Chevrolet Impala

Tire Manufacturer: Nokian

Tire Model / Size: WRG2

225/60R16

Average Stopping Distances (SD)

		<u>New Tires</u>	<u>Worn Tires</u>
<u>Dry Asphalt</u>			
SD feet 60-0 mph		161.28	156.49
Standard Deviation		1.02	1.3
<u>Wet Jennite</u>			
SD feet 35-0 mph		99.68	110.56
Standard Deviation		2.11	3.59
<u>Wet Asphalt Braking In Turn</u>			
SD feet 40-0 mph		85.36	91.74
Standard Deviation		4.64	5.07
<u>Steady State Turn</u>			
Maximum Lateral Acceleration (g)	clockwise	N/A	N/A
<i>with</i> Electronic Stability Control	counter clockwise		
	Average		
Maximum Lateral Acceleration (g)	clockwise	1.01	0.97
<i>without</i> Electronic Stability Control	counter clockwise	0.99	0.95
	Average	1.00	0.96
<u>Wear Sequence Lap Times</u>			
		<u>1st 50</u>	
		<u>Laps</u>	
Counter Clockwise	Average, seconds	64.97	
	Standard Deviation	0.32	
		<u>2nd 50</u>	
		<u>Laps</u>	
Clockwise	Average, seconds	64.8	
	Standard Deviation	0.43	
<u>Percentage of Tread Consumed During Testing</u>			
Average wear by tire position	LF	56.25%	
	RF	61.36%	
	LR	9.66%	
	RR	8.24%	

Nokian WRG2

Chevrolet Impala

Tire showing greatest wear-RF



Tire Summary

Vehicle: 2010 Chevrolet Impala

Tire Manufacturer: Cooper

Tire Model / Size: CS4 265/60/R17

Unable to complete test due to excess tire wear

Average Stopping Distances (SD)

	<u>New Tires</u>	<u>Worn Tires</u>
<u>Dry Asphalt</u>		
SD feet 60-0 mph	139.82	
Standard Deviation	1.37	
<u>Wet Jennite</u>		
SD feet 35-0 mph	93.32	
Standard Deviation	11.86	
<u>Wet Asphalt Braking In Turn</u>		
SD feet 40-0 mph	80.91	
Standard Deviation	5.09	

Steady State Turn

Maximum Lateral Acceleration (g)	clockwise	N/A	N/A
<i>with</i> Electronic Stability Control	counter clockwise		
	Average		
Maximum Lateral Acceleration (g)	clockwise	0.89	
<i>without</i> Electronic Stability Control	counter clockwise	0.87	
	Average	0.88	

Wear Sequence Lap Times

<u>Counter Clockwise</u>		<u>1st 50</u>	
	Average, seconds	<u>Laps</u>	
	Standard Deviation		
<u>Clockwise</u>		<u>2nd 50</u>	
	Average, seconds	<u>Laps</u>	
	Standard Deviation		

Percentage of Tread Consumed During Testing

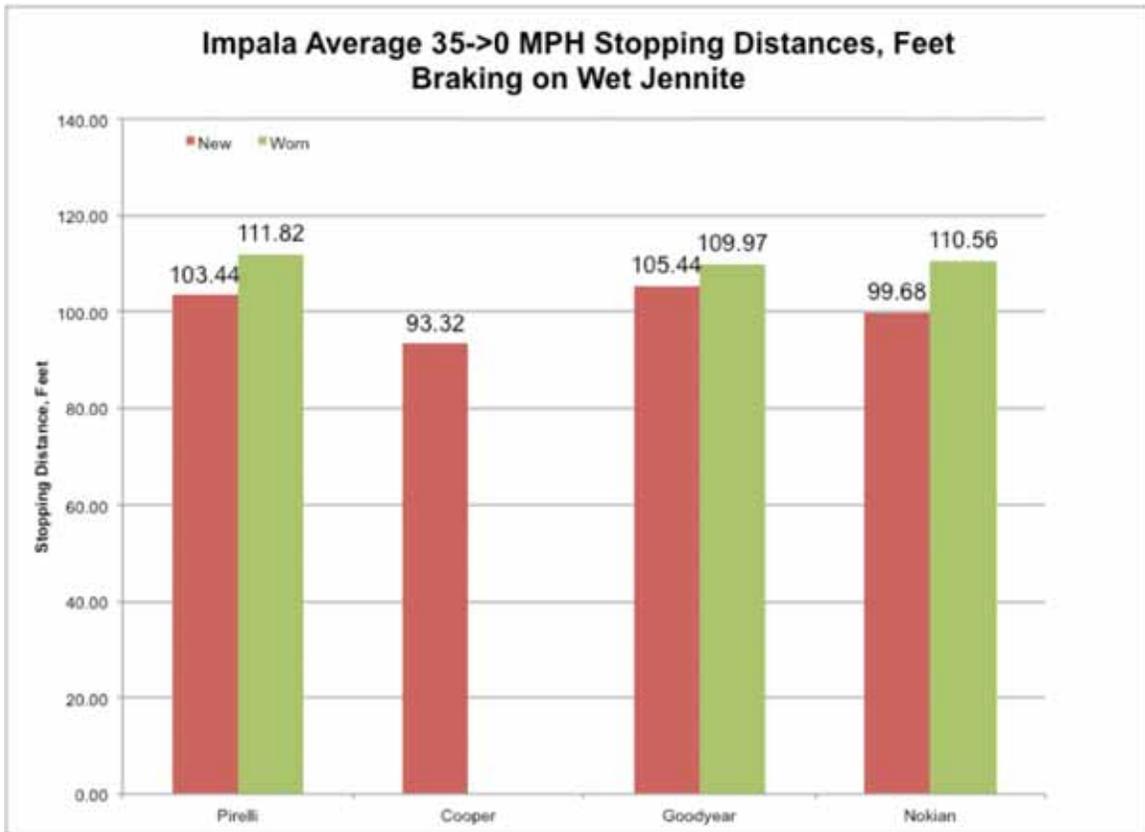
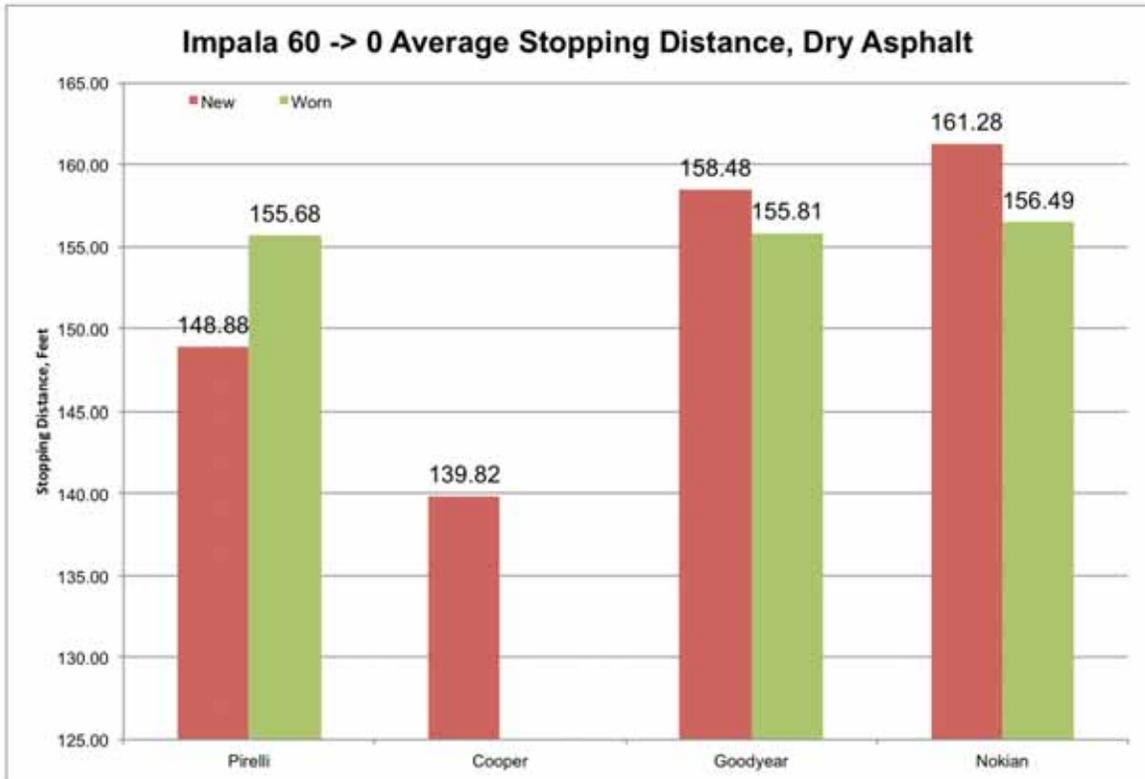
Average wear by tire position	LF
	RF
	LR
	RR

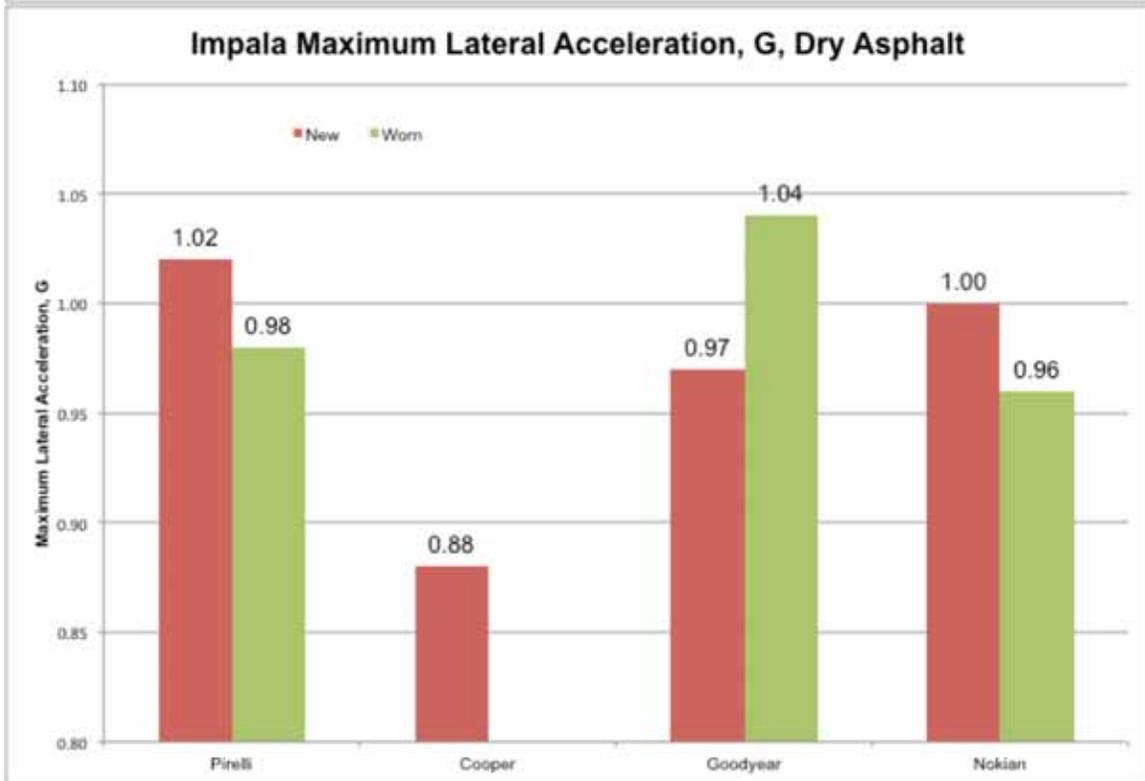
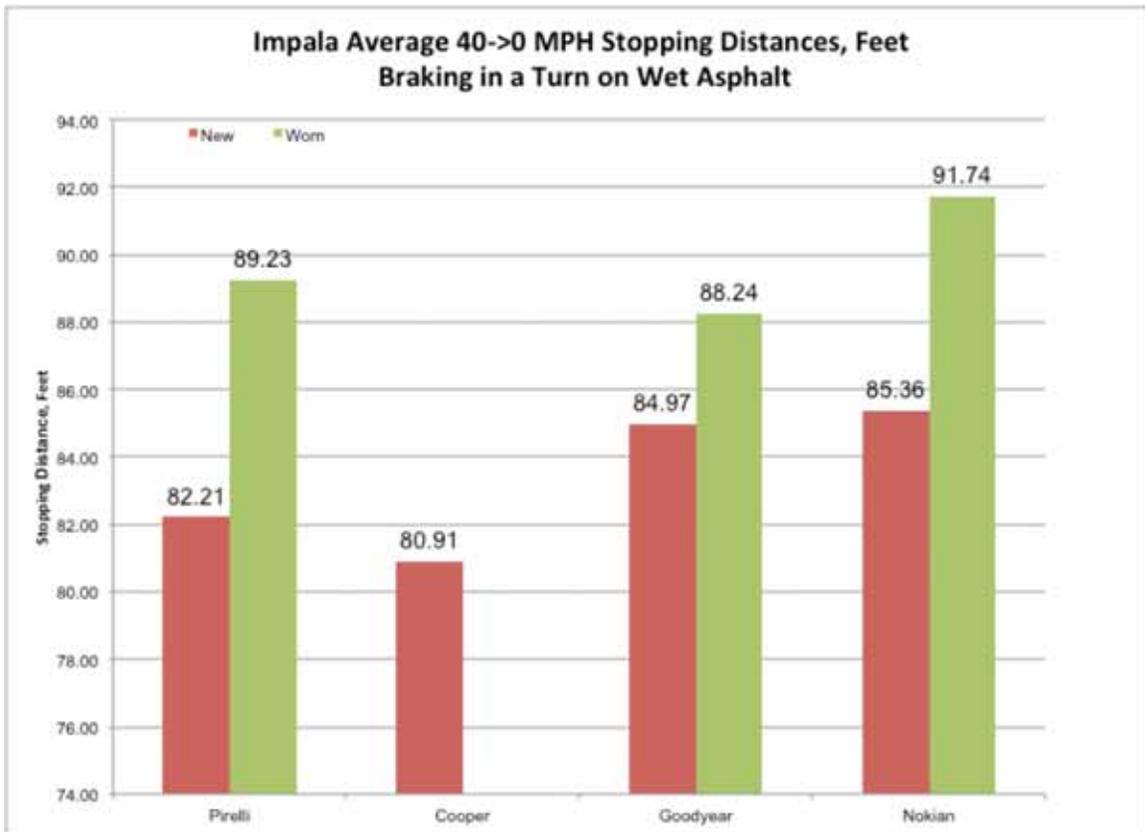
Cooper CS4

Chevrolet Impala

Tire showing greatest wear-RF







Tire Summary

Vehicle: 2010 Ford CVPI

Tire Manufacturer: Firestone

**Tire Model / Size: Firehawk GT Pursuit
235/55/R17**

Average Stopping Distances (SD)

	New Tires	Worn Tires
<u>Dry Asphalt</u>		
SD feet 60-0 mph	137.87	141.08
Standard Deviation	0.79	1.42

Wet Jennite

SD feet 35-0 mph	106.6	122.46
Standard Deviation	4.95	4.54

Wet Asphalt Braking In Turn

SD feet 40-0 mph	71.12	83.89
Standard Deviation	5.77	5.72

Steady State Turn

Maximum Lateral Acceleration (g) <i>with</i> Electronic Stability Control	clockwise counter clockwise Average	N/A	N/A
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Maximum Lateral Acceleration (g) <i>without</i> Electronic Stability Control	clockwise counter clockwise Average	0.95 1.08	1.08 1.00
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Wear Sequence Lap Times

		1st 50 Laps
Counter Clockwise	Average, seconds	63.05
	Standard Deviation	0.34

		2nd 50 Laps
Clockwise	Average, seconds	63.00
	Standard Deviation	0.37

Percentage of Tread Consumed During Testing

Average wear by tire position	LF	57.66%
	RF	57.86%
	LR	55.57%
	RR	68.02%

Firestone Firehawk GT Pursuit

Ford CVPI

Tire showing greatest wear-RR



Tire Summary

Vehicle: 2010 Ford CVPI

Tire Manufacturer: Goodyear

Tire Model / Size: Eagle RSA

235/55/R17

Average Stopping Distances (SD)

	<u>New Tires</u>	<u>Worn Tires</u>
<u>Dry Asphalt</u>		
SD feet 60-0 mph	140.44	144.16
Standard Deviation	2.92	1.69

Wet Jennite

SD feet 35-0 mph	112.57	119.58
Standard Deviation	2.72	6.97

Wet Asphalt Braking In Turn

SD feet 40-0 mph	83.69	88.15
Standard Deviation	4.51	7.16

Steady State Turn

Maximum Lateral Acceleration (g) <i>with</i> Electronic Stability Control	clockwise	N/A	N/A
	counter clockwise		
	Average		
Maximum Lateral Acceleration (g) <i>without</i> Electronic Stability Control	clockwise	0.89	0.99
	counter clockwise	0.95	0.99
	Average	0.92	0.99

Wear Sequence Lap Times

		<u>1st 50</u> <u>Laps</u>
Counter Clockwise	Average, seconds	62.37
	Standard Deviation	0.34
		<u>2nd 50</u> <u>Laps</u>
Clockwise	Average, seconds	62.69
	Standard Deviation	0.25

Percentage of Tread Consumed During Testing

Average wear by tire position	LF	34.57%
	RF	37.18%
	LR	37.90%
	RR	43.40%

Goodyear Eagle RSA

Ford CVPI

Tire showing greatest wear-RR



Tire Summary

Vehicle: 2010 Ford CVPI

Tire Manufacturer: Pirelli

Tire Model / Size: Pzero Nero

235/55/R17

Average Stopping Distances (SD)

		<u>New Tires</u>	<u>Worn Tires</u>
<u>Dry Asphalt</u>			
SD feet 60-0 mph		135.72	139.63
Standard Deviation		0.85	3.07
<u>Wet Jennite</u>			
SD feet 35-0 mph		107.81	119.54
Standard Deviation		4.72	2.48
<u>Wet Asphalt Braking In Turn</u>			
SD feet 40-0 mph		74.31	78.8
Standard Deviation		6.2	2.7
<u>Steady State Turn</u>			
Maximum Lateral Acceleration (g)	clockwise	N/A	N/A
<i>with</i> Electronic Stability Control	counter clockwise		
	Average		
Maximum Lateral Acceleration (g)	clockwise	0.87	0.90
<i>without</i> Electronic Stability Control	counter clockwise	0.97	0.98
	Average	0.92	0.94
<u>Wear Sequence Lap Times</u>			
		<u>1st 50</u>	
		Laps	
Counter Clockwise	Average, seconds	62.53	
	Standard Deviation	0.25	
		<u>2nd 50</u>	
		Laps	
Clockwise	Average, seconds	62.39	
	Standard Deviation	0.28	
<u>Percentage of Tread Consumed During Testing</u>			
Average wear by tire position	LF	53.11%	
	RF	51.79%	
	LR	49.35%	
	RR	48.60%	

Pirelli Pzero Nero

Ford CVPI

Tire showing greatest wear-LF



Tire Summary

Vehicle: 2010 Ford CVPI
Tire Manufacturer: Nokian
Tire Model / Size: WRG2
235/55/R17

Average Stopping Distances (SD)

	New Tires	Worn Tires
<u>Dry Asphalt</u>		
SD feet 60-0 mph	148.27	144.67
Standard Deviation	1.24	1.23

Wet Jennite

SD feet 35-0 mph	103.53	115.72
Standard Deviation	2.87	4.03

Wet Asphalt Braking In Turn

SD feet 40-0 mph	77.6	80.11
Standard Deviation	2.94	6.73

Steady State Turn

Maximum Lateral Acceleration (g)	clockwise	N/A	N/A
<i>with</i> Electronic Stability Control	counter clockwise		
	Average		
Maximum Lateral Acceleration (g)	clockwise	0.96	1.01
<i>without</i> Electronic Stability Control	counter clockwise	0.98	1.02
	Average	0.97	1.02

Wear Sequence Lap Times

		1st 50 Laps
Counter Clockwise	Average, seconds	62.56
	Standard Deviation	0.23
		2nd 50 Laps
Clockwise	Average, seconds	62.87
	Standard Deviation	0.44

Percentage of Tread Consumed During Testing

Average wear by tire position	LF	39.49%
	RF	42.05%
	LR	45.74%
	RR	51.14%

Nokian WRG2

Ford CVPI

Tire showing greatest wear-RR



Tire Summary

Vehicle: 2010 Ford CVPI

Tire Manufacturer: Cooper

Tire Model / Size: CS4 235/55/R17

Unable to complete test due to excess tire wear

Average Stopping Distances (SD)

	<u>New Tires</u>	<u>Worn Tires</u>
<u>Dry Asphalt</u>		
SD feet 60-0 mph	134.09	
Standard Deviation	1.12	
<u>Wet Jennite</u>		
SD feet 35-0 mph	101.11	
Standard Deviation	14.23	
<u>Wet Asphalt Braking In Turn</u>		
SD feet 40-0 mph	82.93	
Standard Deviation	9.66	

Steady State Turn

Maximum Lateral Acceleration (g)	clockwise	N/A	N/A
<i>with</i> Electronic Stability Control	counter clockwise		
	Average		
Maximum Lateral Acceleration (g)	clockwise	0.97	
<i>without</i> Electronic Stability Control	counter clockwise	0.90	
	Average		

Wear Sequence Lap Times

<u>Counter Clockwise</u>		<u>1st 50 Laps</u>	
	Average, seconds		
	Standard Deviation		
<u>Clockwise</u>		<u>2nd 50 Laps</u>	
	Average, seconds		
	Standard Deviation		

Percentage of Tread Consumed During Testing

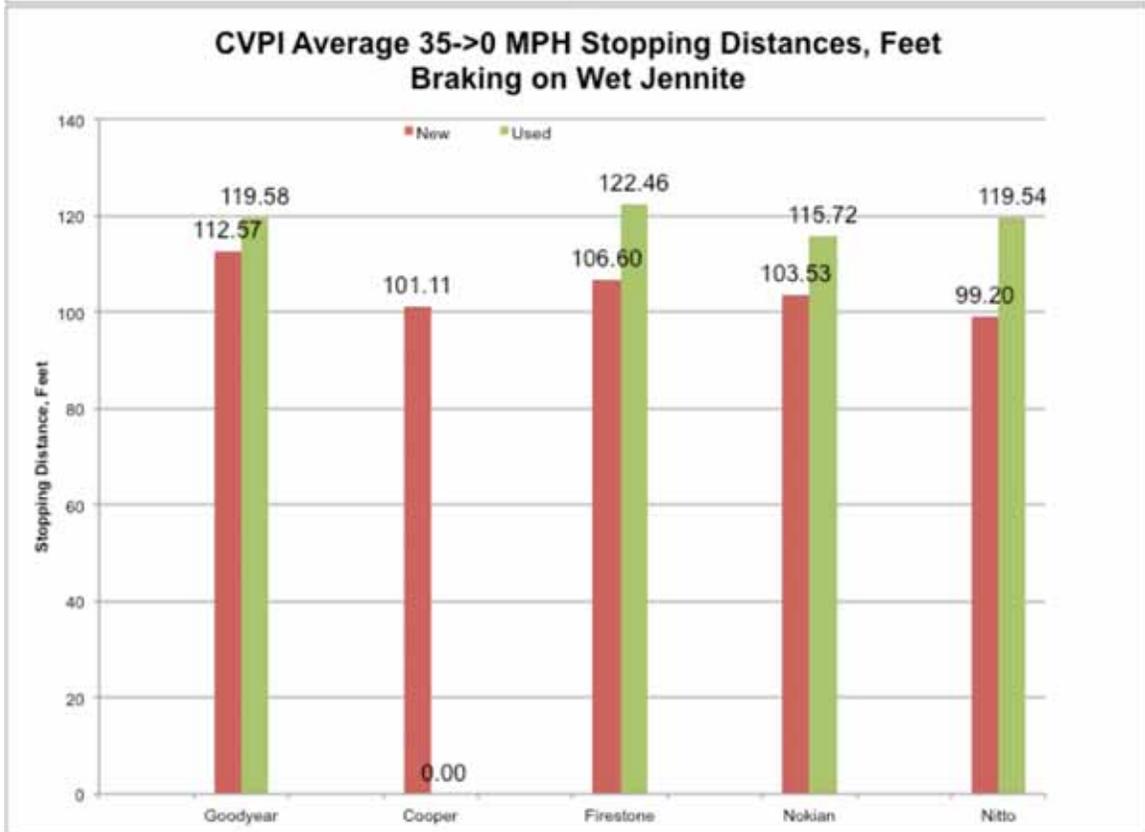
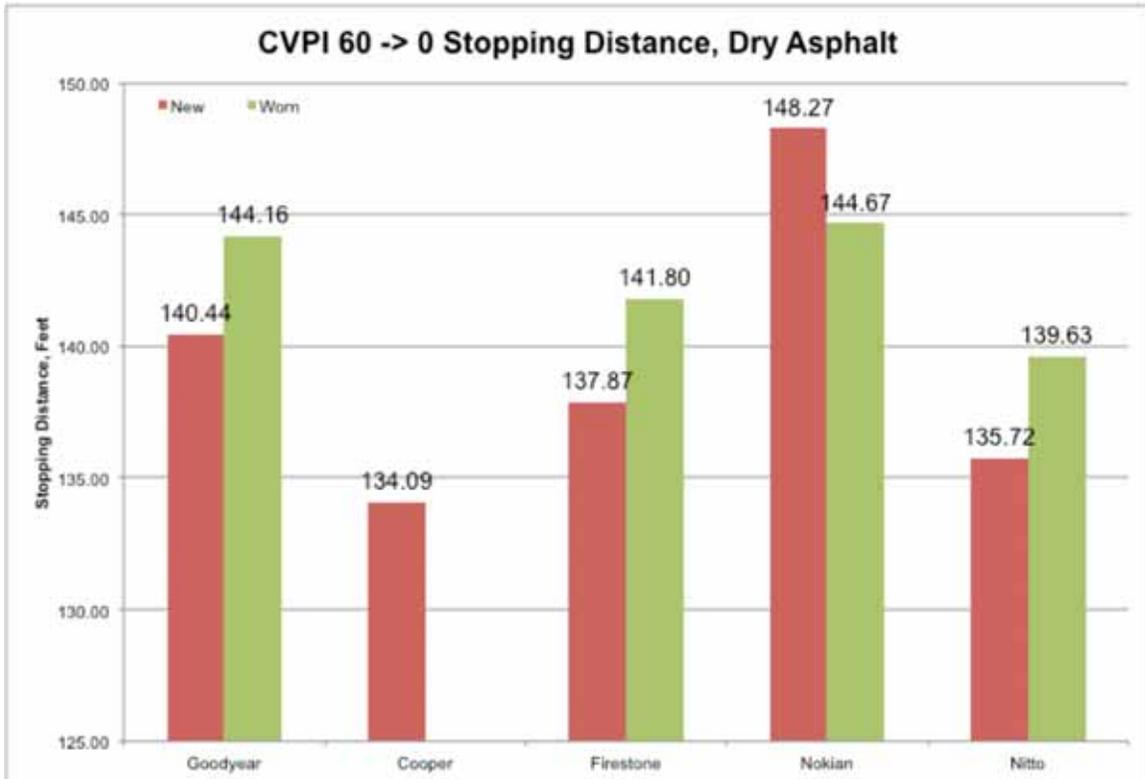
Average wear by tire position	LF
	RF
	LR
	RR

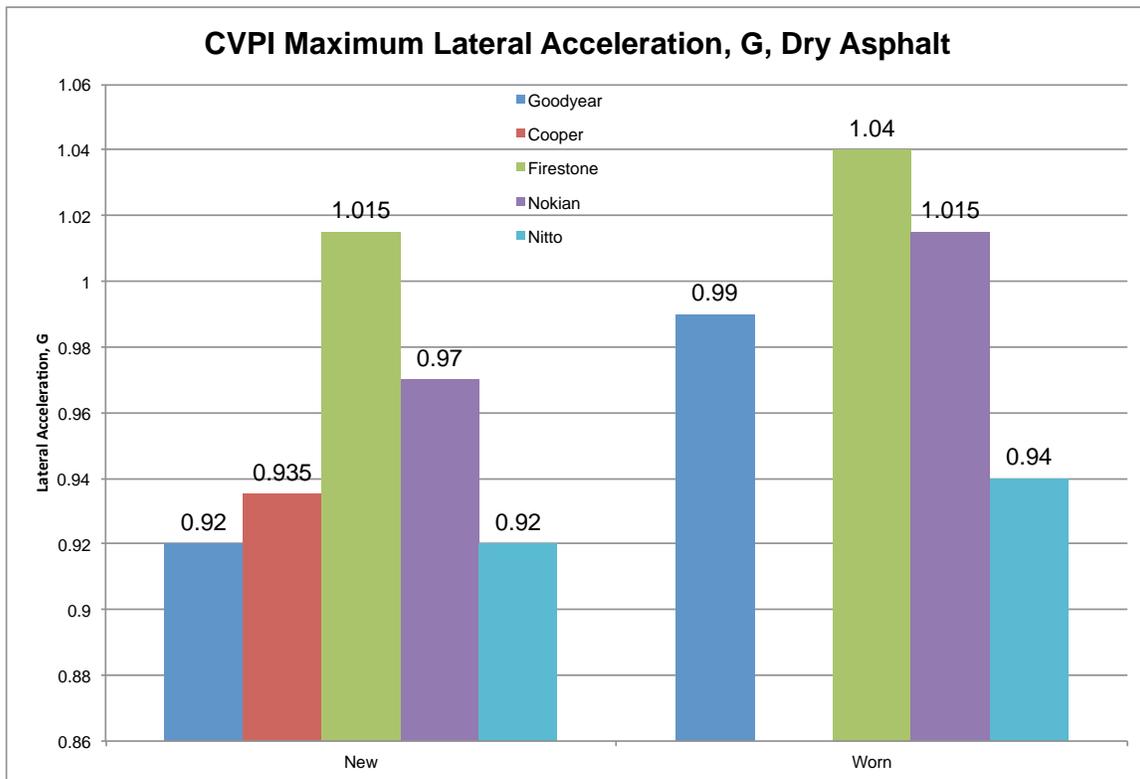
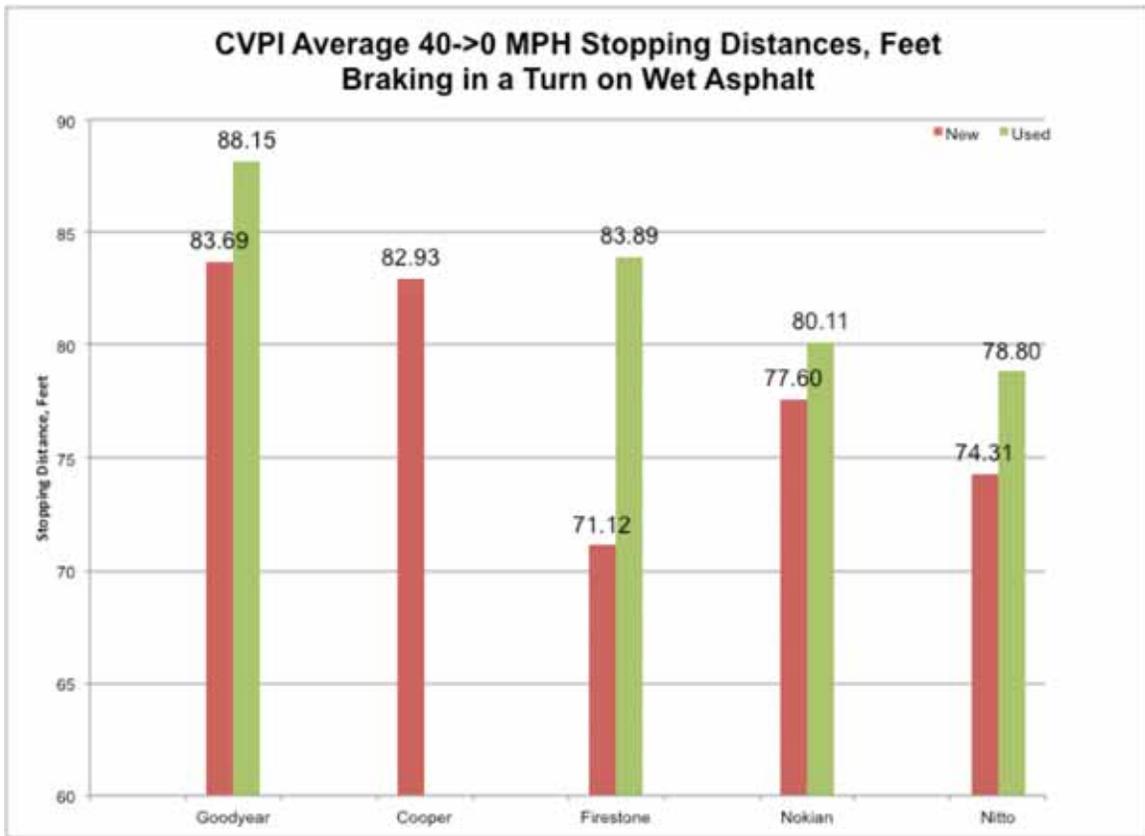
Cooper CS4

Ford CVPI

Tire showing greatest wear-RF







Test Methodology

Stage 1

All recording of pertinent sidewall information and the measurement of new tire tread depth was done before testing began.

Stage 2

To condition the tires and brakes prior to the start of testing, each candidate tire, and vehicle brakes were burnished during ten 60-0 mph full ABS stops. Each stopping distance is mathematically corrected to reflect 60 mph as the initial speed, thus providing a more accurate comparison of each stop. The control tire (Ford CVPI-Goodyear Eagle RSA) ran this stage only one time. The dry asphalt coefficient of friction 0.85 was used.

Stage 3

Each vehicle and candidate tire conducted five 60-0 mph full ABS stops. In an attempt to eliminate brake temperature as a performance factor, a one-mile cool down was conducted between stops. Speeds at trigger of the measurement were mathematically adjusted to 60 mph. Stopping distances were adjusted to reflect changes in track conditions using the track index established by the control tire.

Stage 4

Each vehicle performed ten 35-0 mph full ABS stops on a wet jennite (non-abrasive asphalt sealant) having a coefficient of friction of 0.35. Water is applied to the jennite surface using large commercial irrigation sprinklers. In an attempt to eliminate brake temperature as a performance factor, a one-mile cool down was conducted between stops. Speeds at trigger of the measurement were mathematically adjusted to 35 mph.

Stage 5

Each vehicle and candidate tire performed ten 40-0 mph stops in a turn on wet asphalt. Water was applied to the road surface by a large irrigation sprinkler. Five stops were conducted traveling clockwise and five stops were conducted traveling counter clockwise.

In an attempt to eliminate brake temperature as a performance factor, a one-mile cool down was conducted between stops. Speeds at trigger of the measurement were mathematically adjusted to 40 mph.

Stage 6

Each vehicle and candidate tire performed a steady state turn around a 300-foot diameter circle both clockwise and counter clockwise. The vehicle was driven to the point where it was unable to maintain its turn radius. The dual axis optical sensor measured speed and lateral acceleration in relation to the force of gravity noted as "G" at point of departure. Vehicles having Electronic Stability Control (ESC) were run with ESC on, ESC partial off or ESC off depending on system functionality. Lateral acceleration figures adjusted to reflect track changes using the track index.

Stage 7

To complete the tire endurance and wear test, each vehicle and candidate tire was driven 100 laps on a one-mile road course: 50 laps clockwise and 50 laps counter clockwise. Each lap was driven in a manner to simulate emergency or pursuit driving. Every 10 laps the vehicle stopped in order to obtain temperatures of rotor and tires.

Stage 8

Repeat Stage 3 with worn tires.

Stage 9

Repeat Stage 4 with worn tires.

Stage 10

Repeat Stage 5 with worn tires.

Stage 11

Repeat Stage 6 with worn tires.

Stage 12

Each candidate tire tread depth was measured at the conclusion of Stage 11. Measurements were initiated at the valve stem (considered TDC) moving clockwise to the 90,180 and 270 degree locations. Using the beginning and ending measurements, average percentage of tread consumed during the test was calculated.

Standard Deviation (St Dev)

Standard deviation is a statistic that indicates how tightly various points of data are clustered around the average. For purposes of this test, standard deviation indicates the consistency by which each tire and vehicle brakes and/or stability system performed in combination with each other. Smaller standard deviation numbers indicate better performance.

Detailed Test Data By Vehicle Platform

Chevrolet Caprice/ Goodyear Eagle RSA

2011 NIJ-MSP Tire Test Form General Info Form

Vehicle Application	Caprice
Vehicle VIN	BL532613
Initial Odometer	578
Tire Manufacturer	Goodyear
Tire Brand Name	Eagle RSA

General Track and Weather Info

Date of Test	6/10/11 & 6/13/11		
Driver	Ron Gromak		
		6/10/11	6/13/11
Track Temperature	Initial	66° F	63° F
Deg F	Midpoint		79° F
	Final		101° F
Weather Info			
Temperature	Initial	56° F	57° F
Deg F	Midpoint		64° F
	Final		78° F
Conditions	6/10 Cloudy & Cool		
	6/13 Sunny & Cool		

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Caprice

Tire Manufacturer Goodyear

Tire Brand Name Eagle RSA

Tire Build Date 1511

DOT Code M6GM JAIR 1511

UTQG Treadwear Rating 260

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating W

Load Index 99

Tire Position Left Front Initial Cold Inflation Pressure (psi) 36

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.344	0.344	0.344	0.344		
TDC + 90°	0.344	0.344	0.344	0.344		
TDC + 180°	0.344	0.344	0.344	0.344		
TDC + 270°	0.344	0.344	0.344	0.344		
Average	0.344	0.344	0.344	0.344		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 39

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.266	0.234	0.234	0.266		
TDC + 90°	0.297	0.234	0.250	0.250		
TDC + 180°	0.266	0.234	0.234	0.250		
TDC + 270°	0.266	0.234	0.234	0.250		
Average	0.273	0.234	0.238	0.254		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Caprice

Tire Manufacturer Goodyear

Tire Brand Name Eagle RSA

Tire Build Date 1511

DOT Code M6GM JAIR 1511

UTQG Treadwear Rating 260

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating W

Load Index 99

Tire Position Right Front Initial Cold Inflation Pressure (psi) 36

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.344	0.344	0.344	0.344		
TDC + 90°	0.344	0.344	0.344	0.344		
TDC + 180°	0.344	0.344	0.344	0.344		
TDC + 270°	0.344	0.344	0.344	0.344		
Average	0.344	0.344	0.344	0.344		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 39

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.250	0.219	0.234	0.250		
TDC + 90°	0.219	0.219	0.234	0.250		
TDC + 180°	0.219	0.172	0.250	0.250		
TDC + 270°	0.234	0.219	0.250	0.250		
Average	0.230	0.207	0.242	0.250		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Caprice

Tire Manufacturer Goodyear

Tire Brand Name Eagle RSA

Tire Build Date 1511

DOT Code M6GM JAIR 1511

UTQG Treadwear Rating 260

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating W

Load Index 99

Tire Position Left Rear Initial Cold Inflation Pressure (psi) 36

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.344	0.344	0.344	0.344		
TDC + 90°	0.344	0.344	0.344	0.344		
TDC + 180°	0.344	0.344	0.344	0.344		
TDC + 270°	0.344	0.344	0.344	0.344		
Average	0.344	0.344	0.344	0.344		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 39

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.250	0.203	0.219	0.234		
TDC + 90°	0.250	0.219	0.234	0.234		
TDC + 180°	0.250	0.219	0.234	0.250		
TDC + 270°	0.250	0.219	0.234	0.250		
Average	0.250	0.215	0.230	0.242		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Caprice

Tire Manufacturer Goodyear

Tire Brand Name Eagle RSA

Tire Build Date 1511

DOT Code M6GM JAIR 1511

UTQG Treadwear Rating 260

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating W

Load Index 99

Tire Position Right Rear Initial Cold Inflation Pressure (psi) 36

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.344	0.344	0.344	0.344		
TDC + 90°	0.344	0.344	0.344	0.344		
TDC + 180°	0.344	0.344	0.344	0.344		
TDC + 270°	0.344	0.344	0.344	0.344		
Average	0.344	0.344	0.344	0.344		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 35

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.250	0.234	0.219	0.250		
TDC + 90°	0.250	0.219	0.234	0.250		
TDC + 180°	0.250	0.234	0.234	0.250		
TDC + 270°	0.250	0.219	0.219	0.250		
Average	0.250	0.227	0.227	0.250		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Stage 2-Burnish (driver + full instrumentation + full fuel)

Control tire runs this stage only once

Conduct 10 60 -> 0 mph full ABS stops

Location Dry Asphalt
Date 6/10/11 & 6/13/11
Driver Ron Gromak
Target
Velocity,
MPH 60

Stop #	Initial Velocity, PMH	Stopping Distance, Feet	V ² Corrected SD, Feet	Track Index	SD, Indexed
1	60.24	134.49	133.43	1.0082	134.52895
2	59.21	131.96	135.51	1.0082	136.62103
3	60.21	135.21	134.25	1.0082	135.34749
4	59.98	135.71	135.81	1.0082	136.9212
5	61.18	144.34	138.84	1.0082	139.98083
6	59.25	133.16	136.54	1.0082	137.66342
7	59.24	134.33	137.81	1.0082	138.9444
8	60.57	143.19	140.50	1.0082	141.65318
9	59.18	132.42	136.13	1.0082	137.24561
10	61.81	148.63	140.04	1.0082	141.19123

= Average 60 mph SD feet

136.89

138.01

= Standard Deviation, 60 mph SD feet

2.37

2.38

Stage 5-New Tire Wet Asphalt Braking in a Turn Stopping Distance Tests
(driver + full instrumentation + full fuel)

Conduct 10 40 -> 0 mph full ABS stops (one per lap, five in each direction)

Location Turn 6 (Sprinklers On)
 Date 6/10/11 & 6/13/11
 Driver Ron Gromak
 Target
 Velocity,
 MPH 40

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Run Direction
1	41.92	78.99	71.92	CW
2	41.74	86.12	79.08	CW
3	41.77	75.18	68.95	CW
4	41.40	74.69	69.73	CW
5	41.18	78.57	74.15	CW
6	38.21	61.85	67.77	CCW
7	40.00	73.67	73.67	CCW
8	40.51	72.97	71.16	CCW
9	40.68	76.12	73.60	CCW
10	40.20	73.46	72.74	CCW

= Average 40 mph SD feet 72.28
 = Standard Deviation, 40 mph SD feet 3.21

Stage 6-New Tire Steady State Turn Max Lateral on Dry Asphalt

Control vehicle/tire runs three 60->0 mph full ABS (one per lap) on dynamics pad for reference purposes.

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise) until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Track Index	Adjusted w/ Index
1	CW	48	1.03	1.02	1.05
		Max Lat	1.03		
1	CCW	46.20	0.95	1.02	0.97
		Max Lat	0.95		

ADDITIONAL RUNS MADE WITH STABILITY CONTROL TURNED OFF

Run #	Direction	Velocity	Lateral Accel,G	Track Index	Adjusted w/ Index
1	CW	44.768	0.89	1.02	0.91
1	CCW	48.05	1.03	1.02	1.05

Stage 7-Tire Endurance/Wear Testing

Drive 100 laps at max speed on dry asphalt track (50 each direction).

Lap #	CW Lap Time, Sec	CCW Lap Time, Sec	Lap #	CW Lap Time, Sec	CCW Lap Time, Sec
1	63.093	62.931	39	62.801	63.535
2	62.182	62.158	40	62.733	61.934
3	62.616	61.843	41	62.9	62.697
4	62.451	62.009	42	62.766	62.261
5	62.973	61.774	43	62.463	62.342
6	63.033	61.94	44	62.804	62.322
7	62.68	62.121	45	62.37	62.571
8	62.273	62.155	46	62.629	62.235
9	62.614	62.335	47	62.414	62.271
10	63.054	61.906	48	62.582	62.667
11	62.787	62.083	49	62.429	62.626
12	62.541	61.804	50	62.836	62.786
13	62.69	62.217	Avg =	62.701789	62.321658
14	62.445	62.273	Std Dev =	0.2712426	0.308851
15	62.394	62.874	Min =	62.182	61.774
16	62.913	62.569	Max =	63.281	63.154
17	62.779	62.327	Range =	1.099	1.761
18	62.944	62.204			
19	62.541	62.257			
20	62.855	63.154			
21	63.103	62.305			
22	62.696	62.592			
23	62.52	62.401			
24	62.879	62.421			
25	62.749	62.362			
26	62.733	62.536			
27	63.281	62.258			
28	62.955	62.647			
29	62.847	62.383			
30	62.634	62.605			
31	62.472	62.612			
32	62.338	62.29			
33	62.293	62.389			
34	62.557	62.293			
35	62.492	62.164			
36	63.177	62.087			
37	62.422	62.193			
38	62.662	62.751			

Temperatures of rotor and tire during endurance test

Vehicle Caprice Goodyear Eagle RSA

Lap Sequence	LF		LR		RR		RF	
	Rotor	Tire	Rotor	Tire	Rotor	Tire	Rotor	Tire
After 10 Laps	840	130	372	125	500	145	805	160
After 20 Laps	845	145	430	137	745	160	845	159
After 30 Laps	832	134	495	143	715	162	808	162
After 40 Laps	830	142	655	130	700	162	794	162
After 50 Laps	835	130	656	138	713	158	782	159
After 60 Laps	895	160	780	168	675	119	825	125
After 70 Laps	960	172	840	187	730	126	795	137
After 80 Laps	940	172	860	180	740	136	842	135
After 90 Laps	949	165	800	173	730	125	850	132
After 100 Laps	930	168	805	179	780	136	890	131

Stage 11-Worn Tire Steady State Turn Max Lateral on Dry Asphalt

Control vehicle/tire runs three 60->0 mph full ABS (one per lap) on dynamics pad for reference purposes.

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise) until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Track Index	Adjusted w/ Index
1	CW	45.705	0.93	1.0031	0.93
		Max Lat.	0.93		
1	CCW	46.96	0.98	1.0031	0.99
		Max Lat.	0.98		
ADDITIONAL RUNS MADE WITH STABILITY CONTROL TURNED OFF					
1	CW	45.695	0.93	1.0031	0.93
1	CCW	47.50	1.01	1.0031	1.01

Stage 12- End of Test Tire Wear Check

Measured tire tread depth in each groove at four locations

Left Front		Groove					
Position	1	2	3	4	5	6	
TDC	-0.078125	-0.109375	-0.109375	-0.078125	0	0	
TDC + 90°	-0.046875	-0.109375	-0.09375	-0.09375	0	0	
TDC + 180°	-0.078125	-0.109375	-0.109375	-0.09375	0	0	
TDC + 270°	-0.078125	-0.109375	-0.109375	-0.09375	0	0	
Average	-0.070313	-0.109375	-0.1054688	-0.0898438	0	0	

% Wear 20.45% 31.82% 30.68% 26.14% LF AVG 27.27%

Right Front		Groove					
Position	1	2	3	4	5	6	
TDC	-0.09375	-0.125	-0.109375	-0.09375	0	0	
TDC + 90°	-0.125	-0.125	-0.109375	-0.09375	0	0	
TDC + 180°	-0.125	-0.171875	-0.09375	-0.09375	0	0	
TDC + 270°	-0.109375	-0.125	-0.09375	-0.09375	0	0	
Average	-0.113281	-0.136719	-0.1015625	-0.09375	0	0	

% Wear 32.95% 39.77% 29.55% 27.27% RF AVG 32.39%

Left Rear		Groove					
Position	1	2	3	4	5	6	
TDC	-0.09375	-0.140625	-0.125	-0.109375	0	0	
TDC + 90°	-0.09375	-0.125	-0.109375	-0.109375	0	0	
TDC + 180°	-0.09375	-0.125	-0.109375	-0.09375	0	0	
TDC + 270°	-0.09375	-0.125	-0.109375	-0.09375	0	0	
Average	-0.09375	-0.128906	-0.1132813	-0.1015625	0	0	

% Wear 27.27% 37.50% 32.95% 29.55% LR AVG 31.82%

Right Rear		Groove					
Position	1	2	3	4	5	6	
TDC	-0.09375	-0.109375	-0.125	-0.09375	0	0	
TDC + 90°	-0.09375	-0.125	-0.109375	-0.09375	0	0	
TDC + 180°	-0.09375	-0.109375	-0.109375	-0.09375	0	0	
TDC + 270°	-0.09375	-0.125	-0.125	-0.09375	0	0	
Average	-0.09375	-0.117188	-0.1171875	-0.09375	0	0	

% Wear 27.27% 34.09% 34.09% 27.27% RR AVG 30.68%

Average Wear by Tire Position

Tire Position	% Tread Consumed
LF AVG	27.27%
RF AVG	32.39%
LR AVG	31.82%
RR AVG	30.68%

Chevrolet Caprice/Nitto NT850 Plus

2011 NIJ-MSP Tire Test Form General Info Form

Vehicle Application	<u>Caprice</u>
Vehicle VIN	<u>BL532613</u>
Initial Odometer	<u>429</u>
Tire Manufacturer	<u>Nitto</u>
Tire Brand Name	<u>NT 850 Premium</u>

General Track and Weather Info

Date of Test	<u>8-Jun-11</u>
Driver	<u>Ron Gromak</u>

Track Temperature	Initial	<u>87° F</u>
Deg F	Midpoint	<u>108° F</u>
	Final	<u>116° F</u>

Weather Info		
Temperature	Initial	<u>80° F</u>
Deg F	Midpoint	<u>87° F</u>
	Final	<u>98° F</u>

Conditions Hot, Hazy, Humid

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Caprice

Tire Manufacturer Nitto

Tire Brand Name NT 850 Premium

Tire Build Date 4810

DOT Code 735V HHF 4810

UTQG Treadwear Rating 500

UTQG Load Rating A

UTQG Traction Rating AA

Speed Rating W

Load Index 101

Tire Position Left Front Initial Cold Inflation Pressure (psi) 36

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.281	0.313	0.328	0.297	0.281	
TDC + 90°	0.281	0.313	0.328	0.297	0.281	
TDC + 180°	0.281	0.313	0.328	0.297	0.281	
TDC + 270°	0.281	0.313	0.328	0.297	0.281	
Average	0.28125	0.3125	0.328125	0.296875	0.28125	

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) _____

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.109	0.063	0.156	0.156	0.156	
TDC + 90°	0.141	0.063	0.156	0.156	0.156	
TDC + 180°	0.109	0.063	0.172	0.156	0.172	
TDC + 270°	0.094	0.063	0.156	0.156	0.078	
Average	0.1132813	0.0625	0.1601563	0.15625	0.140625	

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Caprice

Tire Manufacturer Nitto

Tire Brand Name NT 850 Premium

Tire Build Date 4810

DOT Code 735V HHF 4810

UTQG Treadwear Rating 500

UTQG Load Rating A

UTQG Traction Rating AA

Speed Rating W

Load Index 101

Tire Position Right Front Initial Cold Inflation Pressure (psi) 36

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.297	0.313	0.344	0.328	0.297	
TDC + 90°	0.297	0.313	0.344	0.328	0.297	
TDC + 180°	0.297	0.313	0.344	0.328	0.297	
TDC + 270°	0.297	0.313	0.344	0.328	0.297	
Average	0.296875	0.3125	0.34375	0.328125	0.296875	

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) _____

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.094	0.063	0.156	0.156	0.156	
TDC + 90°	0.109	0.078	0.156	0.156	0.141	
TDC + 180°	0.109	0.094	0.188	0.172	0.156	
TDC + 270°	0.109	0.078	0.172	0.172	0.156	
Average	0.1054688	0.078125	0.1679688	0.1640625	0.1523438	

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Caprice

Tire Manufacturer Nitto

Tire Brand Name NT 850 Premium

Tire Build Date 4810

DOT Code 735V HHF 4810

UTQG Treadwear Rating 500

UTQG Load Rating A

UTQG Traction Rating AA

Speed Rating W

Load Index 101

Tire Position Left Rear Initial Cold Inflation Pressure (psi) 36

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.297	0.313	0.344	0.313	0.281	
TDC + 90°	0.297	0.313	0.344	0.313	0.281	
TDC + 180°	0.297	0.313	0.344	0.313	0.281	
TDC + 270°	0.297	0.313	0.344	0.313	0.281	
Average	0.296875	0.3125	0.34375	0.3125	0.28125	

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) _____

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.141	0.109	0.172	0.156	0.141	
TDC + 90°	0.125	0.094	0.156	0.156	0.141	
TDC + 180°	0.109	0.078	0.172	0.156	0.125	
TDC + 270°	0.141	0.094	0.172	0.172	0.141	
Average	0.1289063	0.09375	0.1679688	0.1601563	0.1367188	

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Caprice

Tire Manufacturer Nitto

Tire Brand Name NT 850 Premium

Tire Build Date 4810

DOT Code 735V HHF 4810

UTQG Treadwear Rating 500

UTQG Load Rating A

UTQG Traction Rating AA

Speed Rating W

Load Index 101

Tire Position Right Rear Initial Cold Inflation Pressure (psi) 36

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.297	0.313	0.344	0.313	0.297	
TDC + 90°	0.297	0.313	0.344	0.313	0.297	
TDC + 180°	0.297	0.313	0.344	0.313	0.297	
TDC + 270°	0.297	0.313	0.344	0.313	0.297	
Average	0.296875	0.3125	0.34375	0.3125	0.296875	

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) _____

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.078	0.031	0.125	0.141	0.125	
TDC + 90°	0.063	0.031	0.109	0.125	0.109	
TDC + 180°	0.078	0.047	0.125	0.141	0.141	
TDC + 270°	0.094	0.047	0.125	0.141	0.125	
Average	0.078125	0.0390625	0.1210938	0.1367188	0.125	

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Stage 3-New Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Conduct five 60 -> 0 mph full ABS stops (one per lap)

Location Track Straightaway Dry Asphalt
 Date 6/8/11
 Driver Ron Gromak
 Target
 Velocity,
 MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Track Index	Adjusted w/ Index
1	60.35	131.66	130.13	0.9777	127.23
2	61.24	135.19	129.76	0.9777	126.86
3	60.52	130.68	128.46	0.9777	125.60
4	60.43	131.73	129.85	0.9777	126.95
5	60.71	130.91	127.87	0.9777	125.02
= Average 60 mph SD feet			129.21		126.33
= Standard Deviation, 60 mph SD feet			0.99		0.97

Stage 6-New Tire Steady State Turn Max Lateral on Dry Asphalt

**Control vehicle/tire runs three 60->0 mph full ABS (one per lap)
on dynamics pad for reference**

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise)
until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Track Index	Adjusted w/ Index
1	CW	45.74	0.93	0.9545	0.89
		Max Lat	0.93		
1	CCW	44.81	0.89	0.9545	0.85
		Max Lat	0.89		

ADDITIONAL RUNS MADE WITHOUT STABILITY CONTROL OFF

1	CW	45.37	0.92	0.9545	0.88
1	CCW	45.02	0.90	0.9545	0.86

Stage 7-Tire Endurance/Wear Testing

Drive 100 laps at max speed on dry asphalt track (50 each direction).

Lap #	CW Lap Time, Sec	CCW Lap Time, Sec	Lap #	CW Lap Time, Sec	CCW Lap Time, Sec
1	63.2	63.2	37	62.4	62.7
2	63.2	63.5	38	62.6	63.1
3	62.4	63.2	39	62.2	63.1
4	63	63.9	40	62.1	63.6
5	62.6	63.5	41	62.2	63.7
6	63.1	63.3	42	62.4	63.8
7	63	63.3	43	62.9	63.6
8	63.1	63.5	44	62.2	64
9	62.6	63.5	45	62.4	63.8
10	66.5	63.1	46	62.3	64.2
11	61.8	63.4	47	62.1	64.4
12	62.2	63	48	62	64
13	61.9	62.4	49	62.2	64.2
14	62.2	62.5	50	62	63.4
15	62.3	63			
16	62.8	63	Avg =	62.613889	63.263889
17	62.3	63	Std Dev =	0.7668685	0.3681248
18	62.9	63.6	Min =	61.8	62.4
19	62.2	63.2	Max =	66.5	64
20	62.4	62.8	Range =	4.7	1.6
21	62.8	63			
22	61.9	62.8			
23	62.3	63			
24	62.4	63.2			
25	62.6	63.2			
26	62.2	64			
27	62.4	63.6			
28	62.2	62.9			
29	62.3	63.3			
30	62.9	63.5			
31	62	63.1			
32	62.5	63.3			
33	62.6	63.3			
34	62.5	63.8			
35	62.7	63.7			
36	62.1	63.9			

Temperatures of rotor and tire during endurance test

Vehicle Caprice Nitto NT

Lap Sequence	LF		LR		RR		RF	
	Rotor	Tire	Rotor	Tire	Rotor	Tire	Rotor	Tire
After 10 Laps	625	160	400	165	450	173	630	181
After 20 Laps	700	180	434	175	600	198	740	198
After 30 Laps	785	178	460	181	697	194	735	198
After 40 Laps	830	170	590	178	700	195	775	198
After 50 Laps	760	170	600	175	640	190	690	196
After 60 Laps	829	182	697	178	659	164	717	162
After 70 Laps	941	178	805	184	737	177	806	174
After 80 Laps	862	177	793	182	736	176	791	171
After 90 Laps	925	185	840	192	620	172	805	172
After 100 Laps	925	185	855	189	753	175	793	173

Stage 8-Worn Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Conduct five 60 -> 0 mph full ABS stops (one per lap)
 For each stop record initial vehicle speed, stopping distance

Location Track Straightaway Dry Asphalt
 Date 6/8/11
 Driver Ron Gromak
 Target
 Velocity,
 MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Track Index	Adjusted w/ Index
1	60.29	138.02	136.68	0.9734	133.05
2	61.12	137.91	132.88	0.9734	129.35
3	60.18	136.00	135.20	0.9734	131.61
4	58.77	128.36	133.78	0.9734	130.22
5	59.41	131.87	134.50	0.9734	130.92
= Average 60 mph SD feet			134.61		131.03
= Standard Deviation, 60 mph SD feet			1.44		1.40

Stage 11-Worn Tire Steady State Turn Max Lateral on Dry Asphalt

**Control vehicle/tire runs three 60->0 mph full ABS (one per lap)
on dynamics pad for reference purposes**

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise)
until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Track Index	Adjusted w/ Index
1	CW	48.23	1.04	0.9709	1.01
		Max Lat.	1.04		
1	CCW	47.02	0.99	0.9709	0.96
		Max Lat.	0.99		
ADDITIONAL RUNS MADE WITH STABILITY CONTROL TURNED OFF					
1	CW	48.33	1.04	0.9709	1.01
1	CCW	45.854	0.937	0.9709	0.91

Stage 12- End of Test Tire Wear Check

Measure tire tread depth in each groove at four locations and record results in tire sheet

Left Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.171875	-0.25	-0.171875	-0.140625	-0.125	0
TDC + 90°	-0.140625	-0.25	-0.171875	-0.140625	-0.125	0
TDC + 180°	-0.171875	-0.25	-0.15625	-0.140625	-0.109375	0
TDC + 270°	-0.1875	-0.25	-0.171875	-0.140625	-0.203125	0
Average	-0.167969	-0.25	-0.167969	-0.140625	-0.140625	0

% Wear 59.72% 80.00% 51.19% 47.37% 50.00% LF AVG 57.66%

Right Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.203125	-0.25	-0.1875	-0.171875	-0.140625	0
TDC + 90°	-0.1875	-0.234375	-0.1875	-0.171875	-0.15625	0
TDC + 180°	-0.1875	-0.21875	-0.15625	-0.15625	-0.140625	0
TDC + 270°	-0.1875	-0.234375	-0.171875	-0.15625	-0.140625	0
Average	-0.191406	-0.234375	-0.175781	-0.1640625	-0.144531	0

% Wear 78.95% 90.00% 68.18% 57.14% 63.16% RF AVG 71.49%

Left Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.15625	-0.203125	-0.171875	-0.15625	-0.140625	0
TDC + 90°	-0.171875	-0.21875	-0.1875	-0.15625	-0.140625	0
TDC + 180°	-0.1875	-0.234375	-0.171875	-0.15625	-0.15625	0
TDC + 270°	-0.15625	-0.21875	-0.171875	-0.140625	-0.140625	0
Average	-0.167969	-0.21875	-0.175781	-0.1523438	-0.144531	0

% Wear 56.58% 70.00% 51.14% 48.75% 51.39% LR AVG 55.57%

Right Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.21875	-0.28125	-0.21875	-0.171875	-0.171875	0
TDC + 90°	-0.234375	-0.28125	-0.234375	-0.1875	-0.1875	0
TDC + 180°	-0.21875	-0.265625	-0.21875	-0.171875	-0.15625	0
TDC + 270°	-0.203125	-0.265625	-0.21875	-0.171875	-0.171875	0
Average	-0.21875	-0.273438	-0.222656	-0.1757813	-0.171875	0

% Wear 73.68% 87.50% 64.77% 56.25% 57.89% RR AVG 68.02%

Average Wear by Tire Position

Tire Position	% Tread Consumed
LF AVG	57.66%
RF AVG	71.49%
LR AVG	55.57%
RR AVG	68.02%

Chevrolet Caprice/Nokian WRG2

2011 NIJ-MSP Tire Test Form General Info Form

Vehicle Application	<u>Caprice</u>
Vehicle VIN	<u>BL532613</u>
Initial Odometer	<u>734</u>
Tire Manufacturer	<u>Nokian</u>
Tire Brand Name	<u>WRG 2</u>

Track and Weather Info

Date of Test	<u>15-Jun-11</u>
Driver	<u>Ron Gromak</u>

Track Temperature	Initial	<u>62° F</u>
Deg F	Midpoint	<u>77° F</u>
	Final	<u>85° F</u>

Weather Info	Initial	<u>57° F</u>
Temperature	Midpoint	<u>63° F</u>
Deg F	Final	<u>67° F</u>

Conditions Light Clouds, Cool, Winds 10 - 12 MPH

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Caprice

Tire Manufacturer Nokian

Tire Brand Name WRG 2

Tire Build Date 1610

DOT Code 60BV1610

UTQG Treadwear Rating 400

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 101

Tire Position Left Front Initial Cold Inflation Pressure (psi) 36

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.344	0.344	0.344	0.344		
TDC + 90°	0.344	0.344	0.344	0.344		
TDC + 180°	0.344	0.344	0.344	0.344		
TDC + 270°	0.344	0.344	0.344	0.344		
Average	0.344	0.344	0.344	0.344		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 39

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.234	0.203	0.219	0.219		
TDC + 90°	0.234	0.219	0.203	0.141		
TDC + 180°	0.234	0.203	0.203	0.219		
TDC + 270°	0.234	0.203	0.219	0.219		
Average	0.234	0.207	0.211	0.199		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Caprice

Tire Manufacturer Nokian

Tire Brand Name WRG 2

Tire Build Date 1510

DOT Code 60BV1610

UTQG Treadwear Rating 400

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 101

Tire Position Right Front Initial Cold Inflation Pressure (psi) 36

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.344	0.344	0.344	0.344		
TDC + 90°	0.344	0.344	0.344	0.344		
TDC + 180°	0.344	0.344	0.344	0.344		
TDC + 270°	0.344	0.344	0.344	0.344		
Average	0.344	0.344	0.344	0.344		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 39

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.234	0.234	0.219	0.219		
TDC + 90°	0.219	0.219	0.234	0.219		
TDC + 180°	0.219	0.219	0.219	0.203		
TDC + 270°	0.234	0.219	0.219	0.188		
Average	0.227	0.223	0.223	0.207		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Caprice

Tire Manufacturer Nokian

Tire Brand Name WRG 2

Tire Build Date 1610

DOT Code 60BV1610

UTQG Treadwear Rating 400

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 101

Tire Position Left Rear Initial Cold Inflation Pressure (psi) 36

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.344	0.344	0.344	0.344		
TDC + 90°	0.344	0.344	0.344	0.344		
TDC + 180°	0.344	0.344	0.344	0.344		
TDC + 270°	0.344	0.344	0.344	0.344		
Average	0.344	0.344	0.344	0.344		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 38

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.188	0.172	0.203	0.219		
TDC + 90°	0.188	0.172	0.172	0.188		
TDC + 180°	0.203	0.188	0.188	0.203		
TDC + 270°	0.203	0.172	0.188	0.203		
Average	0.195	0.176	0.188	0.203		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Caprice

Tire Manufacturer Nokian

Tire Brand Name WRG 2

Tire Build Date 1610

DOT Code 60BV1610

UTQG Treadwear Rating 400

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 101

Tire Position Right Rear Initial Cold Inflation Pressure (psi) 36

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.344	0.344	0.344	0.344		
TDC + 90°	0.344	0.344	0.344	0.344		
TDC + 180°	0.344	0.344	0.344	0.344		
TDC + 270°	0.344	0.344	0.344	0.344		
Average	0.344	0.344	0.344	0.344		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 39

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.203	0.203	0.188	0.188		
TDC + 90°	0.203	0.188	0.203	0.188		
TDC + 180°	0.203	0.188	0.203	0.203		
TDC + 270°	0.203	0.188	0.203	0.188		
Average	0.203	0.191	0.199	0.191		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Stage 3-New Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Conduct five 60 -> 0 mph full ABS stops (one per lap)

Location Track Straightaway Dry Asphalt
 Date 6/15/11
 Driver Ron Gromak
 Target
 Velocity,
 MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Track Index	Adjusted w/ Index
1	61.28	153.21	146.90	1.0099	148.35
2	60.39	149.46	147.54	1.0099	149.00
3	59.61	146.09	148.02	1.0099	149.49
4	60.19	145.06	144.16	1.0099	145.59
5	60.14	149.97	149.29	1.0099	150.76
= Average 60 mph SD feet			147.18		148.64
= Standard Deviation, 60 mph SD feet			1.90		1.92

Stage 4-New Tire Wet Jennite Stopping Distance Tests
(driver + full instrumentation + full fuel)

Conduct 10 35 -> 0 mph full ABS stops (one per lap)

Location	Wet Jennite (Sprinklers On)		
Date	6/15/11		
Driver	Ron Gromak		
Target Velocity, MPH	35		
	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet
Stop #			
1	35.32	100.13	98.34
2	35.45	98.20	95.71
3	35.54	97.97	94.99
4	35.51	94.67	91.95
5	34.42	95.42	98.66
6	36.31	101.18	93.99
7	35.86	99.69	94.99
8	34.55	95.07	97.59
9	36.28	103.71	96.54
10	35.19	98.94	97.88

= Average 35 mph SD feet 96.06

= Standard Deviation, 35 mph SD feet 2.14

Stage 6-New Tire Steady State Turn Max Lateral on Dry Asphalt

**Control vehicle/tire runs three 60->0 mph full ABS (one per lap)
on dynamics pad for reference**

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise)
until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Track Index	Adjusted w/ Index
1	CW	46.06	0.95	1.03	0.97
		Max Lat	0.95		
1	CCW	47.05	0.99	1.03	1.02
		Max Lat	0.99		

ADDITIONAL TEST CONDUCTED WITH STABILITY CONTROL TURNED OFF

1	CW	46.59	0.97	1.03	1.00
1	CCW	45.19	0.91	1.03	0.94

Stage 7-Tire Endurance/Wear Testing

Drive 100 laps at max speed on dry asphalt track (50 each direction).

Record lap times

Lap #	CW Lap Time, Sec	CCW Lap Time, Sec	Lap #	CW Lap Time, Sec	CCW Lap Time, Sec
1	61.139	62.651	38	60.733	62.034
2	60.769	62.369	39	60.585	61.506
3	61.119	61.456	40	61.274	62.019
4	60.533	61.83	41	61.38	62.283
5	60.223	61.815	42	61.074	61.356
6	60.47	61.962	43	60.733	62.424
7	60.618	61.774	44	61.35	62.085
8	60.634	61.678	45	60.621	61.908
9	60.38	61.696	46	61.2	61.356
10	60.797	62.116	47	61.24	61.871
11	60.929	62.568	48	60.064	62.004
12	60.449	61.861	49	62.422	62.146
13	60.807	61.731	50	62.692	61.164
14	60.433	61.486			
15	61.185	61.127	Avg =	60.946432	61.860162
16	60.629	61.81	Std Dev =	0.4087694	0.3729747
17	61.087	62.114	Min =	60.223	61.126
18	60.283	61.593	Max =	61.854	62.651
19	60.865	61.868	Range =	1.631	1.525
20	60.994	61.899			
21	60.956	61.923			
22	61.208	61.826			
23	61.519	61.126			
24	60.819	61.882			
25	60.593	62.401			
26	60.774	61.323			
27	61.496	61.598			
28	60.957	62.052			
29	61.45	61.767			
30	61.178	62.419			
31	61.854	61.901			
32	61.396	61.835			
33	61.307	62.414			
34	61.748	62.198			
35	60.921	61.467			
36	60.994	62.003			
37	61.505	61.287			

Temperatures of rotor and tire during endurance test

Vehicle Caprice Nokian WRG2

Lap Sequence	LF		LR		RR		RF	
	Rotor	Tire	Rotor	Tire	Rotor	Tire	Rotor	Tire
After 10 Laps	777	126	470	135	491	157	726	158
After 20 Laps	781	138	501	146	580	153	747	162
After 30 Laps	797	139	535	151	661	164	730	161
After 40 Laps	817	136	621	151	701	156	754	158
After 50 Laps	840	136	655	150	715	146	780	160
After 60 Laps	960	137	778	162	689	141	820	146
After 70 Laps	993	148	878	162	768	145	863	152
After 80 Laps	987	164	878	165	808	145	865	148
After 90 Laps	930	162	802	159	730	144	815	153
After 100 Laps	935	155	789	162	690	130	757	140

Stage 8-Worn Tire Dry Asphalt Stopping Distance Tests)
(driver + full instrumentation + full fuel

Control tire runs this stage

Conduct five 60 -> 0 mph full ABS stops (one per lap)
 For each stop record initial vehicle speed, stopping distance

Location Track Straightaway Dry Asphalt
 Date 6/15/11
 Driver Ron Gromak
 Target
 Velocity,
 MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Track Index	Adjusted w/ Index
1	60.81	142.92	139.14	0.9999	139.12
2	60.28	139.93	138.65	0.9999	138.64
3	60.32	142.65	141.14	0.9999	141.13
4	60.26	138.92	137.71	0.9999	137.69
5	60.01	139.24	139.19	0.9999	139.18
= Average 60 mph SD feet			139.17		139.15
= Standard Deviation, 60 mph SD feet			1.26		1.26

Stage 11-Worn Tire Steady State Turn Max Lateral on Dry Asphalt

**Control vehicle/tire runs three 60->0 mph full ABS (one per lap)
on dynamics pad for reference purposes**

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise)
until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Index	Adjusted w/ Index
1	CW	43.46	0.84	1.01	0.85
		Max Lat.	0.84		
1	CCW	44.88	0.90	1.01	0.91
		Max Lat.	0.90		

ADDITIONAL TEST CONDUCTED WITH STABILITY CONTROL OFF

1	CW	46.07	0.95	1.01	0.96
1	CCW	45.43	0.92	1.01	0.93

Stage 12- End of Test Tire Wear Check

Measure tire tread depth in each groove at four locations and record results in tire sheet

Left Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.109375	-0.140625	-0.125	-0.125	0	0
TDC + 90°	-0.109375	-0.125	-0.140625	-0.203125	0	0
TDC + 180°	-0.109375	-0.140625	-0.140625	-0.125	0	0
TDC + 270°	-0.109375	-0.140625	-0.125	-0.125	0	0
Average	-0.109375	-0.136719	-0.132813	-0.144531	0	0

% Wear 31.82% 39.77% 38.64% 42.05% LF AVG 38.07%

Right Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.109375	-0.109375	-0.125	-0.125	0	0
TDC + 90°	-0.125	-0.125	-0.109375	-0.125	0	0
TDC + 180°	-0.125	-0.12475	-0.125	-0.140625	0	0
TDC + 270°	-0.109375	-0.125	-0.125	-0.15625	0	0
Average	-0.117188	-0.121031	-0.121094	-0.136719	0	0

% Wear 34.09% 35.21% 35.23% 39.77% RF AVG 36.08%

Left Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.15625	-0.171875	-0.140625	-0.125	0	0
TDC + 90°	-0.15625	-0.171875	-0.171875	-0.15625	0	0
TDC + 180°	-0.140625	-0.15625	-0.15625	-0.140625	0	0
TDC + 270°	-0.140625	-0.171875	-0.15625	-0.140625	0	0
Average	-0.148438	-0.167969	-0.15625	-0.140625	0	0

% Wear 43.18% 48.86% 45.45% 40.91% LR AVG 44.60%

Right Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.140625	-0.140625	-0.15625	-0.15625	0	0
TDC + 90°	-0.140625	-0.15625	-0.140625	-0.15625	0	0
TDC + 180°	-0.140625	-0.15625	-0.140625	-0.140625	0	0
TDC + 270°	-0.140625	-0.15625	-0.140625	-0.15625	0	0
Average	-0.140625	-0.152344	-0.144531	-0.152344	0	0

% Wear 40.91% 44.32% 42.05% 44.32% RR AVG 42.90%

Average Wear by Tire Position

Tire Position	% Tread Consumed
LF AVG	38.07%
RF AVG	36.08%
LR AVG	44.60%
RR AVG	42.90%

Dodge Charger/Cooper CS4

2011 NIJ-MSP Tire Test Form General Info Form

Vehicle Application	Dodge Charger
Vehicle VIN	9H604210
Initial Odometer	5145
Tire Manufacturer	Cooper
Tire Brand Name	CS4

Track and Weather Info

Date of Test	6/7/11
Driver	Ron Gromak

Track Temperature Deg F	Initial	86° F
	Midpoint	113°
	Final	

Weather Info Temperature Deg F	Initial	78° F
	Midpoint	86° F
	Final	

Conditions Sunny, Hazy, Humid

TEST ABORTED -- TIRE FAILURE

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Dodge Charger

Tire Manufacturer Cooper

Tire Brand Name CS4

Tire Build Date 4210

DOT Code U9E4 CLT 4210

UTQG Treadwear Rating 520

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 100

Tire Position Left Front Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.297	0.328	0.328	0.297		
TDC + 90°	0.297	0.328	0.328	0.297		
TDC + 180°	0.297	0.328	0.328	0.297		
TDC + 270°	0.297	0.328	0.328	0.297		
Average	0.296875	0.328125	0.328125	0.296875		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) _____

Final Tire Tread Depth (inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.250	0.234	0.219	0.250		
TDC + 90°	0.250	0.219	0.234	0.219		
TDC + 180°	0.250	0.219	0.219	0.234		
TDC + 270°	0.250	0.219	0.234	0.234		
Average	0.25	0.22265625	0.2265625	0.234375		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Dodge Charger

Tire Manufacturer Cooper

Tire Brand Name CS4

Tire Build Date 4210

DOT Code U9E4 CLT 4210

UTQG Treadwear Rating 520

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 100

Tire Position Right Front Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.266	0.328	0.328	0.297		
TDC + 90°	0.266	0.328	0.328	0.297		
TDC + 180°	0.266	0.328	0.328	0.297		
TDC + 270°	0.266	0.328	0.328	0.297		
Average	0.265625	0.328125	0.328125	0.296875		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) _____

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.250	0.234	0.234	0.250		
TDC + 90°	0.250	0.219	0.234	0.250		
TDC + 180°	0.266	0.234	0.250	0.250		
TDC + 270°	0.266	0.234	0.250	0.234		
Average	0.2578125	0.23046875	0.2421875	0.2460938		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Dodge Charger

Tire Manufacturer Cooper

Tire Brand Name CS4

Tire Build Date 4210

DOT Code U9E4 CLT 4210

UTQG Treadwear Rating 520

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 100

Tire Position Left Rear Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.297	0.328	0.328	0.297		
TDC + 90°	0.297	0.328	0.328	0.297		
TDC + 180°	0.297	0.328	0.328	0.297		
TDC + 270°	0.297	0.328	0.328	0.297		
Average	0.296875	0.328125	0.328125	0.296875		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) _____

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.250	0.219	0.219	0.188		
TDC + 90°	0.234	0.219	0.219	0.203		
TDC + 180°	0.234	0.219	0.219	0.203		
TDC + 270°	0.250	0.219	0.219	0.219		
Average	0.2421875	0.21875	0.21875	0.203125		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Dodge Charger

Tire Manufacturer Cooper

Tire Brand Name CS4

Tire Build Date 4210

DOT Code U9E4 CLT 4210

UTQG Treadwear Rating 520

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 100

Tire Position Right Rear Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.297	0.328	0.328	0.297		
TDC + 90°	0.297	0.328	0.328	0.297		
TDC + 180°	0.297	0.328	0.328	0.297		
TDC + 270°	0.297	0.328	0.328	0.297		
Average	0.296875	0.328125	0.328125	0.296875		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) _____

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.203	0.172	0.203	0.219		
TDC + 90°	0.219	0.188	0.203	0.219		
TDC + 180°	0.219	0.172	0.203	0.219		
TDC + 270°	0.219	0.172	0.203	0.219		
Average	0.2148438	0.17578125	0.203125	0.21875		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Stage 2-Burnish (driver + full instrumentation + full fuel)

Control tire runs this stage only once

Conduct 10 60 -> 0 mph full ABS stops

Location Dry Asphalt
Date 6/7/11
Driver Ron Gromak
Target
Velocity,
MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet
1	62.40	147.15	136.04
2	63.09	149.10	134.86
3	62.87	145.56	132.57
4	62.43	149.09	137.70
5	60.42	137.49	135.59
6	61.76	146.61	138.39
7	60.94	139.98	135.69
8	61.46	149.13	142.15
9	60.01	139.44	139.39
10	61.12	142.52	137.33

= Average 60 mph SD feet 136.97

= Standard Deviation, 60 mph SD feet 2.66

Stage 3-New Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Conduct five 60 -> 0 mph full ABS stops (one per lap)

Location Track Straightaway Dry Asphalt
 Date 6/2/11
 Driver Ron Gromak
 Target
 Velocity,
 MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Index	Adjusted w/ Index
1	59.47	137.57	140.04	0.9826	137.60
2	61.32	144.31	138.18	0.9826	135.78
3	61.97	147.04	137.84	0.9826	135.45
4	61.84	146.44	137.85	0.9826	135.45
5	59.96	136.83	137.03	0.9826	134.64
= Average 60 mph SD feet			138.19		135.78
= Standard Deviation, 60 mph SD feet			1.12		1.10

Stage 5-New Tire Wet Asphalt Braking in a Turn Stopping Distance Tests
(driver + full instrumentation + full fuel)

Conduct 10 40 -> 0 mph full ABS stops (one per lap, five in each direction)

Location Turn 6 (Sprinklers On)
 Date 6/2/11
 Driver Ron Gromak
 Target
 Velocity,
 MPH 40

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Run Direction
1	40.67	96.37	93.20	CW
2	39.72	95.35	96.72	CW
3	41.04	85.60	81.33	CW
4	39.75	78.18	79.16	CW
5	42.48	87.88	77.94	CW
6	40.05	70.80	70.63	CCW
7	40.10	66.90	66.57	CCW
8	40.49	78.83	76.93	CCW
9	40.27	80.83	79.77	CCW
10	39.97	73.80	73.93	CCW

= Average 30 mph SD feet 79.62
 = Standard Deviation, 60 mph SD feet 9.27

Stage 6-New Tire Steady State Turn Max Lateral on Dry Asphalt

Control vehicle/tire runs three 60->0 mph full ABS (one per lap) on dynamics pad for reference purposes.

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise) until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Index	Adjusted w/ Index
1	CW	44.21	0.87	0.95	0.83
		Max Lat	0.87		
1	CCW	45.52	0.92	0.95	0.88
		Max Lat	0.92		

Stage 7-Tire Endurance/Wear Testing

Drive 100 laps at max speed on dry asphalt track (50 each direction).

Tested aborted due to excess tire wear

Lap #	CW Lap Time, Sec	CCW Lap Time, Sec		
1			38	
2			39	
3			40	
4			41	
5			42	
6			43	
7			44	
8			45	
9			46	
10			47	
11			48	
12			49	
13			50	
14				
15			Avg =	
16			Std Dev =	
17			Min =	0
18			Max =	0
19			Range =	0
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				

Temperature of rotor and tire during endurance test

Vehicle Charger Cooper Tire

Lap Sequence	LF		LR		RR		RF	
	Rotor	Tire	Rotor	Tire	Rotor	Tire	Rotor	Tire
After 10 Laps	665	165	270	167	277	188	717	201
After 20 Laps	770	175	247	173	323	214	777	210
After 30 Laps		171	276	164	303	192	741	198
After 40 Laps	666	179	266	177	318	193	772	208
After 50 Laps	640	180	277	174	335	198	804	203
After 60 Laps								
After 70 Laps								
After 80 Laps								
After 90 Laps								
Post Test								

Stage 8-Worn Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Test aborted due to excess tire wear

Conduct five 60 -> 0 mph full ABS stops (one per lap)

For each stop record initial vehicle speed, stopping distance

Location	Track Straightaway Dry Asphalt
Date	6/2/11
Driver	Ron Gromak
Target Velocity, MPH	60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet
1			
2			
3			
4			
5			

= Average 60 mph SD feet

Stage 9-Worn Tire Wet Jennite Stopping Distance Tests
(driver + full instrumentation + full fuel)

Tested aborted due to excess tire wear

Conduct 10 35 -> 0 mph full ABS stops (one per lap)
For each stop record initial vehicle speed, stopping distance

Location	Wet Jennite (Sprinklers On)		
Date	6/2/11		
Driver	Ron Gromak		
Target Velocity, MPH	35		
	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet
Stop #			
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

= Average 30 mph SD feet

= Standard Deviation, 60 mph SD feet

Stage 10-Worn Tire Wet Asphalt Braking in a Turn Stopping Distance Tests
(driver + full instrumentation + full fuel)

Test aborted due to excess tire wear

Conduct 10 40 -> 0 mph full ABS stops (one per lap, five in each direction)
For each stop record initial vehicle speed, stopping distance, run direction (CW, CCW)

Location Turn 6 (Sprinklers On)
Date 6/2/11
Driver Ron Gromak
Target
Velocity,
MPH 40

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Run Direction
1				CW
2				CW
3				CW
4				CW
5				CW
6				CCW
7				CCW
8				CCW
9				CCW
10				CCW

= Average 30 mph SD feet

= Standard Deviation, 60 mph SD feet

Stage 11-Worn Tire Steady State Turn Max Lateral on Dry Asphalt

Test aborted due to excess tire wear

**Control vehicle/tire runs three 60->0 mph full ABS (one per lap)
on dynamics pad for reference purposes.**

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise)
until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G
1	CW		0
		Max Lat.	0
1	CCW		0
		Max Lat.	0

Stage 12- End of Test Tire Wear Check

Measure tire tread depth in each groove at four locations

Left Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.046875	-0.09375	-0.109375	-0.046875	0	0
TDC + 90°	-0.046875	-0.109375	-0.09375	-0.078125	0	0
TDC + 180°	-0.046875	-0.109375	-0.109375	-0.0625	0	0
TDC + 270°	-0.046875	-0.109375	-0.09375	-0.0625	0	0
Average	-0.046875	-0.105469	-0.101563	-0.0625	0	0

Right Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.015625	-0.09375	-0.09375	-0.046875	0	0
TDC + 90°	-0.015625	-0.109375	-0.09375	-0.046875	0	0
TDC + 180°	0	-0.09375	-0.078125	-0.046875	0	0
TDC + 270°	0	-0.09375	-0.078125	-0.0625	0	0
Average	-0.007813	-0.097656	-0.085938	-0.050781	0	0

Left Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.046875	-0.109375	-0.109375	-0.109375	0	0
TDC + 90°	-0.0625	-0.109375	-0.109375	-0.09375	0	0
TDC + 180°	-0.0625	-0.109375	-0.109375	-0.09375	0	0
TDC + 270°	-0.046875	-0.109375	-0.109375	-0.078125	0	0
Average	-0.054688	-0.109375	-0.109375	-0.09375	0	0

Right Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.09375	-0.15625	-0.125	-0.078125	0	0
TDC + 90°	-0.078125	-0.140625	-0.125	-0.078125	0	0
TDC + 180°	-0.078125	-0.15625	-0.125	-0.078125	0	0
TDC + 270°	-0.078125	-0.15625	-0.125	-0.078125	0	0
Average	-0.082031	-0.152344	-0.125	-0.078125	0	0

Dodge Charger/Firestone Firehawk GT Pursuit

2011 NIJ-MSP Tire Test Form General Info Form

Vehicle Application	<u>Charger</u>
Vehicle VIN	<u>9H604201</u>
Initial Odometer	<u>5225</u>
Tire Manufacturer	<u>Firestone</u>
Tire Brand Name	<u>Firehawk GT</u>

General Track and Weather Info

Date of Test	<u>6/9/11</u>
Driver	<u>Ron Gromak</u>

Track Temperature	Initial	<u>74° F</u>
Deg F	Midpoint	<u>81° F</u>
	Final	<u>83° F</u>

Weather Info	Initial	<u>68° F</u>
Temperature	Midpoint	<u>71° F</u>
Deg F	Final	<u>71° F</u>

Conditions Cloudy, Some Wind 10-12 MPH

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Charger

Tire Manufacturer Firestone

Tire Brand Name Firehawk GT

Tire Build Date 0511

DOT Code W27DFHY

UTQG Treadwear Rating 340

UTQG Load Rating A

UTQG Traction Rating AA

Speed Rating W

Load Index 99

Tire Position Left Front Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.328	0.188	0.344	0.188	0.328	
TDC + 90°	0.328	0.188	0.344	0.188	0.328	
TDC + 180°	0.328	0.188	0.344	0.188	0.328	
TDC + 270°	0.328	0.188	0.344	0.188	0.328	
Average	0.328	0.188	0.344	0.188	0.328	

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 35

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.188	0.047	0.188	0.031	0.219	
TDC + 90°	0.156	0.031	0.188	0.016	0.219	
TDC + 180°	0.172	0.031	0.203	0.031	0.203	
TDC + 270°	0.219	0.031	0.203	0.031	0.219	
Average	0.184	0.035	0.195	0.027	0.215	

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Charger

Tire Manufacturer Firestone

Tire Brand Name Firehawk GT

Tire Build Date 0511

DOT Code W27DFHY

UTQG Treadwear Rating 340

UTQG Load Rating A

UTQG Traction Rating AA

Speed Rating W

Load Index 99

Tire Position Right Front Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.344	0.188	0.344	0.188	0.328	
TDC + 90°	0.344	0.188	0.344	0.188	0.328	
TDC + 180°	0.344	0.188	0.344	0.188	0.328	
TDC + 270°	0.344	0.188	0.344	0.188	0.328	
Average	0.344	0.188	0.344	0.188	0.328	

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 35

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.234	0.047	0.219	0.031	0.203	
TDC + 90°	0.234	0.063	0.203	0.031	0.203	
TDC + 180°	0.219	0.063	0.203	0.031	0.203	
TDC + 270°	0.219	0.063	0.203	0.031	0.203	
Average	0.227	0.059	0.207	0.031	0.203	

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Charger

Tire Manufacturer Firestone

Tire Brand Name Firehawk GT

Tire Build Date 0511

DOT Code W27DFHY

UTQG Treadwear Rating 340

UTQG Load Rating A

UTQG Traction Rating AA

Speed Rating W

Load Index 99

Tire Position Left Rear Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.297	0.359	0.359	0.297	0.328	
TDC + 90°	0.297	0.359	0.359	0.297	0.328	
TDC + 180°	0.297	0.359	0.359	0.297	0.328	
TDC + 270°	0.297	0.359	0.359	0.297	0.328	
Average	0.297	0.359	0.359	0.297	0.328	

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 35

Final Tire Tread Depth (inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.234	0.078	0.234	0.063	0.219	
TDC + 90°	0.234	0.078	0.219	0.047	0.234	
TDC + 180°	0.234	0.078	0.219	0.047	0.234	
TDC + 270°	0.266	0.078	0.234	0.063	0.219	
Average	0.242	0.078	0.227	0.055	0.227	

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Charger

Tire Manufacturer Firestone

Tire Brand Name Firehawk GT

Tire Build Date 0511

DOT Code W27DFHY

UTQG Treadwear Rating 340

UTQG Load Rating A

UTQG Traction Rating AA

Speed Rating W

Load Index 99

Tire Position Right Rear Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.344	0.188	0.359	0.188	0.344	
TDC + 90°	0.344	0.188	0.359	0.188	0.344	
TDC + 180°	0.344	0.188	0.359	0.188	0.344	
TDC + 270°	0.344	0.188	0.359	0.188	0.344	
Average	0.344	0.188	0.359	0.188	0.344	

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 35

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.188	0.031	0.203	0.031	0.234	
TDC + 90°	0.156	0.016	0.188	0.031	0.219	
TDC + 180°	0.063	0.031	0.156	0.016	0.203	
TDC + 270°	0.078	0.016	0.156	0.016	0.203	
Average	0.121	0.023	0.176	0.023	0.215	

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Stage 3-New Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Conduct five 60 -> 0 mph full ABS stops (one per lap)

Location Track Straightaway Dry Asphalt
 Date 6/9/11
 Driver Ron Gromak
 Target
 Velocity,
 MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Index	Adjusted w/ Index
1	61.15	138.73	133.58	1.0333	138.03
2	59.63	133.02	134.69	1.0333	139.17
3	61.08	140.97	136.02	1.0333	140.55
4	60.90	139.35	135.28	1.0333	139.78
5	61.35	140.82	134.71	1.0333	139.20
= Average 60 mph SD feet			134.86		139.35
= Standard Deviation, 60 mph SD feet			0.89		0.92

Stage 6-New Tire Steady State Turn Max Lateral on Dry Asphalt

Control vehicle/tire runs three 60->0 mph full ABS (one per lap) on dynamics pad for reference purposes.

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise) until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Index	Adjusted w/ Index
1	CW	47.45	1.00	1.04	1.05
		Max Lat	1.00		
1	CCW	46.07	0.95	1.04	0.99
		Max Lat	0.95		

ADDITIONAL RUNS MADE WITH STABILITY CONTROL TURNED OFF

1	CW	44.99	0.90	1.04	0.94
1	CCW	46.10	0.95	1.04	0.99

Stage 7-Tire Endurance/Wear Testing

Drive 100 laps at max speed on dry asphalt track (50 each direction).

Lap #	CW Lap Time, Sec	CCW Lap Time, Sec	Lap #	CW Lap Time, Sec	CCW Lap Time, Sec
1	62.405	62.832	38	62.57	63.706
2	62.599	62.515	39	62.167	63.496
3	62.241	62.858	40	62.69	63.679
4	62.349	62.801	41	61.967	64.112
5	62.41	62.775	42	61.581	63.856
6	62.828	63.332	43	62.518	63.483
7	62.945	63.084	44	61.896	63.678
8	62.605	63.054	45	62.134	64.195
9	63.378	63.381	46	62.54	63.508
10	62.395	63.489	47	62.252	63.909
11	62.704	62.938	48	62.463	64.337
12	62.925	63.533	49	61.941	64.604
13	62.205	62.742	50	62.164	63.773
14	62.563	62.335			
15	62.875	63.049	Avg =	62.505676	63.264865
16	62.465	62.471	Std Dev =	0.2754545	0.4932294
17	62.7	62.653	Min =	61.945	62.335
18	62.26	62.896	Max =	63.378	64.052
19	62.48	62.519	Range =	1.433	1.717
20	62.742	62.809			
21	62.479	63.336			
22	62.201	63.695			
23	62.519	63.903			
24	62.604	63.44			
25	62.597	63.369			
26	62.64	63.739			
27	62.389	63.671			
28	62.549	63.914			
29	62.588	64.052			
30	62.236	63.746			
31	62.474	63.498			
32	62.291	63.293			
33	62.297	63.626			
34	62.58	63.754			
35	62.121	63.735			
36	62.126	63.984			
37	61.945	63.979			

Temperature of rotor and tire during endurance test

Vehicle Charger Firestone Firehawk GT

Lap Sequence	LF		LR		RR		RF	
	Rotor	Tire	Rotor	Tire	Rotor	Tire	Rotor	Tire
After 10 Laps	733	138	262	125	342	167	737	168
After 20 Laps	788	148	272	138	291	178	815	179
After 30 Laps	714	146	247	130	335	176	740	176
After 40 Laps	760	138	262	131	363	156	720	171
After 50 Laps	684	148	285	133	380	149	676	160
After 60 Laps	883	162	386	151	374	123	757	140
After 70 Laps	870	156	385	157	392	119	763	132
After 80 Laps	855	146	373	145	399	130	739	135
After 90 Laps	847	159	386	150	442	139	710	137
After 100 Laps	860	155	386	145	444	136	696	142

Stage 8-Worn Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Conduct five 60 -> 0 mph full ABS stops (one per lap)
 For each stop record initial vehicle speed, stopping distance

Location Track Straightaway Dry Asphalt
 Date 6/9/11
 Driver Ron Gromak
 Target
 Velocity,
 MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Index	Adjusted w/ Index
1	61.38	158.23	151.19	1.0076	152.34
2	60.96	152.65	147.90	1.0076	149.02
3	60.85	155.49	151.17	1.0076	152.31
4	60.52	148.94	146.41	1.0076	147.52
5	60.97	154.97	150.08	1.0076	151.22
= Average 60 mph SD feet			149.35		150.48
= Standard Deviation, 60 mph SD feet			2.12		2.14

Stage 11-Worn Tire Steady State Turn Max Lateral on Dry Asphalt

Control vehicle/tire runs three 60->0 mph full ABS (one per lap) on dynamics pad for reference purposes.

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise) until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Index	Adjusted w/ Index
1	CW	46.47	0.96	1.01	0.97
		Max Lat.	0.96		
1	CCW	45.82	0.94	1.01	0.95
		Max Lat.	0.94		

ADDITIONAL RUNS MADE WITH STABILITY CONTROL TURNED OFF

1	CW	48.17	1.03	1.01	1.05
1	CCW	47.71	1.01	1.01	1.03

Stage 12- End of Test Tire Wear Check

Measure tire tread depth in each groove at four locations

Left Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.140625	-0.140625	-0.15625	-0.15625	-0.109375	0
TDC + 90°	-0.171875	-0.15625	-0.15625	-0.171875	-0.109375	0
TDC + 180°	-0.15625	-0.15625	-0.140625	-0.15625	-0.125	0
TDC + 270°	-0.109375	-0.15625	-0.140625	-0.15625	-0.109375	0
Average	-0.144531	-0.152344	-0.148438	-0.160156	-0.113281	0

% Wear 44.05% 81.25% 43.18% 85.42% LF AVG 63.47%

Right Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.109375	-0.140625	-0.125	-0.15625	-0.125	0
TDC + 90°	-0.109375	-0.125	-0.140625	-0.15625	-0.125	0
TDC + 180°	-0.125	-0.125	-0.140625	-0.15625	-0.125	0
TDC + 270°	-0.125	-0.125	-0.140625	-0.15625	-0.125	0
Average	-0.117188	-0.128906	-0.136719	-0.15625	-0.125	0

% Wear 34.09% 68.75% 39.77% 83.33% RF AVG 56.49%

Left Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.0625	-0.28125	-0.125	-0.234375	-0.109375	0
TDC + 90°	-0.0625	-0.28125	-0.140625	-0.25	-0.09375	0
TDC + 180°	-0.0625	-0.28125	-0.140625	-0.25	-0.09375	0
TDC + 270°	-0.03125	-0.28125	-0.125	-0.234375	-0.109375	0
Average	-0.054688	-0.28125	-0.132813	-0.242188	-0.101563	0

% Wear 18.42% 78.26% 36.96% 81.58% LR AVG 53.80%

Right Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.15625	-0.15625	-0.15625	-0.15625	-0.109375	0
TDC + 90°	-0.1875	-0.171875	-0.171875	-0.15625	-0.125	0
TDC + 180°	-0.28125	-0.15625	-0.203125	-0.171875	-0.140625	0
TDC + 270°	-0.265625	-0.171875	-0.203125	-0.171875	-0.140625	0
Average	-0.222656	-0.164063	-0.183594	-0.164063	-0.128906	0

% Wear 64.77% 87.50% 51.09% 87.50% RR AVG 72.71%

Average Wear by Tire Position

Tire Position	% Tread Consumed
LF AVG	63.47%
RF AVG	56.49%
LR AVG	53.80%
RR AVG	72.71%

Dodge Charger/Goodyear Eagle RSA

2011 NIJ-MSP Tire Test Form General Info Form

Vehicle Application	<u>Charger</u>
Vehicle VIN	<u>9H604210</u>
Initial Odometer	<u>5375</u>
Tire Manufacturer	<u>Goodyear</u>
Tire Brand Name	<u>Eagle RSA</u>

General Track and Weather Info

Date of Test	<u>14-Jun-11</u>
Driver	<u>Ron Gromak</u>

Track Temperature	Initial	<u>65° F</u>
Deg F	Midpoint	<u>95° F</u>
	Final	<u>106° F</u>

Weather Info		
Temperature	Initial	<u>57° F</u>
Deg F	Midpoint	<u>70° F</u>
	Final	<u>76° F</u>

Conditions Sunny, Cool, Light Winds

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Charger

Tire Manufacturer Goodyear

Tire Brand Name Eagle RSA

Tire Build Date 0611

DOT Code M670 KAIR 0611

UTQG Treadwear Rating 260

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating W

Load Index 99

Tire Position Left Front Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.313	0.344	0.344	0.313		
TDC + 90°	0.313	0.344	0.344	0.313		
TDC + 180°	0.313	0.344	0.344	0.313		
TDC + 270°	0.313	0.344	0.344	0.313		
Average	0.313	0.344	0.344	0.313		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 38

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.234	0.234	0.234	0.234		
TDC + 90°	0.250	0.234	0.219	0.219		
TDC + 180°	0.234	0.234	0.234	0.219		
TDC + 270°	0.234	0.234	0.250	0.219		
Average	0.238	0.234	0.234	0.223		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Charger

Tire Manufacturer Goodyear

Tire Brand Name Eagle RSA

Tire Build Date 0611

DOT Code M670 KAIR 0611

UTQG Treadwear Rating 260

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating W

Load Index 99

Tire Position Right Front Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.328	0.344	0.344	0.328		
TDC + 90°	0.328	0.344	0.344	0.328		
TDC + 180°	0.328	0.344	0.344	0.328		
TDC + 270°	0.328	0.344	0.344	0.328		
Average	0.328	0.344	0.344	0.328		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 39

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.234	0.250	0.250	0.219		
TDC + 90°	0.234	0.234	0.234	0.219		
TDC + 180°	0.234	0.250	0.234	0.219		
TDC + 270°	0.234	0.250	0.250	0.219		
Average	0.234	0.246	0.242	0.219		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Charger

Tire Manufacturer Goodyear

Tire Brand Name Eagle RSA

Tire Build Date 0611

DOT Code M670 KAIR 0611

UTQG Treadwear Rating 260

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating W

Load Index 99

Tire Position Left Rear Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.313	0.344	0.344	0.313		
TDC + 90°	0.313	0.344	0.344	0.313		
TDC + 180°	0.313	0.344	0.344	0.313		
TDC + 270°	0.313	0.344	0.344	0.313		
Average	0.313	0.344	0.344	0.313		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 37

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.266	0.266	0.250	0.234		
TDC + 90°	0.266	0.266	0.266	0.234		
TDC + 180°	0.266	0.281	0.266	0.234		
TDC + 270°	0.266	0.266	0.266	0.234		
Average	0.266	0.270	0.262	0.234		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Charger

Tire Manufacturer Goodyear

Tire Brand Name Eagle RSA

Tire Build Date 0611

DOT Code M670 KAIR 0611

UTQG Treadwear Rating 260

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating W

Load Index 99

Tire Position Right Rear Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.313	0.344	0.344	0.313		
TDC + 90°	0.313	0.344	0.344	0.313		
TDC + 180°	0.313	0.344	0.344	0.313		
TDC + 270°	0.313	0.344	0.344	0.313		
Average	0.313	0.344	0.344	0.313		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 38

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.234	0.250	0.266	0.250		
TDC + 90°	0.234	0.266	0.250	0.234		
TDC + 180°	0.234	0.266	0.266	0.250		
TDC + 270°	0.234	0.250	0.250	0.234		
Average	0.234	0.258	0.258	0.242		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Stage 3-New Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Conduct five 60 -> 0 mph full ABS stops (one per lap)

Location Track Straightaway Dry Asphalt
 Date 6/14/11
 Driver Ron Gromak
 Target
 Velocity,
 MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Index	Adjusted w/ Index
1	61.05	142.15	137.30	1.0145	139.29
2	60.50	141.79	139.47	1.0145	141.50
3	60.59	143.28	140.50	1.0145	142.53
4	60.74	144.65	141.13	1.0145	143.18
5	61.33	145.10	138.86	1.0145	140.87
= Average 60 mph SD feet			139.45		141.47
= Standard Deviation, 60 mph SD feet			1.49		1.51

Stage 6-New Tire Steady State Turn Max Lateral on Dry Asphalt

Control vehicle/tire runs three 60->0 mph full ABS (one per lap) on dynamics pad for reference purposes.

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise) until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Index	Adjusted w/ Index
1	CW	45.21	0.91	1.03	0.94
		Max Lat	0.91		
1	CCW	45.74	0.93	1.03	0.96
		Max Lat	0.93		

ADDITIONAL TEST CONDUCTED WITH STABILITY CONTROL TURNED OFF

1	CW	44.14	0.87	1.03	0.89
1	CCW	46.44	0.96	1.03	0.99

Stage 7-Tire Endurance/Wear Testing

Drive 100 laps at max speed on dry asphalt track (50 each direction).

Lap #	CW Lap Time, Sec	CCW Lap Time, Sec	Lap #	CW Lap Time, Sec	CCW Lap Time, Sec
1	62.386	62.359	37	62.222	62.84
2	61.448	62.49	38	62.307	63.25
3	61.369	62.46	39	61.896	63.036
4	61.952	62.575	40	61.876	62.76
5	61.787	62.344	41	61.934	62.378
6	61.677	62.225	42	61.749	61.977
7	62.227	62.675	43	62.128	62.16
8	62.122	62.846	44	61.91	61.467
9	62.509	62.469	45	62.015	61.823
10	62.347	62.365	46	62.022	62.374
11	62.403	61.556	47	61.98	62.799
12	61.516	61.485	48	61.438	62.639
13	61.597	61.891	49	61.685	62.042
14	61.481	62.109	50	61.669	62.394
15	61.723	61.734			
16	61.729	61.898	Avg =	61.944111	62.391417
17	61.871	63.016	Std Dev =	0.2971831	0.4210578
18	61.951	62.079	Min =	61.369	61.485
19	61.618	62.179	Max =	62.509	63.317
20	61.957	62.012	Range =	1.14	1.832
21	62.357	61.828			
22	62.104	62.344			
23	62.373	62.374			
24	61.993	62.775			
25	61.863	62.331			
26	62.144	62.782			
27	62.111	62.844			
28	61.907	63.317			
29	61.816	62.223			
30	62.004	63.08			
31	62.05	62.77			
32	62.274	62.447			
33	61.707	62.475			
34	61.901	62.584			
35	61.963	62.271			
36	61.751	62.879			

Temperature of rotor and tire during endurance test

Vehicle Charger Goodyear Eagle RSA

Lap Sequence	LF		LR		RR		RF	
	Rotor	Tire	Rotor	Tire	Rotor	Tire	Rotor	Tire
After 10 Laps	743	129	309	123	304	156	747	158
After 20 Laps	792	136	451*	129	330	160	760	163
After 30 Laps	747	139	350	135	347	159	742	160
After 40 Laps	700	142	333	130	356	163	724	165
After 50 Laps	740	143	305	137	314	170	720	166
After 60 Laps	850	169	386	156	370	130	713	119
After 70 Laps	927	180	379	167	414	140	785	139
After 80 Laps	913	180	400	167	393	135	735	122
After 90 Laps	896	180	369	164	390	146	745	141
After 100 Laps	868	170	413	163	425	152	746	145

* Temp high due to loose caliper, caliper tightened on track and testing continued

Stage 8-Worn Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Conduct five 60 -> 0 mph full ABS stops (one per lap)
 For each stop record initial vehicle speed, stopping distance

Location Track Straightaway Dry Asphalt
 Date 6/14/11
 Driver Ron Gromak
 Target
 Velocity,
 MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Index	Adjusted w/ Index
1	61.69	163.25	154.42	1.0003	154.46
2	60.73	156.12	152.37	1.0003	152.42
3	61.56	157.20	149.32	1.0003	149.37
4	61.88	160.02	150.43	1.0003	150.48
5	60.68	152.08	148.67	1.0003	148.71
= Average 60 mph SD feet			151.04		151.09
= Standard Deviation, 60 mph SD feet			2.35		2.35

Stage 11-Worn Tire Steady State Turn Max Lateral on Dry Asphalt

**Control vehicle/tire runs three 60->0 mph full ABS (one per lap)
on dynamics pad for reference purposes.**

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise)
until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Index	Adjusted w/ Index
1	CW	46.93	0.98	1.01	0.99
		Max Lat.	0.98		
1	CCW	44.35	0.88	1.01	0.89
		Max Lat.	0.88		

ADDITIONAL TEST CONDUCTED WITH STABILITY CONTROL TURNED OFF

1	CW	45.14	0.91	1.01	0.92
1	CCW	45.45	0.92	1.01	0.93

Stage 12- End of Test Tire Wear Check

Measure tire tread depth in each groove at four locations and record results in tire sheet
 Recheck and record cold tire inflation pressure

Left Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.078125	-0.109375	-0.109375	-0.078125	0	0
TDC + 90°	-0.0625	-0.109375	-0.125	-0.09375	0	0
TDC + 180°	-0.078125	-0.109375	-0.109375	-0.09375	0	0
TDC + 270°	-0.078125	-0.109375	-0.09375	-0.09375	0	0
Average	-0.074219	-0.109375	-0.109375	-0.089844	0	0

% Wear 23.75% 31.82% 31.82% 28.75% LF AVG 29.03%

Right Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.09375	-0.09375	-0.09375	-0.109375	0	0
TDC + 90°	-0.09375	-0.109375	-0.109375	-0.109375	0	0
TDC + 180°	-0.09375	-0.09375	-0.109375	-0.109375	0	0
TDC + 270°	-0.09375	-0.09375	-0.09375	-0.109375	0	0
Average	-0.09375	-0.097656	-0.101563	-0.109375	0	0

% Wear 28.57% 28.41% 29.55% 33.33% RF AVG 29.96%

Left Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.046875	-0.078125	-0.09375	-0.078125	0	0
TDC + 90°	-0.046875	-0.078125	-0.078125	-0.078125	0	0
TDC + 180°	-0.046875	-0.0625	-0.078125	-0.078125	0	0
TDC + 270°	-0.046875	-0.078125	-0.078125	-0.078125	0	0
Average	-0.046875	-0.074219	-0.082031	-0.078125	0	0

% Wear 15.00% 21.59% 23.86% 25.00% LR AVG 21.36%

Right Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.078125	-0.09375	-0.078125	-0.0625	0	0
TDC + 90°	-0.078125	-0.078125	-0.09375	-0.078125	0	0
TDC + 180°	-0.078125	-0.078125	-0.078125	-0.0625	0	0
TDC + 270°	-0.078125	-0.09375	-0.09375	-0.078125	0	0
Average	-0.078125	-0.085938	-0.085938	-0.070313	0	0

% Wear 25.00% 25.00% 25.00% 22.50% RR AVG 24.38%

Average Wear by Tire Position

Tire Position	% Tread Consumed
LF AVG	29.03%
RF AVG	29.96%
LR AVG	21.36%
RR AVG	24.38%

Chevrolet Tahoe/Firestone Firehawk GT Pursuit

2011 NIJ-MSP Tire Test Form General Info Form

Vehicle Application Tahoe
Vehicle VIN AR245440
Initial Odometer 0052
Tire Manufacturer Firestone
Tire Brand Name Firehawk GT

General Track and Weather Info

Date of Test 8-Jun-11
Driver Matt Rogers

Track Temperature Initial 87° F
Deg F Midpoint 108° F
Final 116° F

Weather Info
Temperature Initial 80° F
Deg F Midpoint 87° F
Final 98° F

Conditions Hot, Hazy, Humid

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Tahoe

Tire Manufacturer Firestone

Tire Brand Name Firehawk GT

Tire Build Date 1811

DOT Code W2C5 FJ5 1811

UTQG Treadwear Rating 340

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating H

Load Index 108

Tire Position Left Front Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.328	0.344	0.344	0.328		
TDC + 90°	0.328	0.344	0.344	0.328		
TDC + 180°	0.328	0.344	0.344	0.328		
TDC + 270°	0.328	0.344	0.344	0.328		
Average	0.328125	0.34375	0.34375	0.328125		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) _____

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.203	0.266	0.266	0.250		
TDC + 90°	0.219	0.266	0.250	0.250		
TDC + 180°	0.219	0.266	0.250	0.250		
TDC + 270°	0.234	0.297	0.266	0.250		
Average	0.21875	0.2734375	0.2578125	0.25		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Tahoe

Tire Manufacturer Firestone

Tire Brand Name Firehawk GT

Tire Build Date 1811

DOT Code W2C5 FJ5 1811

UTQG Treadwear Rating 340

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating H

Load Index 108

Tire Position Right Front Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.328	0.344	0.344	0.313		
TDC + 90°	0.328	0.344	0.344	0.313		
TDC + 180°	0.328	0.344	0.344	0.313		
TDC + 270°	0.328	0.344	0.344	0.313		
Average	0.328125	0.34375	0.34375	0.3125		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) _____

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.250	0.297	0.266	0.250		
TDC + 90°	0.250	0.281	0.250	0.250		
TDC + 180°	0.250	0.281	0.250	0.250		
TDC + 270°	0.266	0.281	0.266	0.234		
Average	0.2539063	0.28515625	0.2578125	0.2460938		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Tahoe

Tire Manufacturer Firestone

Tire Brand Name Firehawk GT

Tire Build Date 1811

DOT Code W2C5 FJ5 1811

UTQG Treadwear Rating 340

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating H

Load Index 108

Tire Position Left Rear Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.328	0.344	0.344	0.328		
TDC + 90°	0.328	0.344	0.344	0.328		
TDC + 180°	0.328	0.344	0.344	0.328		
TDC + 270°	0.328	0.344	0.344	0.328		
Average	0.328125	0.34375	0.34375	0.328125		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) _____

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.266	0.219	0.281	0.250		
TDC + 90°	0.266	0.297	0.297	0.250		
TDC + 180°	0.250	0.281	0.281	0.266		
TDC + 270°	0.266	0.297	0.281	0.266		
Average	0.2617188	0.2734375	0.2851563	0.2578125		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Tahoe

Tire Manufacturer Firestone

Tire Brand Name Firehawk GT

Tire Build Date 1811

DOT Code W2C5 FJ5 1811

UTQG Treadwear Rating 340

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating H

Load Index 108

Tire Position Right Rear Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.328	0.344	0.313	0.313		
TDC + 90°	0.328	0.344	0.313	0.313		
TDC + 180°	0.328	0.344	0.313	0.313		
TDC + 270°	0.328	0.344	0.313	0.313		
Average	0.328125	0.34375	0.3125	0.3125		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) _____

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.250	0.313	0.281	0.234		
TDC + 90°	0.281	0.313	0.297	0.234		
TDC + 180°	0.266	0.313	0.297	0.250		
TDC + 270°						
Average	0.265625	0.3125	0.2916667	0.2395833		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Stage 3-New Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Conduct five 60 -> 0 mph full ABS stops (one per lap)

Location Track Straightaway Dry Asphalt
 Date 6/8/11
 Driver Matt Rogers
 Target
 Velocity,
 MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Index	Adjusted w/ Index
1	60.74	139.76	136.36	0.9777	133.31
2	61.28	142.61	136.73	0.9777	133.68
3	60.98	139.38	134.95	0.9777	131.94
4	60.30	139.25	137.89	0.9777	134.81
5	61.02	143.27	138.53	0.9777	135.44
= Average 60 mph SD feet			136.89		133.84
= Standard Deviation, 60 mph SD feet			1.39		1.36

Stage 6-New Tire Steady State Turn Max Lateral on Dry Asphalt

Control vehicle/tire runs three 60->0 mph full ABS (one per lap) on dynamics pad for reference purposes.

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise) until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Index	Adjusted w/ Index
1	CW	45.16	0.91	0.95	0.87
1	CCW	44.81	0.89	0.95	0.85
		Max Lat	0.89		

ADDITIONAL RUNS MADE WITH STABILITY CONTROL OFF

1	CW	46.61	0.97	0.95	0.92
1	CCW	49.47	1.09	0.95	1.04

Stage 7-Tire Endurance/Wear Testing

Drive 100 laps at max speed on dry asphalt track (50 each direction).

Lap #	CW Lap Time, Sec	CCW Lap Time, Sec	Lap #	CW Lap Time, Sec	CCW Lap Time, Sec
1	68.4	68.1	37	67.9	68.8
2	67.9	67.5	38	68.3	68.3
3	68.8	68	39	68	69.1
4	70	67.7	40	68.1	69.3
5	70.5	68.3	41	67.8	68.5
6	69.8	68.2	42	68	68.3
7	71	68.4	43	68.5	68.5
8	70.5	68.3	44	68.1	68.2
9	70.7	68.5	45	68.5	68.2
10	70.3	67.9	46	67.7	68.7
11	68.3	68.3	47	68	68.2
12	68.9	68.6	48	67.5	68.4
13	69.1	68.7	49	67.6	68.4
14	68.9	68.6	50	67.6	69.1
15	68.9	68.6			
16	68.2	68.4	Avg =	68.708333	68.269444
17	68.6	68.3	Std Dev =	0.9475909	0.3284765
18	68.8	68.2	Min =	67.4	67.5
19	68	68.5	Max =	71	68.9
20	67.7	68	Range =	3.6	1.4
21	68.8	68.2			
22	68.3	67.6			
23	67.8	68.5			
24	68.3	68.2			
25	68.3	67.9			
26	68.1	68.5			
27	68.2	68.7			
28	67.5	68.5			
29	68.1	68.2			
30	67.9	68.2			
31	67.9	68.7			
32	68.5	68.2			
33	68.6	67.7			
34	68	68.2			
35	67.4	68.4			
36	68.5	68.9			

Temperatures of rotor and tire during endurance test

Vehicle Tahoe Firestone Firehawk GT

Lap Sequence	LF		LR		RR		RF	
	Rotor	Tire	Rotor	Tire	Rotor	Tire	Rotor	Tire
After 10 Laps	827	153	375	142	386	150	800	175
After 20 Laps	820	168	335	148	425	162	780	192
After 30 Laps	822	171	376	145	420	160	807	180
After 40 Laps	847	160	370	146	500	155	834	190
After 50 Laps	807	165	360	148	480	164	758	175
After 60 Laps	701	170	330	158	366	139	625	149
After 70 Laps	885	169	420	164	402	153	769	164
After 80 Laps	918	178	595	158	450	156	766	166
After 90 Laps	945	167	623	158	437	146	806	161
After 100 Laps	942	177	644	160	425	159	812	161

Stage 8-Worn Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Conduct five 60 -> 0 mph full ABS stops (one per lap)
 For each stop record initial vehicle speed, stopping distance

Location Track Straightaway Dry Asphalt
 Date 6/8/11
 Driver Matt Rogers
 Target
 Velocity,
 MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Index	Adjusted w/ Index
1	61.08	160.77	155.14	0.9734	151.01
2	61.14	153.91	148.23	0.9734	144.29
3	60.56	149.78	147.03	0.9734	143.12
4	60.16	152.05	151.26	0.9734	147.24
5	61.38	159.43	152.36	0.9734	148.31
= Average 60 mph SD feet			150.81		146.79
= Standard Deviation, 60 mph SD feet			3.25		3.16

Stage 10-Worn Tire Wet Asphalt Braking in a Turn Stopping Distance Tests
(driver + full instrumentation + full fuel)

Conduct 10 40 -> 0 mph full ABS stops (one per lap, five in each direction)
 For each stop record initial vehicle speed, stopping distance, run direction (CW, CCW)

Location Turn 6 (Sprinklers On)
 Date 6/8/11
 Driver Matt Rogers
 Target
 Velocity,
 MPH 40

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Run Direction
1	42.52	96.44	85.35	CW
2	38.51	102.56	110.67	CW
3	39.68	78.32	79.59	CW
4	39.14	83.63	87.33	CW
5	38.52	77.05	83.07	CW
6	41.06	88.47	83.98	CCW
7	40.34	98.68	97.01	CCW
8	39.67	79.58	80.91	CCW
9	40.08	74.54	74.24	CCW
10	41.20	90.35	85.16	CCW

= Average 40 mph SD feet 86.73
 = Standard Deviation, 40 mph SD feet 10.25

Stage 11-Worn Tire Steady State Turn Max Lateral on Dry Asphalt

Control vehicle/tire runs three 60->0 mph full ABS (one per lap) on dynamics pad for reference purposes.

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise) until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Index	Adjusted w/ Index
1	CW	44.38	0.88	0.97	0.85
		Max Lat.	0.88		
1	CCW	44.71	0.89	0.97	0.86
		Max Lat.	0.89		

ADDITIONAL RUNS MADE WITHOUT STABILITY CONTROL OFF

1	CW	44.05	0.87	0.97	0.84
1	CCW	45.43	0.92	0.97	0.89

Stage 12- End of Test Tire Wear Check

Measure tire tread depth in each groove at four locations and record results in tire sheet

Left Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.125	-0.078125	-0.078125	-0.078125	0	0
TDC + 90°	-0.109375	-0.078125	-0.09375	-0.078125	0	0
TDC + 180°	-0.109375	-0.078125	-0.09375	-0.078125	0	0
TDC + 270°	-0.09375	-0.046875	-0.078125	-0.078125	0	0
Average	-0.109375	-0.070313	-0.085938	-0.078125	0	0

% Wear 33.33% 20.45% 25.00% 23.81% LF Avg 25.65%

Right Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.078125	-0.046875	-0.078125	-0.0625	0	0
TDC + 90°	-0.078125	-0.0625	-0.09375	-0.0625	0	0
TDC + 180°	-0.078125	-0.0625	-0.09375	-0.0625	0	0
TDC + 270°	-0.0625	-0.0625	-0.078125	-0.078125	0	0
Average	-0.074219	-0.058594	-0.085938	-0.066406	0	0

% Wear 22.62% 17.05% 25.00% 21.25% RF Avg 21.48%

Left Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.0625	-0.125	-0.0625	-0.078125	0	0
TDC + 90°	-0.0625	-0.046875	-0.046875	-0.078125	0	0
TDC + 180°	-0.078125	-0.0625	-0.0625	-0.0625	0	0
TDC + 270°	-0.0625	-0.046875	-0.0625	-0.0625	0	0
Average	-0.066406	-0.070313	-0.058594	-0.070313	0	0

% Wear 20.24% 20.45% 17.05% 21.43% LR Avg 19.79%

Right Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.078125	-0.03125	-0.03125	-0.078125	0	0
TDC + 90°	-0.046875	-0.03125	-0.015625	-0.078125	0	0
TDC + 180°	-0.0625	-0.03125	-0.015625	-0.0625	0	0
TDC + 270°	-0.328125	-0.34375	-0.3125	-0.3125	0	0
Average	-0.128906	-0.109375	-0.09375	-0.132813	0	0

% Wear 39.29% 31.82% 30.00% 42.50% RR Avg 35.90%

Average Wear by Tire Position

Tire Position	% Tread Consumed
LF Avg	25.65%
RF AVG	21.48%
LR AVG	19.79%
RR AVG	35.90%

Chevrolet Tahoe/Goodyear Eagle RSA

2011 NIJ-MSP Tire Test Form General Info Form

Vehicle Application Tahoe
Vehicle VIN AR245440
Initial Odometer 197
Tire Manufacturer Goodyear
Tire Brand Name Eagle RSA

General Track and Weather Info

Date of Test 6/10/11 & 6/13/11
Driver Matt Rogers

		<u>6/10/11</u>	<u>6/13/11</u>
Track Temperature	Initial	<u>66° F</u>	<u>63° F</u>
Deg F	Midpoint	<u></u>	<u>79° F</u>
	Final	<u></u>	<u>101° F</u>

Weather Info

Temperature	Initial	<u>56° F</u>	<u>57° F</u>
Deg F	Midpoint	<u></u>	<u>64° F</u>
	Final	<u></u>	<u>78° F</u>

Conditions 6/10 Cloudy & Cool
6/13 Sunny & Cool

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Tahoe

Tire Manufacturer Goodyear

Tire Brand Name Eagle RSA

Tire Build Date 1611

DOT Code 4BC5 JAIR 1611

UTQG Treadwear Rating 260

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 108

Tire Position Left Front Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.328	0.359	0.359	0.328		
TDC + 90°	0.328	0.359	0.359	0.328		
TDC + 180°	0.328	0.359	0.359	0.328		
TDC + 270°	0.328	0.359	0.359	0.328		
Average	0.328	0.359	0.359	0.328		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 38

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.172	0.172	0.188	0.203		
TDC + 90°	0.219	0.156	0.172	0.203		
TDC + 180°	0.109	0.172	0.188	0.203		
TDC + 270°	0.219	0.188	0.188	0.203		
Average	0.180	0.172	0.184	0.203		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Tahoe

Tire Manufacturer Goodyear

Tire Brand Name Eagle RSA

Tire Build Date 1611

DOT Code 4BC5 JAIR 1611

UTQG Treadwear Rating 260

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 108

Tire Position Right Front Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.328	0.344	0.344	0.328		
TDC + 90°	0.328	0.344	0.344	0.328		
TDC + 180°	0.328	0.344	0.344	0.328		
TDC + 270°	0.328	0.344	0.344	0.328		
Average	0.328	0.344	0.344	0.328		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 38

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.203	0.188	0.203	0.219		
TDC + 90°	0.188	0.172	0.203	0.234		
TDC + 180°	0.234	0.172	0.203	0.219		
TDC + 270°	0.219	0.172	0.203	0.219		
Average	0.211	0.176	0.203	0.223		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Tahoe
 Tire Manufacturer Goodyear
 Tire Brand Name Eagle RSA
 Tire Build Date 1611
 DOT Code 4BC5 JAIR 1611
 UTQG Treadwear Rating 260
 UTQG Load Rating A
 UTQG Traction Rating A
 Speed Rating V
 Load Index 108

Tire Position Left Rear Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.328	0.344	0.344	0.328		
TDC + 90°	0.328	0.344	0.344	0.328		
TDC + 180°	0.328	0.344	0.344	0.328		
TDC + 270°	0.328	0.344	0.344	0.328		
Average	0.328	0.344	0.344	0.328		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 38

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.219	0.188	0.219	0.234		
TDC + 90°	0.219	0.203	0.219	0.219		
TDC + 180°	0.234	0.188	0.203	0.219		
TDC + 270°	0.234	0.203	0.219	0.234		
Average	0.227	0.195	0.215	0.227		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Tahoe
 Tire Manufacturer Goodyear
 Tire Brand Name Eagle RSA
 Tire Build Date 1611
 DOT Code 4BC5 JAIR 1611
 UTQG Treadwear Rating 260
 UTQG Load Rating A
 UTQG Traction Rating A
 Speed Rating V
 Load Index 108

Tire Position Right Rear Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.328	0.344	0.344	0.328		
TDC + 90°	0.328	0.344	0.344	0.328		
TDC + 180°	0.328	0.344	0.344	0.328		
TDC + 270°	0.328	0.344	0.344	0.328		
Average	0.328	0.344	0.344	0.328		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 35

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.266	0.250	0.250	0.219		
TDC + 90°	0.266	0.234	0.234	0.234		
TDC + 180°	0.266	0.250	0.234	0.250		
TDC + 270°	0.266	0.250	0.234	0.234		
Average	0.266	0.246	0.238	0.234		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Stage 2-Burnish (driver + full instrumentation + full fuel)

Control tire runs this stage only once

Conduct 10 60 -> 0 mph full ABS stops

Location Dry Asphalt
Date 6/10/11 & 6/13/11
Driver Matt Rogers
Target
Velocity,
MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet
1	61.15	136.84	131.75
2	60.15	136.10	135.41
3	60.90	138.52	134.48
4	62.36	147.96	136.96
5	61.00	143.81	139.13
6	61.49	144.81	137.89
7	61.32	144.47	138.32
8	60.95	144.81	140.33
9	62.12	146.45	136.64
10	61.11	144.26	139.07

= Average 60 mph SD feet 137.00

= Standard Deviation, 60 mph SD feet 2.56

Stage 5-New Tire Wet Asphalt Braking in a Turn Stopping Distance Tests
(driver + full instrumentation + full fuel)

Conduct 10 40 -> 0 mph full ABS stops (one per lap, five in each direction)
 For each stop record initial vehicle speed, stopping distance, run direction (CW, CCW)

Location Turn 6 (Sprinklers On)
 Date 6/10/11 & 6/13/11
 Driver Matt Rogers
 Target
 Velocity,
 MPH 40

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Run Direction
1	41.42	85.22	79.46	CW
2	43.57	94.98	80.04	CW
3	40.86	86.19	82.61	CW
4	40.53	83.99	81.80	CW
5	40.53	95.85	93.36	CW
6	40.46	80.93	79.11	CCW
7	41.75	87.10	79.97	CCW
8	40.23	81.85	80.94	CCW
9	41.03	85.65	81.42	CCW
10	40.10	82.44	82.01	CCW

= Average 40 mph SD feet 82.07
 = Standard Deviation, 40 mph SD feet 4.13

Stage 6-New Tire Steady State Turn Max Lateral on Dry Asphalt

Control vehicle/tire runs three 60->0 mph full ABS (one per lap) on dynamics pad for reference purposes.

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise) until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Index	Adjusted w/ Index
1	CW	43.93	0.86	1.02	0.88
		Max Lat	0.86		
1	CCW	45.68	0.93	1.02	0.95
		Max Lat	0.93		

ADDITIONAL RUNS MADE WITHOUT STABILITY CONTROL OFF

1	CW	44.62	0.89	1.02	0.90
1	CCW	46.59	0.97	1.02	0.99

Stage 7-Tire Endurance/Wear Testing

Drive 100 laps at max speed on dry asphalt track (50 each direction).

Lap #	CW Lap Time, Sec	CCW Lap Time, Sec	Lap #	CW Lap Time, Sec	CCW Lap Time, Sec
1	66.297	66.356	37	66.422	67.742
2	66.163	66.95	38	65.688	67.295
3	66.054	65.928	39	66.338	66.713
4	66.726	66.381	40	66.601	67.097
5	66.865	66.703	41	66.279	67.201
6	65.824	66.777	42	66.376	66.28
7	65.973	67.477	43	66.514	66.284
8	66.388	66.927	44	66.481	67.04
9	66.43	67.585	45	66.403	67.694
10	66.099	67.485	46	67.035	66.902
11	66.409	67.441	47	66.911	66.898
12	66.579	67.415	48	67.576	67.338
13	66.316	67.4	49	66.799	67.258
14	66.184	66.865	50	66.192	67.589
15	66.928	67.376			
16	66.312	67.548	Avg =	66.209333	67.015972
17	66.064	66.91	Std Dev =	0.309473	0.3972125
18	66.222	67.035	Min =	65.532	65.928
19	66.086	66.458	Max =	66.928	67.66
20	66.242	67.133	Range =	1.396	1.732
21	66.491	67.203			
22	65.808	67.024			
23	65.803	67.66			
24	65.675	66.995			
25	66.372	66.685			
26	66.379	67.46			
27	66.118	66.744			
28	66.301	66.663			
29	66.119	66.976			
30	66.363	66.846			
31	66.209	66.682			
32	65.532	67.308			
33	66.266	67.352			
34	66.029	66.919			
35	66.231	66.91			
36	65.679	66.998			

Temperature of rotor and tire during endurance testing

Vehicle Tahoe Goodyear Eagle RSA

Lap Sequence	LF		LR		RR		RF	
	Rotor	Tire	Rotor	Tire	Rotor	Tire	Rotor	Tire
After 10 Laps	782	125	298	115	420	135	793	162
After 20 Laps	760	125	640	115	480	150	795	168
After 30 Laps	810	118	400	116	580	150	827	170
After 40 Laps	814	125	393	113	585	149	834	170
After 50 Laps	812	130	420	120	605	150	840	170
After 60 Laps	900	167	545	155	525	111	840	132
After 70 Laps	920	180	585	170	530	115	870	133
After 80 Laps	925	180	610	174	520	112	870	125
After 90 Laps	945	176	615	176	570	115	883	131
After 100 Laps	950	175	628	175	585	117	915	136

Stage 8-Worn Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Test aborted due to excess

Conduct five 60 -> 0 mph full ABS stops (one per lap)

For each stop record initial vehicle speed, stopping distance

Location	Track Straightaway Dry Asphalt
Date	6/10/11 & 6/13/11
Driver	Matt Rogers
Target Velocity, MPH	60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet
1			
2			
3			
4			
5			

= Average 60 mph SD feet

= Standard Deviation, 60 mph SD feet

Stage 10-Worn Tire Wet Asphalt Braking in a Turn Stopping Distance Tests
(driver + full instrumentation + full fuel)

Test aborted due to excess tire wear

Conduct 10 40 -> 0 mph full ABS stops (one per lap, five in each direction)

For each stop record initial vehicle speed, stopping distance, run direction (CW, CCW)

Location Turn 6 (Sprinklers On)
Date 6/10/11 & 6/13/11
Driver Matt Rogers
Target
Velocity,
MPH 40

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Run Direction
1				CW
2				CW
3				CW
4				CW
5				CW
6				CCW
7				CCW
8				CCW
9				CCW
10				CCW

= Average 40 mph SD feet

= Standard Deviation, 40 mph SD feet

Stage 11-Worn Tire Steady State Turn Max Lateral on Dry Asphalt

Control vehicle/tire runs three 60->0 mph full ABS (one per lap) on dynamics pad for reference purposes.

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise) until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Test aborted due to excess tire wear

Run #	Direction	Velocity	Lateral Accel,G
1	CW		0
		Max Lat.	0
1	CCW		0
		Max Lat.	0

Stage 12- End of Test Tire Wear Check

Measure tire tread depth in each groove at four locations

Left Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.15625	-0.1875	-0.171875	-0.125	0	0
TDC + 90°	-0.109375	-0.203125	-0.1875	-0.125	0	0
TDC + 180°	-0.21875	-0.1875	-0.171875	-0.125	0	0
TDC + 270°	-0.109375	-0.171875	-0.171875	-0.125	0	0
Average	-0.148438	-0.1875	-0.175781	-0.125	0	0

% Wear 45.24% 52.17% 48.91% 38.10% LF AVG 46.11%

Right Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.125	-0.15625	-0.140625	-0.109375	0	0
TDC + 90°	-0.140625	-0.171875	-0.140625	-0.09375	0	0
TDC + 180°	-0.09375	-0.171875	-0.140625	-0.109375	0	0
TDC + 270°	-0.109375	-0.171875	-0.140625	-0.109375	0	0
Average	-0.117188	-0.167969	-0.140625	-0.105469	0	0

% Wear 35.71% 48.86% 40.91% 32.14% RF AVG 39.41%

Left Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.109375	-0.15625	-0.125	-0.09375	0	0
TDC + 90°	-0.109375	-0.140625	-0.125	-0.109375	0	0
TDC + 180°	-0.09375	-0.15625	-0.140625	-0.109375	0	0
TDC + 270°	-0.09375	-0.140625	-0.125	-0.09375	0	0
Average	-0.101563	-0.148438	-0.128906	-0.101563	0	0

% Wear 30.95% 43.18% 37.50% 30.95% LR AVG 35.65%

Right Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.0625	-0.09375	-0.09375	-0.109375	0	0
TDC + 90°	-0.0625	-0.109375	-0.109375	-0.09375	0	0
TDC + 180°	-0.0625	-0.09375	-0.109375	-0.078125	0	0
TDC + 270°	-0.0625	-0.09375	-0.109375	-0.09375	0	0
Average	-0.0625	-0.097656	-0.105469	-0.09375	0	0

% Wear 19.05% 28.41% 30.68% 28.57% RR AVG 26.68%

Average Wear by Tire Position

Tire Position	% Tread Consumed
LF AVG	46.11%
RF AVG	39.41%
LR AVG	35.65%
RR AVG	26.68%

Chevrolet Impala/Goodyear Eagle RSA

2011 NIJ-MSP Tire Test Form General Info Form

Vehicle Application	<u>Impala</u>
Vehicle VIN	<u>B1100004</u>
Initial Odometer	<u>1889</u>
Tire Manufacturer	<u>Goodyear</u>
Tire Brand Name	<u>Eagle RSA</u>

General Track and Weather Info

Date of Test	<u>9-Jun-11</u>
Driver	<u>Matt Rogers</u>

Track Temperature	Initial	<u>74° F</u>
Deg F	Midpoint	<u>81° F</u>
	Final	<u>83° F</u>

Weather Info		
Temperature	Initial	<u>68° F</u>
Deg F	Midpoint	<u>71° F</u>
	Final	<u>71° F</u>

Conditions Cloudy, Some Wind 10-12 mph

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Impala

Tire Manufacturer Goodyear

Tire Brand Name Eagle RSA

Tire Build Date 1411

DOT Code MKXOBEER

UTQG Treadwear Rating 260

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 97

Tire Position Left Front Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.297	0.359	0.359	0.297		
TDC + 90°	0.297	0.359	0.359	0.297		
TDC + 180°	0.297	0.359	0.359	0.297		
TDC + 270°	0.297	0.359	0.359	0.297		
Average	0.297	0.359	0.359	0.297		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 35

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.109	0.094	0.109	0.094		
TDC + 90°	0.109	0.094	0.109	0.094		
TDC + 180°	0.109	0.094	0.109	0.094		
TDC + 270°	0.109	0.094	0.109	0.094		
Average	0.109	0.094	0.109	0.094		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Impala

Tire Manufacturer Goodyear

Tire Brand Name Eagle RSA

Tire Build Date 1511

DOT Code MKXOBEER

UTQG Treadwear Rating 260

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 97

Tire Position Right Front Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.297	0.359	0.359	0.297		
TDC + 90°	0.297	0.359	0.359	0.297		
TDC + 180°	0.297	0.359	0.359	0.297		
TDC + 270°	0.297	0.359	0.359	0.297		
Average	0.297	0.359	0.359	0.297		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 35

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.109	0.156	0.156	0.125		
TDC + 90°	0.094	0.141	0.125	0.109		
TDC + 180°	0.094	0.125	0.141	0.109		
TDC + 270°	0.094	0.141	0.141	0.109		
Average	0.098	0.141	0.141	0.113		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Impala

Tire Manufacturer Goodyear

Tire Brand Name Eagle RSA

Tire Build Date 1511

DOT Code MKXOBEER

UTQG Treadwear Rating 260

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 97

Tire Position Left Rear Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.297	0.359	0.359	0.297		
TDC + 90°	0.297	0.359	0.359	0.297		
TDC + 180°	0.297	0.359	0.359	0.297		
TDC + 270°	0.297	0.359	0.359	0.297		
Average	0.297	0.359	0.359	0.297		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 35

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.250	0.328	0.344	0.281		
TDC + 90°	0.250	0.344	0.344	0.297		
TDC + 180°	0.250	0.328	0.344	0.281		
TDC + 270°	0.250	0.328	0.344	0.281		
Average	0.250	0.332	0.344	0.285		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Impala
 Tire Manufacturer Goodyear
 Tire Brand Name Eagle RSA
 Tire Build Date 1511
 DOT Code MKXOBEER
 UTQG Treadwear Rating 260
 UTQG Load Rating A
 UTQG Traction Rating A
 Speed Rating V
 Load Index 97

Tire Position Right Rear Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.297	0.359	0.359	0.297		
TDC + 90°	0.297	0.359	0.359	0.297		
TDC + 180°	0.297	0.359	0.359	0.297		
TDC + 270°	0.297	0.359	0.359	0.297		
Average	0.297	0.359	0.359	0.297		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 35

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.250	0.328	0.328	0.281		
TDC + 90°	0.250	0.328	0.328	0.266		
TDC + 180°	0.281	0.313	0.313	0.266		
TDC + 270°	0.234	0.328	0.328	0.266		
Average	0.254	0.324	0.324	0.270		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Stage 3-New Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Conduct five 60 -> 0 mph full ABS stops (one per lap)

Location Track Straightaway Dry Asphalt
 Date 6/9/11
 Driver Matt Rogers
 Target
 Velocity,
 MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Index	Adjusted w/ Index
1	61.64	164.96	156.29	1.0333	161.50
2	60.00	156.61	156.63	1.0333	161.85
3	61.07	158.70	153.18	1.0333	158.28
4	60.15	151.77	151.00	1.0333	156.03
5	59.70	148.28	149.77	1.0333	154.76
= Average 60 mph SD feet			153.38		158.48
= Standard Deviation, 60 mph SD feet			3.07		3.18

Stage 6-New Tire Steady State Turn Max Lateral on Dry Asphalt

Control vehicle/tire runs three 60->0 mph full ABS (one per lap) on dynamics pad for reference purposes.

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise) until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Index	Adjusted w/ index
1	CW	45.55	0.92	1.04	0.96
		Max Lat	0.92		
1.00	CCW	46.02	0.94	1.04	0.98
		Max Lat	0.94		

Stage 7-Tire Endurance/Wear Testing

Drive 100 laps at max speed on dry asphalt track (50 each direction).

Lap #	CW Lap Time, Sec	CCW Lap Time, Sec	Lap #	CW Lap Time, Sec	CCW Lap Time, Sec
1	64.674		37	65.849	65.104
2	64.302		38	65.484	65.057
3	65.022		39	65.425	65.288
4	65.209		40	64.853	65.332
5	65.555		41	64.15	64.873
6	65.697		42	64.305	64.658
7	65.616		43	63.812	65.125
8	65.753	65.498	44	64.235	65.419
9	65.912	64.996	45	64.423	65.052
10	65.476	65.711	46	64.87	64.985
11	65.853	65.936	47	64.628	65.184
12	65.034	65.648	48	64.527	65.016
13	65.196	65.373	49	64.566	64.898
14	65.464	65.401	50	64.872	65.09
15	65.498	65.536			
16	65.107	65.304	Avg =	65.374028	65.338069
17	65.444	65.303	Std Dev =	0.3986455	0.2967317
18	65.445	64.798	Min =	64.302	64.798
19	65.02	65.083	Max =	66.154	65.936
20	65.504	65.278	Range =	1.852	1.138
21	65.651	65.081			
22	65.12	65.716			
23	65.079	65.454			
24	65.415	65.345			
25	65.813	65.401			
26	65.959	65.649			
27	65.096	65.132			
28	66.154	65.499			
29	65.33	65.799			
30	65.723	65.415			
31	65.076	64.9			
32	64.796	64.894			
33	65.939	64.853			
34	65.117	65.459			
35	65.019	65.075			
36	65.397	65.267			

Temperatures of rotor and tire during endurance test

Vehicle Impala Goodyear RSA

Lap Sequence	LF		LR		RR		RF	
	Rotor	Tire	Rotor	Tire	Rotor	Tire	Rotor	Tire
After 10 Laps	646	165	358	110	380	137	633	193
After 20 Laps	684	174	350	122	369	141	650	200
After 30 Laps	683	170	332	121	365	140	652	194
After 40 Laps	673	172	342	122	367	144	645	191
After 50 Laps	615	168	325	118	351	138	605	184
After 60 Laps	720	173	406	140	357	109	658	143
After 70 Laps	752	174	430	131	375	104	695	137
After 80 Laps	750	170	445	133	410	115	695	148
After 90 Laps	750	166	431	117	402	119	704	150
After 100 Laps	742	182	415	136	381	119	685	157

Stage 8-Worn Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Conduct five 60 -> 0 mph full ABS stops (one per lap)
 For each stop record initial vehicle speed, stopping distance

Location Track Straightaway Dry Asphalt
 Date 6/9/11
 Driver Matt Rogers
 Target
 Velocity,
 MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Index	Adjusted w/ Index
1	62.08	162.78	152.05	1.0076	153.20
2	60.29	157.82	156.32	1.0076	157.50
3	60.61	157.10	153.98	1.0076	155.15
4	60.08	154.21	153.82	1.0076	154.99
5	60.28	158.51	157.03	1.0076	158.22
= Average 60 mph SD feet			154.64		155.81
= Standard Deviation, 60 mph SD feet			2.02		2.04

Stage 11-Worn Tire Steady State Turn Max Lateral on Dry Asphalt

Control vehicle/tire runs three 60->0 mph full ABS (one per lap) on dynamics pad for reference purposes.

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise) until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Index	Adjusted w/ Index
1	CW	47.49	1.01	1.01	1.02
		Max Lat.	1.01		
1	CCW	48.55	1.05	1.01	1.06
		Max Lat.	1.05		

Stage 12- End of Test Tire Wear Check

Measure tire tread depth in each groove at four locations

Left Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.1875	-0.265625	-0.25	-0.203125	0	0
TDC + 90°	-0.1875	-0.265625	-0.25	-0.203125	0	0
TDC + 180°	-0.1875	-0.265625	-0.25	-0.203125	0	0
TDC + 270°	-0.1875	-0.265625	-0.25	-0.203125	0	0
Average	-0.1875	-0.265625	-0.25	-0.203125	0	0

% Wear 63.16% 73.91% 69.57% 68.42% LF AVG 68.76%

Right Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.1875	-0.203125	-0.203125	-0.171875	0	0
TDC + 90°	-0.203125	-0.21875	-0.234375	-0.1875	0	0
TDC + 180°	-0.203125	-0.234375	-0.21875	-0.1875	0	0
TDC + 270°	-0.203125	-0.21875	-0.21875	-0.1875	0	0
Average	-0.199219	-0.21875	-0.21875	-0.183594	0	0

% Wear 67.11% 60.87% 60.87% 61.84% RF AVG 62.67%

Left Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.046875	-0.03125	-0.015625	-0.015625	0	0
TDC + 90°	-0.046875	-0.015625	-0.015625	0	0	0
TDC + 180°	-0.046875	-0.03125	-0.015625	-0.015625	0	0
TDC + 270°	-0.046875	-0.03125	-0.015625	-0.015625	0	0
Average	-0.046875	-0.027344	-0.015625	-0.011719	0	0

% Wear 15.79% 7.61% 4.35% 3.95% LR AVG 7.92%

Right Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.046875	-0.03125	-0.03125	-0.015625	0	0
TDC + 90°	-0.046875	-0.03125	-0.03125	-0.03125	0	0
TDC + 180°	-0.015625	-0.046875	-0.046875	-0.03125	0	0
TDC + 270°	-0.0625	-0.03125	-0.03125	-0.03125	0	0
Average	-0.042969	-0.035156	-0.035156	-0.027344	0	0

% Wear 14.47% 9.78% 9.78% 9.21% RR AVG 10.81%

Average Wear by Tire Position

Tire Position	% Tread Consumed
LF AVG	68.76%
RF AVG	62.67%
LR AVG	7.92%
RR AVG	10.81%

Chevrolet Impala/Pirelli P6 4 Season

2011 NIJ-MSP Tire Test Form General Info Form

Vehicle Application	<u>Impala</u>
Vehicle VIN	<u>BL1100004</u>
Initial Odometer	<u>2185</u>
Tire Manufacturer	<u>Pirelli</u>
Tire Brand Name	<u>P6 4 Season</u>

General Track and Weather Info

Date of Test	<u>15-Jun-11</u>
Driver	<u>Matt Rogers</u>

Track Temperature	Initial	<u>62° F</u>
Deg F	Midpoint	<u>77° F</u>
	Final	<u>85° F</u>

Weather Info		
Temperature	Initial	<u>57° F</u>
Deg F	Midpoint	<u>63° F</u>
	Final	<u>67° F</u>

Conditions Light Clouds, Cool, Winds 10 - 12 mph

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Impala

Tire Manufacturer Pirelli

Tire Brand Name P6 4 Season

Tire Build Date 3010

DOT Code XL X0 H093

UTQG Treadwear Rating 400

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 97

Tire Position Left Front Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.203	0.344	0.344	0.297		
TDC + 90°	0.203	0.344	0.344	0.297		
TDC + 180°	0.203	0.344	0.344	0.297		
TDC + 270°	0.203	0.344	0.344	0.297		
Average	0.203	0.344	0.344	0.297		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 38

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.188	0.109	0.109	0.109		
TDC + 90°	0.172	0.109	0.141	0.125		
TDC + 180°	0.188	0.125	0.125	0.125		
TDC + 270°	0.188	0.109	0.125	0.125		
Average	0.184	0.113	0.125	0.121		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Impala

Tire Manufacturer Pirelli

Tire Brand Name P6 4 Season

Tire Build Date 3010

DOT Code XL X0 H093

UTQG Treadwear Rating 400

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 97

Tire Position Right Front Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.297	0.344	0.344	0.297		
TDC + 90°	0.297	0.344	0.344	0.297		
TDC + 180°	0.297	0.344	0.344	0.297		
TDC + 270°	0.297	0.344	0.344	0.297		
Average	0.297	0.344	0.344	0.297		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 38

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.156	0.125	0.141	0.078		
TDC + 90°	0.156	0.109	0.125	0.078		
TDC + 180°	0.156	0.125	0.141	0.078		
TDC + 270°	0.172	0.141	0.125	0.078		
Average	0.160	0.125	0.133	0.078		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Impala
 Tire Manufacturer Pirelli
 Tire Brand Name P6 4 Season
 Tire Build Date 3010
 DOT Code XL X0 H093
 UTQG Treadwear Rating 400
 UTQG Load Rating A
 UTQG Traction Rating A
 Speed Rating V
 Load Index 97

Tire Position Left Rear Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.297	0.344	0.344	0.297		
TDC + 90°	0.297	0.344	0.344	0.297		
TDC + 180°	0.297	0.344	0.344	0.297		
TDC + 270°	0.297	0.344	0.344	0.297		
Average	0.297	0.344	0.344	0.297		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 38

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.281	0.313	0.250	0.281		
TDC + 90°	0.266	0.313	0.313	0.266		
TDC + 180°	0.281	0.313	0.313	0.281		
TDC + 270°	0.266	0.328	0.328	0.281		
Average	0.273	0.316	0.301	0.277		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Impala

Tire Manufacturer Pirelli

Tire Brand Name P6 4 Season

Tire Build Date 3010

DOT Code XL X0 H093

UTQG Treadwear Rating 400

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 97

Tire Position Right Rear Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.297	0.344	0.344	0.297		
TDC + 90°	0.297	0.344	0.344	0.297		
TDC + 180°	0.297	0.344	0.344	0.297		
TDC + 270°	0.297	0.344	0.344	0.297		
Average	0.297	0.344	0.344	0.297		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 38

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.250	0.313	0.313	0.281		
TDC + 90°	0.281	0.313	0.313	0.281		
TDC + 180°	0.203	0.281	0.328	0.281		
TDC + 270°	0.266	0.328	0.313	0.281		
Average	0.250	0.309	0.316	0.281		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Stage 3-New Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Conduct five 60 -> 0 mph full ABS stops (one per lap)
 For each stop record initial vehicle speed, stopping distance

Location Track Straightaway Dry Asphalt
 Date 6/15/11
 Driver Matt Rogers
 Target
 Velocity,
 MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Index	Adjusted w/ Index
1	61.35	154.15	147.42	1.0099	148.88
2	59.99	147.74	147.79	1.0099	149.25
3	61.44	150.36	143.40	1.0099	144.82
4	60.68	152.69	149.30	1.0099	150.78
5	60.86	153.48	149.20	1.0099	150.68
= Average 60 mph SD feet			147.42		148.88
= Standard Deviation, 60 mph SD feet			2.40		2.42

Stage 6-New Tire Steady State Turn Max Lateral on Dry Asphalt

Control vehicle/tire runs three 60->0 mph full ABS (one per lap) on dynamics pad for reference purposes.

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise) until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Index	Adjusted w/ Index
1	CW	47.28	1.00	1.03	1.03
		Max Lat	1.00		
1	CCW	47.00	0.98	1.03	1.01
		Max Lat	0.98		

Stage 7-Tire Endurance/Wear Testing

Drive 100 laps at max speed on dry asphalt track (50 each direction).

Lap #	CW Lap Time, Sec	CCW Lap Time, Sec	Lap #	CW Lap Time, Sec	CCW Lap Time, Sec
1	64.822	63.601	37	64.553	64.166
2	64.395	63.501	38	64.794	64.613
3	64.155	63.949	39	64.641	64.288
4	64.404	63.79	40	64.32	64.123
5	64.575	64.102	41	63.88	63.58
6	64.515	63.775	42	63.49	63.706
7	63.601	63.978	43	63.268	64.214
8	64.379	63.905	44	63.926	63.798
9	64.512	64.045	45	63.917	64.456
10	64.432	64.215	46	63.977	63.903
11	64.244	64.28	47	64.087	63.975
12	64.315	64.062	48	63.698	64.296
13	64.513	63.859	49	64.012	64.081
14	64.827	64.244	50	64.357	64.226
15	64.395	64.507			
16	64.353	64.121	Avg =	64.346972	64.207722
17	64.639	64.513	Std Dev =	0.2320869	0.3152705
18	64.576	64.474	Min =	63.601	63.501
19	64.167	64.387	Max =	64.827	64.757
20	64.138	64.71	Range =	1.226	1.256
21	64.108	63.79			
22	64.241	64.471			
23	64.313	64.087			
24	64.247	64.334			
25	64.263	64.433			
26	64.18	64.482			
27	64.516	64.25			
28	64.368	64.512			
29	64.566	64.303			
30	64.408	64.633			
31	64.361	64.124			
32	63.933	64.03			
33	64.385	64.345			
34	64.114	64.19			
35	64.374	64.719			
36	64.157	64.757			

Temperatures of rotor and tire during endurance test

Vehicle Impala Pirelli P6 4 Season

Lap Sequence	LF		LR		RR		RF	
	Rotor	Tire	Rotor	Tire	Rotor	Tire	Rotor	Tire
After 10 Laps	630	152	379	121	401	133	648	175
After 20 Laps	649	158	348	122	397	125	649	170
After 30 Laps	667	158	355	122	361	128	646	158
After 40 Laps	645	167	356	130	367	133	626	168
After 50 Laps	652	141	380	122	393	128	630	167
After 60 Laps	751	179	390	133	389	119	670	151
After 70 Laps	755	175	400	131	410	119	696	153
After 80 Laps	770	179	421	128	431	122	708	153
After 90 Laps	720	175	395	122	395	118	680	153
After 100 Laps	648	192	339	146	333	116	603	144

Stage 8-Worn Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Conduct five 60 -> 0 mph full ABS stops (one per lap)
 For each stop record initial vehicle speed, stopping distance

Location Track Straightaway Dry Asphalt
 Date 6/15/11
 Driver Matt Rogers
 Target
 Velocity,
 MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Index	Adjusted w/ Index
1	59.64	152.08	153.91	0.9999	153.89
2	60.47	162.09	159.56	0.9999	159.55
3	59.98	155.02	155.13	0.9999	155.12
4	60.37	155.94	154.02	0.9999	154.01
5	60.53	158.60	155.84	0.9999	155.83
= Average 60 mph SD feet			155.69		155.68
= Standard Deviation, 60 mph SD feet			2.31		2.31

Stage 11-Worn Tire Steady State Turn Max Lateral on Dry Asphalt

Control vehicle/tire runs three 60->0 mph full ABS (one per lap) on dynamics pad for reference purposes.

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise) until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Index	Adjusted w/ Index
1	CW	46.48	0.96	1.01	0.97
		Max Lat.	0.96		
1	CCW	46.85	0.98	1.01	0.99
		Max Lat.	0.98		

Stage 12- End of Test Tire Wear Check

Measure tire tread depth in each groove at four locations

Left Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.015625	-0.234375	-0.234375	-0.1875	0	0
TDC + 90°	-0.03125	-0.234375	-0.203125	-0.171875	0	0
TDC + 180°	-0.015625	-0.21875	-0.21875	-0.171875	0	0
TDC + 270°	-0.015625	-0.234375	-0.21875	-0.171875	0	0
Average	-0.019531	-0.230469	-0.21875	-0.175781	0	0

% Wear 9.62% 67.05% 63.64% 59.21% LF AVG 49.88%

Right Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.140625	-0.21875	-0.203125	-0.21875	0	0
TDC + 90°	-0.140625	-0.234375	-0.21875	-0.21875	0	0
TDC + 180°	-0.140625	-0.21875	-0.203125	-0.21875	0	0
TDC + 270°	-0.125	-0.203125	-0.21875	-0.21875	0	0
Average	-0.136719	-0.21875	-0.210938	-0.21875	0	0

% Wear 46.05% 63.64% 61.36% 73.68% RF AVG 61.18%

Left Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.015625	-0.03125	-0.09375	-0.015625	0	0
TDC + 90°	-0.03125	-0.03125	-0.03125	-0.03125	0	0
TDC + 180°	-0.015625	-0.03125	-0.03125	-0.015625	0	0
TDC + 270°	-0.03125	-0.015625	-0.015625	-0.015625	0	0
Average	-0.023438	-0.027344	-0.042969	-0.019531	0	0

% Wear 7.89% 7.95% 12.50% 6.58% LR AVG 8.73%

Right Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.046875	-0.03125	-0.03125	-0.015625	0	0
TDC + 90°	-0.015625	-0.03125	-0.03125	-0.015625	0	0
TDC + 180°	-0.09375	-0.0625	-0.015625	-0.015625	0	0
TDC + 270°	-0.03125	-0.015625	-0.03125	-0.015625	0	0
Average	-0.046875	-0.035156	-0.027344	-0.015625	0	0

% Wear 15.79% 10.23% 7.95% 5.26% RR AVG 9.81%

Average Wear by Tire Position

Tire Position	% Tread Consumed
LF AVG	49.88%
RF AVG	61.18%
LR AVG	8.73%
RR AVG	9.81%

Chevrolet Impala/Nokian WRG2

2011 NIJ-MSP Tire Test Form General Info Form

Vehicle Application	<u>Impala</u>
Vehicle VIN	<u>B1100004</u>
Initial Odometer	<u>2037</u>
Tire Manufacturer	<u>Nokian</u>
Tire Brand Name	<u>WRG2</u>

General Track and Weather Info

Date of Test	<u>14-Jun-11</u>
Driver	<u>Matt Rogers</u>

Track Temperature	Initial	<u>65° F</u>
Deg F	Midpoint	<u>95° F</u>
	Final	<u>106° F</u>

Weather Info		
Temperature	Initial	<u>57° F</u>
Deg F	Midpoint	<u>70° F</u>
	Final	<u>76° F</u>

Conditions Sunny, Cool, Light Winds

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application _____ Impala _____
 Tire Manufacturer _____ Nokian _____
 Tire Brand Name _____ WRG2 _____
 Tire Build Date _____ 2210 _____
 DOT Code _____ 60AD 2210 _____
 UTQG Treadwear Rating _____ 420 _____
 UTQG Load Rating _____ A _____
 UTQG Traction Rating _____ A _____
 Speed Rating _____ V _____
 Load Index _____ 102 _____

Tire Position Left Front Initial Cold Inflation Pressure (psi) _____ 35 _____

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.344	0.344	0.344	0.344		
TDC + 90°	0.344	0.344	0.344	0.344		
TDC + 180°	0.344	0.344	0.344	0.344		
TDC + 270°	0.344	0.344	0.344	0.344		
Average	0.344	0.344	0.344	0.344		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) _____ 40 _____

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.156	0.141	0.141	0.156		
TDC + 90°	0.156	0.141	0.156	0.156		
TDC + 180°	0.156	0.141	0.156	0.156		
TDC + 270°	0.156	0.141	0.141	0.156		
Average	0.156	0.141	0.148	0.156		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application _____ Impala _____
 Tire Manufacturer _____ Nokian _____
 Tire Brand Name _____ WRG2 _____
 Tire Build Date _____ 2210 _____
 DOT Code _____ 60AD 2210 _____
 UTQG Treadwear Rating _____ 420 _____
 UTQG Load Rating _____ A _____
 UTQG Traction Rating _____ A _____
 Speed Rating _____ V _____
 Load Index _____ 102 _____

Tire Position Right Front Initial Cold Inflation Pressure (psi) _____ 35 _____

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.344	0.344	0.344	0.344		
TDC + 90°	0.344	0.344	0.344	0.344		
TDC + 180°	0.344	0.344	0.344	0.344		
TDC + 270°	0.344	0.344	0.344	0.344		
Average	0.344	0.344	0.344	0.344		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) _____ 40 _____

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.109	0.125	0.156	0.141		
TDC + 90°	0.109	0.125	0.156	0.156		
TDC + 180°	0.109	0.125	0.141	0.125		
TDC + 270°	0.125	0.125	0.156	0.141		
Average	0.113	0.125	0.152	0.141		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application _____ Impala _____
 Tire Manufacturer _____ Nokian _____
 Tire Brand Name _____ WRG2 _____
 Tire Build Date _____ 2210 _____
 DOT Code _____ 60AD 2210 _____
 UTQG Treadwear Rating _____ 420 _____
 UTQG Load Rating _____ A _____
 UTQG Traction Rating _____ A _____
 Speed Rating _____ V _____
 Load Index _____ 102 _____

Tire Position Left Rear Initial Cold Inflation Pressure (psi) _____ 35 _____

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.344	0.344	0.344	0.344		
TDC + 90°	0.344	0.344	0.344	0.344		
TDC + 180°	0.344	0.344	0.344	0.344		
TDC + 270°	0.344	0.344	0.344	0.344		
Average	0.344	0.344	0.344	0.344		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) _____ 39 _____

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.297	0.313	0.328	0.313		
TDC + 90°	0.297	0.313	0.328	0.313		
TDC + 180°	0.297	0.313	0.297	0.313		
TDC + 270°	0.281	0.313	0.328	0.328		
Average	0.293	0.313	0.320	0.316		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application _____ Impala _____
 Tire Manufacturer _____ Nokian _____
 Tire Brand Name _____ WRG2 _____
 Tire Build Date _____ 1511 _____
 DOT Code _____ 60AD 2210 _____
 UTQG Treadwear Rating _____ 420 _____
 UTQG Load Rating _____ A _____
 UTQG Traction Rating _____ A _____
 Speed Rating _____ V _____
 Load Index _____ 102 _____

Tire Position Right Rear Initial Cold Inflation Pressure (psi) _____ 35 _____

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.344	0.344	0.344	0.344		
TDC + 90°	0.344	0.344	0.344	0.344		
TDC + 180°	0.344	0.344	0.344	0.344		
TDC + 270°	0.344	0.344	0.344	0.344		
Average	0.344	0.344	0.344	0.344		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) _____ 40 _____

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.281	0.328	0.328	0.313		
TDC + 90°	0.313	0.328	0.313	0.313		
TDC + 180°	0.297	0.313	0.328	0.313		
TDC + 270°	0.313	0.328	0.328	0.313		
Average	0.301	0.324	0.324	0.313		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Stage 6-New Tire Steady State Turn Max Lateral on Dry Asphalt

Control vehicle/tire runs three 60->0 mph full ABS (one per lap) on dynamics pad for reference purposes.

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise) until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Index	Adjusted w/ Index
1	CW	46.95	0.98	1.03	1.01
		Max Lat	0.98		
1	CCW	46.40	0.96	1.03	0.99
		Max Lat	0.96		

Stage 7-Tire Endurance/Wear Testing

Drive 100 laps at max speed on dry asphalt track (50 each direction).

Lap #	CW Lap Time, Sec	CCW Lap Time, Sec	Lap #	CW Lap Time, Sec	CCW Lap Time, Sec
1	64.604	64.184	37	65.318	65.104
2	64.886	64.31	38	64.742	65.137
3	64.902	64.576	39	64.854	64.965
4	65.24	64.563	40	64.608	65.232
5	65.1	64.721	41	64.477	65.466
6	65.417	64.44	42	64.392	65.379
7	65.358	64.642	43	64.038	65.574
8	64.89	64.876	44	63.898	65.16
9	65.428	64.46	45	63.69	65.193
10	65.799	65.039	46	64.654	65.19
11	64.99	65.265	47	64.111	64.486
12	65.091	64.866	48	64.217	65.299
13	65.311	64.81	49	64.117	65.264
14	64.936	64.849	50	64.299	64.975
15	64.957	64.87			
16	64.821	64.619	Avg =	64.957278	64.890667
17	65.446	65.225	Std Dev =	0.3138025	0.3026347
18	65.036	65.161	Min =	64.337	64.184
19	65.001	65.184	Max =	65.799	65.487
20	64.967	65.079	Range =	1.462	1.303
21	64.526	64.99			
22	64.759	64.662			
23	64.337	65.192			
24	64.491	64.796			
25	65.019	65.125			
26	64.795	65.093			
27	65.161	64.569			
28	64.614	64.936			
29	64.713	64.903			
30	64.642	64.935			
31	64.899	64.902			
32	64.885	64.961			
33	64.531	65.487			
34	65.11	65.236			
35	64.676	65.266			
36	65.124	65.272			

Temperatures of rotor and tire during endurance test

Vehicle Impala Nokian WRG2

Lap Sequence	LF		LR		RR		RF	
	Rotor	Tire	Rotor	Tire	Rotor	Tire	Rotor	Tire
After 10 Laps	677	140	366	106	406	125	667	161
After 20 Laps	700	148	365	110	383	136	683	166
After 30 Laps	748	142	381	109	402	132	731	167
After 40 Laps	695	147	355	113	403	131	655	160
After 50 Laps	980	156	352	117	411	138	671	164
After 60 Laps	710	169	396	127	335	99	626	125
After 70 Laps	775	173	415	125	396	110	690	137
After 80 Laps	751	180	430	134	395	106	663	130
After 90 Laps	760	177	428	131	419	112	690	139
After 100 Laps	741	171	400	127	397	126	673	155

Stage 8-Worn Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Conduct five 60 -> 0 mph full ABS stops (one per lap)
 For each stop record initial vehicle speed, stopping distance

Location Track Straightaway Dry Asphalt
 Date 6/14/11
 Driver Matt Rogers
 Target
 Velocity,
 MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Index	Adjusted w/ Index
1	60.70	159.60	155.92	1.0003	155.96
2	60.98	160.23	155.14	1.0003	155.19
3	60.33	158.36	156.62	1.0003	156.67
4	60.97	163.74	158.58	1.0003	158.62
5	60.10	156.46	155.95	1.0003	156.00
= Average 60 mph SD feet			156.44		156.49
= Standard Deviation, 60 mph SD feet			1.30		1.30

Stage 11-Worn Tire Steady State Turn Max Lateral on Dry Asphalt

Control vehicle/tire runs three 60->0 mph full ABS (one per lap) on dynamics pad for reference purposes.

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise) until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Index	Adjusted w/ Index
1	CW	46.29	0.95	1.01	0.97
		Max Lat.	0.95		
1	CCW	45.92	0.94	1.01	0.95
		Max Lat.	0.94		

Stage 12- End of Test Tire Wear Check

Measure tire tread depth in each groove at four locations

Left Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.1875	-0.203125	-0.203125	-0.1875	0	0
TDC + 90°	-0.1875	-0.203125	-0.1875	-0.1875	0	0
TDC + 180°	-0.1875	-0.203125	-0.1875	-0.1875	0	0
TDC + 270°	-0.1875	-0.203125	-0.203125	-0.1875	0	0
Average	-0.1875	-0.203125	-0.195313	-0.1875	0	0

% Wear 54.55% 59.09% 56.82% 54.55% LF AVG 56.25%

Right Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.234375	-0.21875	-0.1875	-0.203125	0	0
TDC + 90°	-0.234375	-0.21875	-0.1875	-0.1875	0	0
TDC + 180°	-0.234375	-0.21875	-0.203125	-0.21875	0	0
TDC + 270°	-0.21875	-0.21875	-0.1875	-0.203125	0	0
Average	-0.230469	-0.21875	-0.191406	-0.203125	0	0

% Wear 67.05% 63.64% 55.68% 59.09% RF AVG 61.36%

Left Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.046875	-0.03125	-0.015625	-0.03125	0	0
TDC + 90°	-0.046875	-0.03125	-0.015625	-0.03125	0	0
TDC + 180°	-0.046875	-0.03125	-0.046875	-0.03125	0	0
TDC + 270°	-0.0625	-0.03125	-0.015625	-0.015625	0	0
Average	-0.050781	-0.03125	-0.023438	-0.027344	0	0

% Wear 14.77% 9.09% 6.82% 7.95% LR AVG 9.66%

Right Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.0625	-0.015625	-0.015625	-0.03125	0	0
TDC + 90°	-0.03125	-0.015625	-0.03125	-0.03125	0	0
TDC + 180°	-0.046875	-0.03125	-0.015625	-0.03125	0	0
TDC + 270°	-0.03125	-0.015625	-0.015625	-0.03125	0	0
Average	-0.042969	-0.019531	-0.019531	-0.03125	0	0

% Wear 12.50% 5.68% 5.68% 9.09% RR AVG 8.24%

Average Wear by Tire Position

Tire Position	% Tread Consumed
LF AVG	56.25%
RF AVG	61.36%
LR AVG	9.66%
RR AVG	8.24%

Chevrolet Impala/Cooper CS4

2011 NIJ-MSP Tire Test Form General Info Form

Vehicle Application	<u>Chevy Impala</u>
Vehicle VIN	<u>B1100004</u>
Initial Odometer	<u>1840</u>
Tire Manufacturer	<u>Cooper</u>
Tire Brand Name	<u>CS4</u>

General Track and Weather Info

Date of Test	<u>6/7/11</u>
Driver	<u>Matt Rogers</u>

Track Temperature	Initial	<u>86° F</u>
Deg F	Midpoint	<u>113°</u>
	Final	<u> </u>

Weather Info		
Temperature	Initial	<u>78° F</u>
Deg F	Midpoint	<u>86° F</u>
	Final	<u> </u>

Conditions Sunny, Hazy, Humid

TEST ABORTED -- TIRE FAILURE

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Chevy Impala

Tire Manufacturer Cooper

Tire Brand Name CS4

Tire Build Date 5110

DOT Code U9X3 CLN 5110

UTQG Treadwear Rating 520

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 98

Tire Position Left Front Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.297	0.328	0.328	0.297		
TDC + 90°	0.297	0.328	0.328	0.297		
TDC + 180°	0.297	0.328	0.328	0.297		
TDC + 270°	0.297	0.328	0.328	0.297		
Average	0.296875	0.328125	0.328125	0.296875		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) _____

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.281	0.266	0.281	0.250		
TDC + 90°	0.281	0.281	0.266	0.250		
TDC + 180°	0.266	0.281	0.266	0.250		
TDC + 270°	0.266	0.281	0.266	0.250		
Average	0.2734375	0.27734375	0.2695313	0.25		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Chevy Impala

Tire Manufacturer Cooper

Tire Brand Name CS4

Tire Build Date 5110

DOT Code U9X3 CLN 5110

UTQG Treadwear Rating 520

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 98

Tire Position Right Front Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.297	0.328	0.328	0.297		
TDC + 90°	0.297	0.328	0.328	0.297		
TDC + 180°	0.297	0.328	0.328	0.297		
TDC + 270°	0.297	0.328	0.328	0.297		
Average	0.296875	0.328125	0.328125	0.296875		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) _____

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.266	0.281	0.266	0.281		
TDC + 90°	0.266	0.266	0.297	0.281		
TDC + 180°	0.250	0.266	0.281	0.281		
TDC + 270°	0.250	0.250	0.266	0.281		
Average	0.2578125	0.265625	0.2773438	0.28125		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Chevy Impala

Tire Manufacturer Cooper

Tire Brand Name CS4

Tire Build Date 5110

DOT Code U9X3 CLN 5110

UTQG Treadwear Rating 520

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 98

Tire Position Left Rear Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.297	0.328	0.328	0.297		
TDC + 90°	0.297	0.328	0.328	0.297		
TDC + 180°	0.297	0.328	0.328	0.297		
TDC + 270°	0.297	0.328	0.328	0.297		
Average	0.296875	0.328125	0.328125	0.296875		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) _____

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.313	0.328	0.344	0.328		
TDC + 90°	0.328	0.328	0.328	0.313		
TDC + 180°	0.328	0.328	0.344	0.313		
TDC + 270°	0.313	0.344	0.344	0.313		
Average	0.3203125	0.33203125	0.3398438	0.3164063		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application Chevy Impala

Tire Manufacturer Cooper

Tire Brand Name CS4

Tire Build Date 5110

DOT Code U9X3 CLN 5110

UTQG Treadwear Rating 520

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 98

Tire Position Right Rear Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.297	0.328	0.328	0.297		
TDC + 90°	0.297	0.328	0.328	0.297		
TDC + 180°	0.297	0.328	0.328	0.297		
TDC + 270°	0.297	0.328	0.328	0.297		
Average	0.296875	0.328125	0.328125	0.296875		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) _____

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.313	0.328	0.328	0.313		
TDC + 90°	0.313	0.328	0.328	0.313		
TDC + 180°	0.297	0.313	0.328	0.313		
TDC + 270°	0.313	0.328	0.328	0.313		
Average	0.3085938	0.32421875	0.328125	0.3125		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Stage 3-New Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Conduct five 60 -> 0 mph full ABS stops (one per lap)

Location Track Straightaway Dry Asphalt
 Date 6/7/11
 Driver Matt Rogers
 Target
 Velocity,
 MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Index	Adjusted w/ Index
1	60.32	144.50	142.97	0.9826	140.48
2	59.04	139.34	143.90	0.9826	141.40
3	60.20	141.16	140.23	0.9826	137.79
4	59.61	140.82	142.65	0.9826	140.16
5	60.53	144.25	141.74	0.9826	139.28
= Average 60 mph SD feet			142.30		139.82
= Standard Deviation, 60 mph SD feet			1.39		1.37

Stage 5-New Tire Wet Asphalt Braking in a Turn Stopping Distance Tests
(driver + full instrumentation + full fuel)

Conduct 10 40 -> 0 mph full ABS stops (one per lap, five in each direction)

Location Turn 6 (Sprinklers On)
 Date 6/7/11
 Driver Matt Rogers
 Target
 Velocity,
 MPH 40

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Run Direction
1	41.97	89.58	81.36	CW
2	42.46	90.54	80.37	CW
3	41.84	91.89	84.00	CW
4	41.10	97.90	92.73	CW
5	42.88	93.81	81.64	CW
6	39.20	71.22	74.17	CCW
7	39.05	75.14	78.83	CCW
8	39.03	77.45	81.37	CCW
9	40.17	76.03	75.40	CCW
10	39.30	76.45	79.22	CCW

= Average 30 mph SD feet 80.91
 = Standard Deviation, 60 mph SD feet 5.09

Stage 6-New Tire Steady State Turn Max Lateral on Dry Asphalt

Control vehicle/tire runs three 60->0 mph full ABS (one per lap) on dynamics pad for reference purposes.

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise) until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Index	Adjusted w/ Index
1	CW	45.69	0.93	0.95	0.89
		Max Lat	0.93		
1	CCW	45.39	0.92	0.95	0.87
		Max Lat	0.92		

Temperatures of rotor and tire during endurance test

Vehicle Impala Cooper Tire

Lap Sequence	LF		LR		RR		RF	
	Rotor	Tire	Rotor	Tire	Rotor	Tire	Rotor	Tire
After 10 Laps	557	178	350	390	390	148	570	199
After 20 Laps	611	192	385	432	432	162	656	208
After 30 Laps	640	208	444	467	467	184	842	250
After 40 Laps								
After 50 Laps								
After 60 Laps								
After 70 Laps								
After 80 Laps								
After 90 Laps								
Post Test								

Stage 8-Worn Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Test aborted due to excess tire wear

Conduct five 60 -> 0 mph full ABS stops (one per lap)

For each stop record initial vehicle speed, stopping distance

Location	Track Straightaway Dry Asphalt
Date	6/7/11
Driver	Matt Rogers
Target Velocity, MPH	60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet
1			
2			
3			
4			
5			

= Average 60 mph SD feet

= Standard Deviation, 60 mph SD feet

Stage 9-Worn Tire Wet Jennite Stopping Distance Tests
(driver + full instrumentation + full fuel)

Conduct 10 35 -> 0 mph full ABS stops (one per lap)
For each stop record initial vehicle speed, stopping distance

Location Wet Jennite (Sprinklers On)
Date 6/7/11
Driver Matt Rogers
Target
Velocity,
MPH 35

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

= Average 30 mph SD feet
= Standard Deviation, 60 mph SD feet

Stage 10-Worn Tire Wet Asphalt Braking in a Turn Stopping Distance Tests
(driver + full instrumentation + full fuel)

Conduct 10 40 -> 0 mph full ABS stops (one per lap, five in each direction)

For each stop record initial vehicle speed, stopping distance, run direction (CW, CCW)

Location Turn 6 (Sprinklers On)
 Date 6/7/11
 Driver Matt Rogers
 Target
 Velocity,
 MPH 40

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Run Direction
1				CW
2				CW
3				CW
4				CW
5				CW
6				CCW
7				CCW
8				CCW
9				CCW
10				CCW

= Average 30 mph SD feet

= Standard Deviation, 60 mph SD feet

Stage 11-Worn Tire Steady State Turn Max Lateral on Dry Asphalt

Test aborted due to excess tire wear

**Control vehicle/tire runs three 60->0 mph full ABS (one per lap)
on dynamics pad for reference purposes.**

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

**Conduct steady state turn tests in both direction (clockwise, counter clockwise)
until reaching loss of stability or failure to maintain turn radius.**

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G
1	CW		0
		Max Lat.	0
1	CCW		0
		Max Lat.	0

Stage 12- End of Test Tire Wear Check

Measure tire tread depth in each groove at four locations and record results in tire sheet

Left Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.015625	-0.0625	-0.046875	-0.046875	0	0
TDC + 90°	-0.015625	-0.046875	-0.0625	-0.046875	0	0
TDC + 180°	-0.03125	-0.046875	-0.0625	-0.046875	0	0
TDC + 270°	-0.03125	-0.046875	-0.0625	-0.046875	0	0
Average	-0.023438	-0.050781	-0.058594	-0.046875	0	0

Right Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.03125	-0.046875	-0.0625	-0.015625	0	0
TDC + 90°	-0.03125	-0.0625	-0.03125	-0.015625	0	0
TDC + 180°	-0.046875	-0.0625	-0.046875	-0.015625	0	0
TDC + 270°	-0.046875	-0.078125	-0.0625	-0.015625	0	0
Average	-0.039063	-0.0625	-0.050781	-0.015625	0	0

Left Rear	Groove					
Position	1	2	3	4	5	6
TDC	0.015625	0	0.015625	0.03125	0	0
TDC + 90°	0.03125	0	0	0.015625	0	0
TDC + 180°	0.03125	0	0.015625	0.015625	0	0
TDC + 270°	0.015625	0.015625	0.015625	0.015625	0	0
Average	0.0234375	0.0039063	0.0117188	0.0195313	0	0

Right Rear	Groove					
Position	1	2	3	4	5	6
TDC	0.015625	0	0	0.015625	0	0
TDC + 90°	0.015625	0	0	0.015625	0	0
TDC + 180°	0	-0.015625	0	0.015625	0	0
TDC + 270°	0.015625	0	0	0.015625	0	0
Average	0.0117188	-0.003906	0	0.015625	0	0

Ford CVPI/Firestone Firehawk GT Pursuit

2011 NIJ-MSP Tire Test Form General Info Form

Vehicle Application	<u>CVPI</u>
Vehicle VIN	<u>AX125586</u>
Initial Odometer	<u>3217</u>
Tire Manufacturer	<u>Firestone</u>
Tire Brand Name	<u>Firehawk GT</u>

General Track and Weather Info

Date of Test	<u>9-Jun-11</u>
Driver	<u>Jim Flegel</u>

Track Temperature	Initial	<u>74° F</u>
Deg F	Midpoint	<u>81° F</u>
	Final	<u>83° F</u>

Weather Info		
Temperature	Initial	<u>68° F</u>
Deg F	Midpoint	<u>71° F</u>
	Final	<u>71° F</u>

Conditions Cloudy, Some Wind 10-12 mph

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application CVPI

Tire Manufacturer Firestone

Tire Brand Name Firehawk GT

Tire Build Date 0211

DOT Code W278FHP

UTQG Treadwear Rating 340

UTQG Load Rating A

UTQG Traction Rating AA

Speed Rating W

Load Index 98

Tire Position Left Front Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.328	0.188	0.359	0.188	0.328	
TDC + 90°	0.328	0.188	0.359	0.188	0.328	
TDC + 180°	0.328	0.188	0.359	0.188	0.328	
TDC + 270°	0.328	0.188	0.359	0.188	0.328	
Average	0.328	0.188	0.359	0.188	0.328	

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 35

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.172	0.016	0.203	0.031	0.203	
TDC + 90°	0.172	0.031	0.203	0.031	0.203	
TDC + 180°	0.219	0.016	0.219	0.031	0.203	
TDC + 270°	0.125	0.031	0.219	0.031	0.188	
Average	0.172	0.023	0.211	0.031	0.199	

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application CVPI

Tire Manufacturer Firestone

Tire Brand Name Firehawk GT

Tire Build Date 0211

DOT Code W278FHP

UTQG Treadwear Rating 340

UTQG Load Rating A

UTQG Traction Rating AA

Speed Rating W

Load Index 98

Tire Position Right Front Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.344	0.188	0.359	0.188	0.328	
TDC + 90°	0.344	0.188	0.359	0.188	0.328	
TDC + 180°	0.344	0.188	0.359	0.188	0.328	
TDC + 270°	0.344	0.188	0.359	0.188	0.328	
Average	0.344	0.188	0.359	0.188	0.328	

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 35

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.203	0.031	0.203	0.031	0.188	
TDC + 90°	0.203	0.031	0.203	0.031	0.172	
TDC + 180°	0.188	0.031	0.203	0.031	0.188	
TDC + 270°	0.203	0.031	0.219	0.031	0.188	
Average	0.199	0.031	0.207	0.031	0.184	

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application CVPI

Tire Manufacturer Firestone

Tire Brand Name Firehawk GT

Tire Build Date 0211

DOT Code W278FHP

UTQG Treadwear Rating 340

UTQG Load Rating A

UTQG Traction Rating AA

Speed Rating W

Load Index 98

Tire Position Left Rear Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.328	0.172	0.281	0.188	0.328	
TDC + 90°	0.328	0.172	0.281	0.188	0.328	
TDC + 180°	0.328	0.172	0.281	0.188	0.328	
TDC + 270°	0.328	0.172	0.281	0.188	0.328	
Average	0.328	0.172	0.281	0.188	0.328	

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 35

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.203	0.031	0.188	0.031	0.203	
TDC + 90°	0.203	0.016	0.203	0.031	0.203	
TDC + 180°	0.203	0.016	0.203	0.031	0.203	
TDC + 270°	0.203	0.031	0.203	0.031	0.219	
Average	0.203	0.023	0.199	0.031	0.207	

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application CVPI

Tire Manufacturer Firestone

Tire Brand Name Firehawk GT

Tire Build Date 0211

DOT Code W278FHP

UTQG Treadwear Rating 340

UTQG Load Rating A

UTQG Traction Rating AA

Speed Rating W

Load Index 98

Tire Position Right Rear Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.344	0.188	0.359	0.188	0.328	
TDC + 90°	0.344	0.188	0.359	0.188	0.328	
TDC + 180°	0.344	0.188	0.359	0.188	0.328	
TDC + 270°	0.344	0.188	0.359	0.188	0.328	
Average	0.344	0.188	0.359	0.188	0.328	

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 35

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.188	0.031	0.188	0.016	0.188	
TDC + 90°	0.172	0.031	0.203	0.031	0.188	
TDC + 180°	0.172	0.031	0.203	0.031	0.203	
TDC + 270°	0.188	0.031	0.203	0.031	0.203	
Average	0.180	0.031	0.199	0.027	0.195	

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Stage 3-New Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Conduct five 60 -> 0 mph full ABS stops (one per lap)

Location Track Straightaway Dry Asphalt
 Date 6/9/11
 Driver Jim Flegel
 Target
 Velocity,
 MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Index	Adjusted w/ Index
1	59.93	132.83	133.16	1.0333	137.59
2	60.77	135.90	132.46	1.0333	136.88
3	60.05	133.65	133.41	1.0333	137.85
4	60.33	134.97	133.51	1.0333	137.96
5	60.38	136.27	134.58	1.0333	139.06
= Average 60 mph SD feet			133.42		137.87
= Standard Deviation, 60 mph SD feet			0.76		0.79

Stage 6-New Tire Steady State Turn Max Lateral on Dry Asphalt

Control vehicle/tire runs three 60->0 mph full ABS (one per lap) on dynamics pad for reference purposes.

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise) until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Index	Adjusted w/ Index
1	CW	45.32	0.92	1.04	0.95
		Max Lat	0.92		
1	CCW	48.22	1.04	1.04	1.08
		Max Lat	1.04		

Stage 7-Tire Endurance/Wear Testing

Drive 100 laps at max speed on dry asphalt track (50 each direction).

Lap #	CW Lap Time, Sec	CCW Lap Time, Sec	Lap #	CW Lap Time, Sec	CCW Lap Time, Sec
1	63.49	62.654	37	62.984	63.291
2	63.152	63.042	38	62.498	63.117
3	63.474	62.676	39	62.987	63.375
4	63.003	62.288	40	63.18	63.726
5	62.987	62.529	41	62.571	62.483
6	63.154	62.983	42	64.095	62.93
7	63.051	63.035	43	62.632	62.998
8	63.157	62.678	44	62.606	63.085
9	63.235	62.767	45	62.404	63.469
10	63.154	63.358	46	62.427	63.083
11	63.305	62.55	47	62.508	63.177
12	63.448	62.545	48	62.71	63.003
13	62.853	63.234	49	62.661	63.433
14	63.625	62.761	50	62.61	63.374
15	63.138	62.942			
16	63.07	63.149	Avg =	63.075889	62.996917
17	63.358	63.128	Std Dev =	0.3024549	0.338339
18	63.163	63.555	Min =	62.2	62.288
19	63.165	63.073	Max =	63.625	63.654
20	63.115	63.4	Range =	1.425	1.366
21	63.212	62.687			
22	63.602	63.044			
23	62.669	62.56			
24	62.847	62.982			
25	62.862	63.354			
26	62.894	62.99			
27	62.663	63.555			
28	63.005	63.125			
29	62.815	63.654			
30	63.445	63.46			
31	63.253	62.72			
32	62.8	62.907			
33	62.759	63.141			
34	62.2	63.322			
35	62.616	62.762			
36	62.993	63.279			

Temperature of rotor and tire during endurance test

Vehicle CVPI Firestone Firehawk GT

Lap Sequence	LF		LR		RR		RF	
	Rotor	Tire	Rotor	Tire	Rotor	Tire	Rotor	Tire
After 10 Laps	869	148	351	141	368	163	823	180
After 20 Laps	863	149	385	151	395	169	820	184
After 30 Laps	887	148	417	145	438	164	827	187
After 40 Laps	853	141	412	141	480	154	793	190
After 50 Laps	835	146	422	131	515	157	765	180
After 60 Laps	882	172	520	168	488	123	788	142
After 70 Laps	920	154	610	164	550	124	840	134
After 80 Laps	893	158	633	151	579	135	810	140
After 90 Laps	925	162	615	150	570	132	847	150
After 100 Laps	915	178	615	160	539	130	829	155

Stage 8-Worn Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Conduct five 60 -> 0 mph full ABS stops (one per lap)

Location Track Straightaway Dry Asphalt
 Date 6/9/11
 Driver Jim Flegel
 Target
 Velocity,
 MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Index	Adjusted w/ Index
1	60.16	143.70	142.92	1.0076	144.00
2	60.04	139.22	139.03	1.0076	140.08
3	59.76	139.30	140.41	1.0076	141.47
4	59.89	140.38	140.88	1.0076	141.96
5	60.65	143.48	140.41	1.0076	141.48
= Average 60 mph SD feet			140.73		141.80
= Standard Deviation, 60 mph SD feet			1.41		1.42

Stage 10-Worn Tire Wet Asphalt Braking in a Turn Stopping Distance Tests
(driver + full instrumentation + full fuel)

Conduct 10 40 -> 0 mph full ABS stops (one per lap, five in each direction)
 For each stop record initial vehicle speed, stopping distance, run direction (CW, CCW)

Location Turn 6 (Sprinklers On)
 Date 6/9/11
 Driver Jim Flegel
 Target
 Velocity,
 mph 40

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Run Direction
1	41.30	91.70	86.02	CW
2	41.92	82.38	75.00	CW
3	40.03	84.93	84.81	CW
4	40.99	89.28	85.01	CW
5	40.68	81.98	79.27	CW
6	37.74	82.31	92.47	CCW
7	41.54	85.02	78.85	CCW
8	39.46	77.86	80.01	CCW
9	38.99	87.75	92.38	CCW
10	39.24	81.91	85.12	CCW

= Average 40 mph SD feet 83.89
 = Standard Deviation, 40 mph SD feet 5.72

Stage 11-Worn Tire Steady State Turn Max Lateral on Dry Asphalt

Control vehicle/tire runs three 60->0 mph full ABS (one per lap) on dynamics pad for reference purposes.

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise) until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Index	Adjusted w/ Index
1	CW	48.94	1.07	1.01	1.08
		Max Lat.	1.07		
1	CCW	47.09	0.99	1.01	1.00
		Max Lat.	0.99		

Stage 12- End of Test Tire Wear Check

Measure tire tread depth in each groove at four locations and record results in tire sheet

Left Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.15625	-0.171875	-0.15625	-0.15625	-0.125	0
TDC + 90°	-0.15625	-0.15625	-0.15625	-0.15625	-0.125	0
TDC + 180°	-0.109375	-0.171875	-0.140625	-0.15625	-0.125	0
TDC + 270°	-0.203125	-0.15625	-0.140625	-0.15625	-0.140625	0
Average	-0.15625	-0.164063	-0.148438	-0.15625	-0.128906	0

% Wear 47.62% 87.50% 41.30% 83.33% LF AVG 64.94%

Right Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.140625	-0.15625	-0.15625	-0.15625	-0.140625	0
TDC + 90°	-0.140625	-0.15625	-0.15625	-0.15625	-0.15625	0
TDC + 180°	-0.15625	-0.15625	-0.15625	-0.15625	-0.140625	0
TDC + 270°	-0.140625	-0.15625	-0.140625	-0.15625	-0.140625	0
Average	-0.144531	-0.15625	-0.152344	-0.15625	-0.144531	0

% Wear 42.05% 83.33% 42.39% 83.33% RF AVG 62.78%

Left Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.125	-0.140625	-0.09375	-0.15625	-0.125	0
TDC + 90°	-0.125	-0.15625	-0.078125	-0.15625	-0.125	0
TDC + 180°	-0.125	-0.15625	-0.078125	-0.15625	-0.125	0
TDC + 270°	-0.125	-0.140625	-0.078125	-0.15625	-0.109375	0
Average	-0.125	-0.148438	-0.082031	-0.15625	-0.121094	0

% Wear 38.10% 86.36% 29.17% 83.33% LR AVG 59.24%

Right Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.15625	-0.15625	-0.171875	-0.171875	-0.140625	0
TDC + 90°	-0.171875	-0.15625	-0.15625	-0.15625	-0.140625	0
TDC + 180°	-0.171875	-0.15625	-0.15625	-0.15625	-0.125	0
TDC + 270°	-0.15625	-0.15625	-0.15625	-0.15625	-0.125	0
Average	-0.164063	-0.15625	-0.160156	-0.160156	-0.132813	0

% Wear 47.73% 83.33% 44.57% 85.42% RR AVG 65.26%

Average Wear by Tire Position

Tire Position	% Tread Consumed
LF AVG	57.66%
RF AVG	57.86%
LR AVG	55.57%
RR AVG	68.02%

Ford CVPI/Goodyear Eagle RSA

2011 NIJ-MSP Tire Test Form General Info Form

Vehicle Application	<u>CVPI</u>
Vehicle VIN	<u>AX125586</u>
Initial Odometer	<u>3365</u>
Tire Manufacturer	<u>Goodyear</u>
Tire Brand Name	<u>Eagle RSA</u>

General Track and Weather Info

Date of Test	<u>6/10/11 & 6/13/11</u>
Driver	<u>Jim Flegel</u>

		<u>6/10/11</u>	<u>6/13/11</u>
Track Temperature	Initial	<u>66° F</u>	<u>63° F</u>
Deg F	Midpoint	<u></u>	<u>79° F</u>
	Final	<u></u>	<u>101° F</u>

Weather Info

Temperature	Initial	<u>56° F</u>	<u>57° F</u>
Deg F	Midpoint	<u></u>	<u>64° F</u>
	Final	<u></u>	<u>78° F</u>

Conditions	<u>6/10 Cloudy & Cool</u>
	<u>6/13 Sunny & Cool</u>

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application CVPI

Tire Manufacturer Goodyear

Tire Brand Name Eagle RSA

Tire Build Date 2509

DOT Code M678 LNER 2509

UTQG Treadwear Rating 260

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating W

Load Index 98

Tire Position Left Front Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.281	0.328	0.328	0.281		
TDC + 90°	0.281	0.328	0.328	0.281		
TDC + 180°	0.281	0.328	0.328	0.281		
TDC + 270°	0.281	0.328	0.328	0.281		
Average	0.281	0.328	0.328	0.281		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 38

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.203	0.203	0.203	0.172		
TDC + 90°	0.188	0.203	0.219	0.172		
TDC + 180°	0.188	0.219	0.219	0.188		
TDC + 270°	0.203	0.219	0.219	0.172		
Average	0.195	0.211	0.215	0.176		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application CVPI

Tire Manufacturer Goodyear

Tire Brand Name Eagle RSA

Tire Build Date 2209

DOT Code M678 LNER 2209

UTQG Treadwear Rating 260

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating W

Load Index 98

Tire Position Right Front Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.281	0.344	0.344	0.281		
TDC + 90°	0.281	0.344	0.344	0.281		
TDC + 180°	0.281	0.344	0.344	0.281		
TDC + 270°	0.281	0.344	0.344	0.281		
Average	0.281	0.344	0.344	0.281		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 38

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.203	0.203	0.219	0.188		
TDC + 90°	0.188	0.203	0.219	0.172		
TDC + 180°	0.188	0.188	0.219	0.188		
TDC + 270°	0.188	0.188	0.203	0.172		
Average	0.191	0.195	0.215	0.180		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

TREAD DELAMINATION AT END OF TEST

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application CVPI

Tire Manufacturer Goodyear

Tire Brand Name Eagle RSA

Tire Build Date 2509

DOT Code M678 LNER 2209

UTQG Treadwear Rating 260

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating W

Load Index 98

Tire Position Left Rear Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.281	0.328	0.328	0.281		
TDC + 90°	0.281	0.328	0.328	0.281		
TDC + 180°	0.281	0.328	0.328	0.281		
TDC + 270°	0.281	0.328	0.328	0.281		
Average	0.281	0.328	0.328	0.281		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 38

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.188	0.172	0.203	0.188		
TDC + 90°	0.188	0.188	0.203	0.188		
TDC + 180°	0.172	0.188	0.203	0.188		
TDC + 270°	0.188	0.188	0.203	0.172		
Average	0.184	0.184	0.203	0.184		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application CVPI

Tire Manufacturer Goodyear

Tire Brand Name Eagle RSA

Tire Build Date 2209

DOT Code M678 LNER 2209

UTQG Treadwear Rating 260

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating W

Load Index 98

Tire Position Right Rear Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.281	0.328	0.328	0.281		
TDC + 90°	0.281	0.328	0.328	0.281		
TDC + 180°	0.281	0.328	0.328	0.281		
TDC + 270°	0.281	0.328	0.328	0.281		
Average	0.281	0.328	0.328	0.281		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 35

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.172	0.172	0.188	0.172		
TDC + 90°	0.172	0.172	0.172	0.156		
TDC + 180°	0.156	0.156	0.188	0.172		
TDC + 270°	0.172	0.188	0.188	0.156		
Average	0.168	0.172	0.184	0.164		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Stage 2-Burnish (driver + full instrumentation + full fuel)

Control tire runs this stage only once.

Conduct 10 60 -> 0 mph full ABS stops

Location Dry Asphalt
Date 6/10/11 & 6/13/11
Driver Jim Flegel
Target
Velocity,
MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet
1	60.80	146.37	142.53
2	60.36	141.63	139.95
3	60.35	140.12	138.52
4	60.46	139.39	137.28
5	59.83	138.32	139.12
6	60.03	138.37	138.25
7	60.39	138.06	136.30
8	59.71	133.38	134.67
9	60.41	140.06	138.15
10	60.14	137.43	136.77

= Average 60 mph SD feet 138.15

= Standard Deviation, 60 mph SD feet 2.15

Stage 6-New Tire Steady State Turn Max Lateral on Dry Asphalt

Control vehicle/tire runs three 60->0 mph full ABS (one per lap) on dynamics pad for reference purposes.

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise) until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Index	Adjusted w/ Index
1	CW	44.25	0.87	1.02	0.89
		Max Lat	0.87		
1	CCW	45.63	0.93	1.02	0.95
		Max Lat	0.93		

Stage 7-Tire Endurance/Wear Testing

Drive 100 laps at max speed on dry asphalt track (50 each direction).

Lap #	CW Lap Time, Sec	CCW Lap Time, Sec	Lap #	CW Lap Time, Sec	CCW Lap Time, Sec
1	63.093	62.931	37	62.422	62.193
2	62.182	62.158	38	62.662	62.751
3	62.616	61.843	39	62.801	63.535
4	62.451	62.009	40	62.733	61.934
5	62.973	61.774	41	62.9	62.697
6	63.033	61.94	42	62.766	62.261
7	62.68	62.121	43	62.463	62.342
8	62.273	62.155	44	62.804	62.322
9	62.614	62.335	45	62.37	62.571
10	63.054	61.906	46	62.629	62.235
11	62.787	62.083	47	62.414	62.271
12	62.541	61.804	48	62.582	62.667
13	62.69	62.217	49	62.429	62.626
14	62.445	62.273	50	62.836	62.786
15	62.394	62.874			
16	62.913	62.569	Avg =	62.710667	62.313306
17	62.779	62.327	Std Dev =	0.2746157	0.3082667
18	62.944	62.204	Min =	62.182	61.774
19	62.541	62.257	Max =	63.281	63.154
20	62.855	63.154	Range =	1.099	1.38
21	63.103	62.305			
22	62.696	62.592			
23	62.52	62.401			
24	62.879	62.421			
25	62.749	62.362			
26	62.733	62.536			
27	63.281	62.258			
28	62.955	62.647			
29	62.847	62.383			
30	62.634	62.605			
31	62.472	62.612			
32	62.338	62.29			
33	62.293	62.389			
34	62.557	62.293			
35	62.492	62.164			
36	63.177	62.087			

Temperatures of rotor and tire during endurance test

Vehicle CVPI Goodyear Eagle RSA

Lap Sequence	LF		LR		RR		RF	
	Rotor	Tire	Rotor	Tire	Rotor	Tire	Rotor	Tire
After 10 Laps	835	132	300	125	315	136	798	155
After 20 Laps	888	130	333	130	358	140	815	160
After 30 Laps	852	128	350	128	395	155	830	160
After 40 Laps	855	142	321	121	392	152	829	158
After 50 Laps	855	131	343	125	475	152	844	160
After 60 Laps	855	175	405	170	395	115	750	125
After 70 Laps	950	174	445	170	470	122	833	128
After 80 Laps	955	169	504	179	425	118	830	123
After 90 Laps	920	170	540	164	490	122	823	126
After 100 Laps	950	172	615	170	530	132	863	128

Stage 10-Worn Tire Wet Asphalt Braking in a Turn Stopping Distance Tests
(driver + full instrumentation + full fuel)

Conduct 10 40 -> 0 mph full ABS stops (one per lap, five in each direction)
 For each stop record initial vehicle speed, stopping distance, run direction (CW, CCW)

Location Turn 6 (Sprinklers On)
 Date 6/10/11 & 6/13/11
 Driver Jim Flegel
 Target
 Velocity,
 MPH 40

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Run Direction
1	41.56	86.75	80.35	CW
2	41.58	104.82	97.03	CW
3	40.54	101.07	98.38	CW
4	40.98	95.71	91.21	CW
5	41.16	102.66	96.96	CW
6	40.07	87.69	87.40	CCW
7	39.04	79.03	82.98	CCW
8	39.86	83.24	83.82	CCW
9	40.84	84.66	81.22	CCW
10	40.40	83.77	82.11	CCW

= Average 40 mph SD feet 88.15
 = Standard Deviation, 40 mph SD feet 7.16

Stage 11-Worn Tire Steady State Turn Max Lateral on Dry Asphalt

Control vehicle/tire runs three 60->0 mph full ABS (one per lap) on dynamics pad for reference purposes.

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise) until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Index	Adjusted w/ Index
1	CW	47.01	0.98	1.00	0.99
		Max Lat.	0.98		
1	CCW	47.12	0.99	1.00	0.99
		Max Lat.	0.99		

Stage 12- End of Test Tire Wear Check

Measure tire tread depth in each groove at four locations and record results in tire sheet
 Recheck and record cold tire inflation pressure

Left Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.078125	-0.125	-0.125	-0.109375	0	0
TDC + 90°	-0.09375	-0.125	-0.109375	-0.109375	0	0
TDC + 180°	-0.09375	-0.109375	-0.109375	-0.09375	0	0
TDC + 270°	-0.078125	-0.109375	-0.109375	-0.109375	0	0
Average	-0.085938	-0.117188	-0.113281	-0.105469	0	0

% Wear 30.56% 35.71% 34.52% 37.50% LF AVG 34.57%

Right Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.078125	-0.140625	-0.125	-0.09375	0	0
TDC + 90°	-0.09375	-0.140625	-0.125	-0.109375	0	0
TDC + 180°	-0.09375	-0.15625	-0.125	-0.09375	0	0
TDC + 270°	-0.09375	-0.15625	-0.140625	-0.109375	0	0
Average	-0.089844	-0.148438	-0.128906	-0.101563	0	0

% Wear 31.94% 43.18% 37.50% 36.11% RF AVG 37.18%

Left Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.09375	-0.15625	-0.125	-0.09375	0	0
TDC + 90°	-0.09375	-0.140625	-0.125	-0.09375	0	0
TDC + 180°	-0.109375	-0.140625	-0.125	-0.09375	0	0
TDC + 270°	-0.09375	-0.140625	-0.125	-0.109375	0	0
Average	-0.097656	-0.144531	-0.125	-0.097656	0	0

% Wear 34.72% 44.05% 38.10% 34.72% LR AVG 37.90%

Right Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.109375	-0.15625	-0.140625	-0.109375	0	0
TDC + 90°	-0.109375	-0.15625	-0.15625	-0.125	0	0
TDC + 180°	-0.125	-0.171875	-0.140625	-0.109375	0	0
TDC + 270°	-0.109375	-0.140625	-0.140625	-0.125	0	0
Average	-0.113281	-0.15625	-0.144531	-0.117188	0	0

% Wear 40.28% 47.62% 44.05% 41.67% RR AVG 43.40%

Average Wear by Tire Position

Tire Position	% Tread Consumed
LF AVG	34.57%
RF AVG	37.18%
LR AVG	37.90%
RR AVG	43.40%

Ford CVPI/Pirelli Pzero Nero

2011 NIJ-MSP Tire Test Form General Info Form

Vehicle Application	<u>CVPI</u>
Vehicle VIN	<u>AX125586</u>
Initial Odometer	<u>3663</u>
Tire Manufacturer	<u>Pirelli</u>
Tire Brand Name	<u>Pzero Nero</u>

General Track and Weather Info

Date of Test	<u>15-Jun-11</u>
Driver	<u>Jim Flegel</u>

Track Temperature	Initial	<u>62° F</u>
Deg F	Midpoint	<u>77° F</u>
	Final	<u>85° F</u>

Weather Info		
Temperature	Initial	<u>57° F</u>
Deg F	Midpoint	<u>63° F</u>
	Final	<u>67° F</u>

Conditions Light Clouds, Cool, Winds 10 - 12 mph

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application CVPI

Tire Manufacturer Pirelli

Tire Brand Name Pzero Nero

Tire Build Date 4610

DOT Code 51 EK E 661

UTQG Treadwear Rating 400

UTQG Load Rating A

UTQG Traction Rating AA

Speed Rating W

Load Index 98

Tire Position Left Front Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.313	0.328	0.328	0.281		
TDC + 90°	0.313	0.328	0.328	0.281		
TDC + 180°	0.313	0.328	0.328	0.281		
TDC + 270°	0.313	0.328	0.328	0.281		
Average	0.313	0.328	0.328	0.281		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 38

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.188	0.141	0.141	0.125		
TDC + 90°	0.203	0.141	0.125	0.125		
TDC + 180°	0.203	0.141	0.125	0.109		
TDC + 270°	0.203	0.141	0.125	0.109		
Average	0.199	0.141	0.129	0.117		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application CVPI

Tire Manufacturer Pirelli

Tire Brand Name Pzero Nero

Tire Build Date 4610

DOT Code 51 EK E 661

UTQG Treadwear Rating 400

UTQG Load Rating A

UTQG Traction Rating AA

Speed Rating W

Load Index 98

Tire Position Right Front Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.297	0.313	0.328	0.297		
TDC + 90°	0.297	0.313	0.328	0.297		
TDC + 180°	0.297	0.313	0.328	0.297		
TDC + 270°	0.297	0.313	0.328	0.297		
Average	0.297	0.313	0.328	0.297		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 38

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.188	0.156	0.141	0.109		
TDC + 90°	0.188	0.156	0.141	0.109		
TDC + 180°	0.188	0.156	0.141	0.109		
TDC + 270°	0.188	0.156	0.141	0.109		
Average	0.188	0.156	0.141	0.109		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application CVPI

Tire Manufacturer Pirelli

Tire Brand Name Pzero Nero

Tire Build Date 4610

DOT Code 51 EK E 661

UTQG Treadwear Rating 400

UTQG Load Rating A

UTQG Traction Rating AA

Speed Rating W

Load Index 98

Tire Position Left Rear Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.297	0.328	0.328	0.281		
TDC + 90°	0.297	0.328	0.328	0.281		
TDC + 180°	0.297	0.328	0.328	0.281		
TDC + 270°	0.297	0.328	0.328	0.281		
Average	0.297	0.328	0.328	0.281		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 38

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.172	0.141	0.141	0.141		
TDC + 90°	0.188	0.141	0.141	0.141		
TDC + 180°	0.172	0.156	0.156	0.156		
TDC + 270°	0.188	0.141	0.156	0.156		
Average	0.180	0.145	0.148	0.148		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application CVPI

Tire Manufacturer Pirelli

Tire Brand Name Pzero Nero

Tire Build Date 4610

DOT Code 51 EK E 661

UTQG Treadwear Rating 400

UTQG Load Rating A

UTQG Traction Rating AA

Speed Rating W

Load Index 98

Tire Position Right Rear Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.297	0.328	0.313	0.281		
TDC + 90°	0.297	0.328	0.313	0.281		
TDC + 180°	0.297	0.328	0.313	0.281		
TDC + 270°	0.297	0.328	0.313	0.281		
Average	0.297	0.328	0.313	0.281		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 38

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.172	0.156	0.156	0.141		
TDC + 90°	0.172	0.156	0.156	0.141		
TDC + 180°	0.156	0.156	0.156	0.156		
TDC + 270°	0.172	0.156	0.156	0.141		
Average	0.168	0.156	0.156	0.145		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Stage 3-New Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Conduct five 60 -> 0 mph full ABS stops (one per lap)
 For each stop record initial vehicle speed, stopping distance

Location Track Straightaway Dry Asphalt
 Date 6/15/11
 Driver Jim Flegel
 Target
 Velocity,
 MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Index	Adjusted w/ Index
1	60.54	136.97	134.55	1.0099	135.88
2	60.56	136.03	133.55	1.0099	134.87
3	60.69	138.22	135.11	1.0099	136.45
4	60.36	135.10	133.49	1.0099	134.82
5	59.84	134.56	135.27	1.0099	136.60
= Average 60 mph SD feet			134.39		135.72
= Standard Deviation, 60 mph SD feet			0.84		0.85

Stage 6-New Tire Steady State Turn Max Lateral on Dry Asphalt

Control vehicle/tire runs three 60->0 mph full ABS (one per lap) on dynamics pad for reference purposes.

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise) until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Index	Adjusted w/ Index
1	CW	43.64	0.85	1.03	0.87
		Max Lat	0.85		
1	CCW	46.05	0.95	1.03	0.97
		Max Lat	0.95		

Stage 7-Tire Endurance/Wear Testing

Drive 100 laps at max speed on dry asphalt track (50 each direction).

Record lap times

Lap #	CW Lap Time, Sec	CCW Lap Time, Sec	Lap #	CW Lap Time, Sec	CCW Lap Time, Sec
1	62.197	62.669	37	62.508	62.818
2	62.502	62.655	38	62.799	62.799
3	62.26	62.523	39	62.519	63.064
4	62.545	62.419	40	63.055	62.751
5	62.016	62.618	41	62.62	62.059
6	62.333	62.861	42	61.998	62.162
7	62.54	62.635	43	62.285	62.063
8	63.04	62.741	44	62.206	62.042
9	62.606	62.751	45	62.446	62.384
10	62.624	62.648	46	62.601	62.24
11	62.074	61.934	47	62.93	62.658
12	62.153	62.662	48	62.677	62.526
13	62.029	62.321	49	62.542	62.641
14	62.122	62.273	50	62.795	62.54
15	62.001	62.636			
16	62.001	62.465	Avg =	62.326861	62.552167
17	61.979	62.89	Std Dev =	0.2493473	0.2196363
18	61.824	62.55	Min =	61.824	61.934
19	62.772	62.897	Max =	63.04	62.954
20	62.393	62.642	Range =	1.216	1.02
21	62.131	62.313			
22	62.283	62.383			
23	62.467	62.457			
24	62.255	62.228			
25	62.49	62.298			
26	62.367	62.59			
27	62.473	62.548			
28	62.378	62.346			
29	62.482	62.823			
30	62.254	62.954			
31	62.382	62.541			
32	62.395	62.297			
33	62.246	62.769			
34	62.455	62.434			
35	62.165	62.597			
36	62.533	62.51			

Temperatures of rotor and tire during endurance test

Vehicle CVPI - Pirelli Pzero Nero

Lap Sequence	LF		LR		RR		RF	
	Rotor	Tire	Rotor	Tire	Rotor	Tire	Rotor	Tire
After 10 Laps	831	140	350	142	385	141	795	162
After 20 Laps	856	147	400	151	394	152	820	161
After 30 Laps	862	149	425	159	435	156	825	167
After 40 Laps	852	152	408	152	460	155	804	163
After 50 Laps	871	143	430	152	539	156	856	161
After 60 Laps	917	157	465	155	526	140	831	149
After 70 Laps	948	168	498	154	570	141	848	150
After 80 Laps	970	171	505	155	610	144	865	157
After 90 Laps	960	173	510	159	505	136	867	159
After 100 Laps	880	177	507	173	515	136	778	142

Stage 8-Worn Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Conduct five 60 -> 0 mph full ABS stops (one per lap)
 For each stop record initial vehicle speed, stopping distance

Location Track Straightaway Dry Asphalt
 Date 6/15/11
 Driver Jim Flegel
 Target
 Velocity,
 MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Index	Adjusted w/ Index
1	61.08	150.13	144.89	0.9999	144.88
2	60.66	142.50	139.41	0.9999	139.40
3	60.58	140.22	137.53	0.9999	137.51
4	60.39	140.77	138.97	0.9999	138.96
5	60.31	138.80	137.40	0.9999	137.38
= Average 60 mph SD feet			139.64		139.63
= Standard Deviation, 60 mph SD feet			3.07		3.07

Stage 10-Worn Tire Wet Asphalt Braking in a Turn Stopping Distance Tests
(driver + full instrumentation + full fuel)

Conduct 10 40 -> 0 mph full ABS stops (one per lap, five in each direction)
 For each stop record initial vehicle speed, stopping distance, run direction (CW, CCW)

Location Turn 6 (Sprinklers On)
 Date 6/15/11
 Driver Jim Flegel
 Target
 Velocity,
 MPH 40

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Run Direction
1	40.51	81.74	79.69	CW
2	42.05	87.58	79.24	CW
3	42.27	87.78	78.62	CW
4	40.56	85.92	83.54	CW
5	39.72	76.49	77.56	CW
6	40.86	84.89	81.36	CCW
7	41.37	86.10	80.51	CCW
8	40.35	78.85	77.51	CCW
9	40.42	77.15	75.56	CCW
10	40.41	75.99	74.46	CCW

= Average 40 mph SD feet 78.80
 = Standard Deviation, 40 mph SD feet 2.70

Stage 11-Worn Tire Steady State Turn Max Lateral on Dry Asphalt

Control vehicle/tire runs three 60->0 mph full ABS (one per lap) on dynamics pad for reference purposes.

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise) until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Index	Adjusted w/ Index
1	CW	44.79	0.89	1.01	0.90
		Max Lat.	0.89		
1	CCW	46.73	0.97	1.01	0.98
		Max Lat.	0.97		

Stage 12- End of Test Tire Wear Check

Measure tire tread depth in each groove at four locations

Left Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.125	-0.1875	-0.1875	-0.15625	0	0
TDC + 90°	-0.109375	-0.1875	-0.203125	-0.15625	0	0
TDC + 180°	-0.109375	-0.1875	-0.203125	-0.171875	0	0
TDC + 270°	-0.109375	-0.1875	-0.203125	-0.171875	0	0
Average	-0.113281	-0.1875	-0.199219	-0.164063	0	0

% Wear 36.25% 57.14% 60.71% 58.33% LF AVG 53.11%

Right Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.109375	-0.15625	-0.1875	-0.1875	0	0
TDC + 90°	-0.109375	-0.15625	-0.1875	-0.1875	0	0
TDC + 180°	-0.109375	-0.15625	-0.1875	-0.1875	0	0
TDC + 270°	-0.109375	-0.15625	-0.1875	-0.1875	0	0
Average	-0.109375	-0.15625	-0.1875	-0.1875	0	0

% Wear 36.84% 50.00% 57.14% 63.16% RF AVG 51.79%

Left Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.125	-0.1875	-0.1875	-0.140625	0	0
TDC + 90°	-0.109375	-0.1875	-0.1875	-0.140625	0	0
TDC + 180°	-0.125	-0.171875	-0.171875	-0.125	0	0
TDC + 270°	-0.109375	-0.1875	-0.171875	-0.125	0	0
Average	-0.117188	-0.183594	-0.179688	-0.132813	0	0

% Wear 39.47% 55.95% 54.76% 47.22% LR AVG 49.35%

Right Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.125	-0.171875	-0.15625	-0.140625	0	0
TDC + 90°	-0.125	-0.171875	-0.15625	-0.140625	0	0
TDC + 180°	-0.140625	-0.171875	-0.15625	-0.125	0	0
TDC + 270°	-0.125	-0.171875	-0.15625	-0.140625	0	0
Average	-0.128906	-0.171875	-0.15625	-0.136719	0	0

% Wear 43.42% 52.38% 50.00% 48.61% RR AVG 48.60%

Average Wear by Tire Position

Tire Position	% Tread Consumed
LF AVG	53.11%
RF AVG	51.79%
LR AVG	49.35%
RR AVG	48.60%

Ford CVPI/Nokian WRG2

2011 NIJ-MSP Tire Test Form General Info Form

Vehicle Application	<u>CVPI</u>
Vehicle VIN	<u>AX125586</u>
Initial Odometer	<u>3517</u>
Tire Manufacturer	<u>Nokian</u>
Tire Brand Name	<u>WRG2</u>

General Track and Weather Info

Date of Test	<u>14-Jun-11</u>
Driver	<u>Jim Flegel</u>

Track Temperature	Initial	<u>65° F</u>
Deg F	Midpoint	<u>95° F</u>
	Final	<u>106° F</u>

Weather Info		
Temperature	Initial	<u>57° F</u>
Deg F	Midpoint	<u>70° F</u>
	Final	<u>76° F</u>

Conditions Sunny, Cool, Light Winds

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application CVPI

Tire Manufacturer Nokian

Tire Brand Name WRG2

Tire Build Date 1710

DOT Code 60C6 1710

UTQG Treadwear Rating 400

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 103

Tire Position Left Front Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.344	0.344	0.344	0.344		
TDC + 90°	0.344	0.344	0.344	0.344		
TDC + 180°	0.344	0.344	0.344	0.344		
TDC + 270°	0.344	0.344	0.344	0.344		
Average	0.344	0.344	0.344	0.344		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 39

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.219	0.188	0.203	0.203		
TDC + 90°	0.219	0.203	0.188	0.203		
TDC + 180°	0.219	0.203	0.203	0.219		
TDC + 270°	0.219	0.203	0.219	0.219		
Average	0.219	0.199	0.203	0.211		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application CVPI

Tire Manufacturer Nokian

Tire Brand Name WRG2

Tire Build Date 1710

DOT Code 60C6 1710

UTQG Treadwear Rating 400

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 103

Tire Position Right Front Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.344	0.344	0.344	0.344		
TDC + 90°	0.344	0.344	0.344	0.344		
TDC + 180°	0.344	0.344	0.344	0.344		
TDC + 270°	0.344	0.344	0.344	0.344		
Average	0.344	0.344	0.344	0.344		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 40

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.203	0.188	0.203	0.203		
TDC + 90°	0.203	0.188	0.203	0.203		
TDC + 180°	0.203	0.172	0.219	0.203		
TDC + 270°	0.219	0.172	0.203	0.203		
Average	0.207	0.180	0.207	0.203		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application CVPI

Tire Manufacturer Nokian

Tire Brand Name WRG2

Tire Build Date 1710

DOT Code 60C6 1710

UTQG Treadwear Rating 400

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 103

Tire Position Left Rear Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.344	0.344	0.344	0.344		
TDC + 90°	0.344	0.344	0.344	0.344		
TDC + 180°	0.344	0.344	0.344	0.344		
TDC + 270°	0.344	0.344	0.344	0.344		
Average	0.344	0.344	0.344	0.344		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 39

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.188	0.172	0.188	0.203		
TDC + 90°	0.188	0.156	0.188	0.219		
TDC + 180°	0.188	0.156	0.188	0.219		
TDC + 270°	0.188	0.156	0.188	0.203		
Average	0.188	0.160	0.188	0.211		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application CVPI

Tire Manufacturer Nokian

Tire Brand Name WRG2

Tire Build Date 1710

DOT Code 60C6 1710

UTQG Treadwear Rating 400

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 103

Tire Position Right Rear Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.344	0.344	0.344	0.344		
TDC + 90°	0.344	0.344	0.344	0.344		
TDC + 180°	0.344	0.344	0.344	0.344		
TDC + 270°	0.344	0.344	0.344	0.344		
Average	0.344	0.344	0.344	0.344		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) 40

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.156	0.156	0.172	0.188		
TDC + 90°	0.156	0.156	0.172	0.172		
TDC + 180°	0.141	0.156	0.172	0.203		
TDC + 270°	0.172	0.156	0.172	0.188		
Average	0.156	0.156	0.172	0.188		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Stage 3-New Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Conduct five 60 -> 0 mph full ABS stops (one per lap)

Location Track Straightaway Dry Asphalt
 Date 6/14/11
 Driver Jim Flegel
 Target
 Velocity,
 MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Index	Adjusted w/ Index
1	59.59	142.94	144.91	1.0145	147.01
2	60.76	148.88	145.17	1.0145	147.27
3	59.81	146.39	147.33	1.0145	149.47
4	60.30	149.02	147.55	1.0145	149.69
5	60.08	146.18	145.80	1.0145	147.91
= Average 60 mph SD feet			146.15		148.27
= Standard Deviation, 60 mph SD feet			1.22		1.24

Stage 5-New Tire Wet Asphalt Braking in a Turn Stopping Distance Tests
(driver + full instrumentation + full fuel)

Conduct 10 40 -> 0 mph full ABS stops (one per lap, five in each direction)

Location Turn 6 (Sprinklers On)
 Date 6/14/11
 Driver Jim Flegel
 Target
 Velocity,
 MPH 40

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Run Direction
1	40.82	80.42	77.21	CW
2	39.72	83.65	84.82	CW
3	41.37	83.83	78.39	CW
4	41.04	81.78	77.68	CW
5	41.75	84.68	77.74	CW
6	39.26	74.97	77.84	CCW
7	39.27	71.72	74.41	CCW
8	40.86	81.32	77.93	CCW
9	39.62	74.29	75.74	CCW
10	39.45	72.22	74.27	CCW

= Average 40 mph SD feet 77.60

= Standard Deviation, 40 mph SD feet 2.94

Stage 6-New Tire Steady State Turn Max Lateral on Dry Asphalt

Control vehicle/tire runs three 60->0 mph full ABS (one per lap) on dynamics pad for reference purposes.

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise) until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Index	Adjusted w/ Index
1	CW	45.74	0.93	1.03	0.96
		Max Lat	0.93		
1	CCW	46.24	0.95	1.03	0.98
		Max Lat	0.95		

Stage 7-Tire Endurance/Wear Testing

Drive 100 laps at max speed on dry asphalt track (50 each direction).

Lap #	CW Lap Time, Sec	CCW Lap Time, Sec	Lap #	CW Lap Time, Sec	CCW Lap Time, Sec
1	62.684	62.23	37	62.677	62.638
2	62.383	62.487	38	63.079	62.627
3	62.679	62.572	39	62.87	63.103
4	62.723	62.336	40	62.825	62.492
5	63.108	62.42	41	62.682	62.532
6	62.892	62.423	42	62.534	62.198
7	62.609	62.716	43	62.908	62.573
8	62.624	62.487	44	62.63	62.71
9	63.062	62.343	45	62.806	62.798
10	62.871	62.33	46	62.798	62.826
11	63.033	62.231	47	62.919	63.163
12	62.814	62.173	48	62.908	62.738
13	62.562	62.286	49	62.899	62.961
14	62.58	62.573	50	62.796	62.597
15	62.578	62.402			
16	62.728	62.507	Avg =	62.891611	62.497778
17	62.755	62.324	Std Dev =	0.5136552	0.1903315
18	62.469	62.495	Min =	62.383	62.173
19	65.412	62.79	Max =	65.412	62.935
20	63.163	62.391	Range =	3.029	0.762
21	62.47	62.589			
22	62.833	62.465			
23	63.101	62.368			
24	63.024	62.281			
25	62.612	62.386			
26	62.709	62.452			
27	62.781	62.546			
28	62.862	62.896			
29	63.303	62.935			
30	62.718	62.599			
31	62.623	62.392			
32	62.726	62.612			
33	63.557	62.614			
34	63.521	62.753			
35	62.526	62.735			
36	63.003	62.781			

Temperatures of rotor and tire during endurance test

Vehicle CVPI Nokian WRG2

Lap Sequence	LF		LR		RR		RF	
	Rotor	Tire	Rotor	Tire	Rotor	Tire	Rotor	Tire
After 10 Laps	842	117	345	128	330	160	813	158
After 20 Laps	866	130	407	144	378	156	805	167
After 30 Laps	948	128	505	150	408	158	892	161
After 40 Laps	901	131	430	152	430	161	856	167
After 50 Laps	854	137	465	144	426	163	823	168
After 60 Laps	878	156	473	159	372	116	791	123
After 70 Laps	960	164	559	160	449	132	840	140
After 80 Laps	917	166	545	161	436	125	847	130
After 90 Laps	953	168	615	163	503	134	848	140
After 100 Laps	940	155	580	143	525	140	868	154

Stage 8-Worn Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Conduct five 60 -> 0 mph full ABS stops (one per lap)
 For each stop record initial vehicle speed, stopping distance

Location Track Straightaway Dry Asphalt
 Date 6/14/11
 Driver Jim Flegel
 Target
 Velocity,
 MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Index	Adjusted w/ Index
1	59.76	145.42	146.60	1.0003	146.64
2	59.93	144.29	144.61	1.0003	144.65
3	59.97	143.95	144.11	1.0003	144.16
4	60.16	145.31	144.54	1.0003	144.58
5	60.28	144.59	143.26	1.0003	143.30
= Average 60 mph SD feet			144.62		144.67
= Standard Deviation, 60 mph SD feet			1.23		1.23

Stage 10-Worn Tire Wet Asphalt Braking in a Turn Stopping Distance Tests
(driver + full instrumentation + full fuel)

Conduct 10 40 -> 0 mph full ABS stops (one per lap, five in each direction)
 For each stop record initial vehicle speed, stopping distance, run direction (CW, CCW)

Location Turn 6 (Sprinklers On)
 Date 6/14/11
 Driver Jim Flegel
 Target
 Velocity,
 MPH 40

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Run Direction
1	40.49	80.13	78.18	CW
2	40.88	73.29	70.18	CW
3	40.66	96.29	93.19	CW
4	40.36	90.43	88.83	CW
5	41.10	86.51	81.94	CW
6	39.70	73.20	74.31	CCW
7	38.65	76.12	81.52	CCW
8	39.33	74.77	77.34	CCW
9	40.76	81.46	78.43	CCW
10	40.70	79.86	77.14	CCW

= Average 40 mph SD feet 80.11
 = Standard Deviation, 40 mph SD feet 6.73

Stage 11-Worn Tire Steady State Turn Max Lateral on Dry Asphalt

Control vehicle/tire runs three 60->0 mph full ABS (one per lap) on dynamics pad for reference purposes.

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise) until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Index	Adjusted w/ Index
1	CW	47.24	0.99	1.01	1.01
		Max Lat.	0.99		
1	CCW	47.52	1.01	1.01	1.02
		Max Lat.	1.01		

Stage 12- End of Test Tire Wear Check

Measure tire tread depth in each groove at four locations and record results in tire sheet

Left Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.125	-0.15625	-0.140625	-0.140625	0	0
TDC + 90°	-0.125	-0.140625	-0.15625	-0.140625	0	0
TDC + 180°	-0.125	-0.140625	-0.140625	-0.125	0	0
TDC + 270°	-0.125	-0.140625	-0.125	-0.125	0	0
Average	-0.125	-0.144531	-0.140625	-0.132813	0	0

% Wear 36.36% 42.05% 40.91% 38.64% LF AVG 39.49%

Right Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.140625	-0.15625	-0.140625	-0.140625	0	0
TDC + 90°	-0.140625	-0.15625	-0.140625	-0.140625	0	0
TDC + 180°	-0.140625	-0.171875	-0.125	-0.140625	0	0
TDC + 270°	-0.125	-0.171875	-0.140625	-0.140625	0	0
Average	-0.136719	-0.164063	-0.136719	-0.140625	0	0

% Wear 39.77% 47.73% 39.77% 40.91% RF AVG 42.05%

Left Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.15625	-0.171875	-0.15625	-0.140625	0	0
TDC + 90°	-0.15625	-0.1875	-0.15625	-0.125	0	0
TDC + 180°	-0.15625	-0.1875	-0.15625	-0.125	0	0
TDC + 270°	-0.15625	-0.1875	-0.15625	-0.140625	0	0
Average	-0.15625	-0.183594	-0.15625	-0.132813	0	0

% Wear 45.45% 53.41% 45.45% 38.64% LR AVG 45.74%

Right Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.1875	-0.1875	-0.171875	-0.15625	0	0
TDC + 90°	-0.1875	-0.1875	-0.171875	-0.171875	0	0
TDC + 180°	-0.203125	-0.1875	-0.171875	-0.140625	0	0
TDC + 270°	-0.171875	-0.1875	-0.171875	-0.15625	0	0
Average	-0.1875	-0.1875	-0.171875	-0.15625	0	0

% Wear 54.55% 54.55% 50.00% 45.45% RR AVG 51.14%

Average Wear by Tire Position

Tire Position	% Tread Consumed
LF AVG	39.49%
RF AVG	42.05%
LR AVG	45.74%
RR AVG	51.14%

Ford CVPI/Cooper CS4

2011 NIJ-MSP Tire Test Form General Info Form

Vehicle Application	CVPI
Vehicle VIN	AX125586
Initial Odometer	3154
Tire Manufacturer	Cooper
Tire Brand Name	CS4

General Track and Weather Info

Date of Test	6/7/11
Driver	Jim Flegel

Track Temperature	Initial	86° F
Deg F	Midpoint	113°
	Final	

Weather Info		
Temperature	Initial	78° F
Deg F	Midpoint	86° F
	Final	

Conditions Sunny, Hazy, Humid

TEST ABORTED -- TIRE FAILURE

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application CVPI

Tire Manufacturer Cooper

Tire Brand Name CS4

Tire Build Date 4910

DOT Code U97A CLT 4910

UTQG Treadwear Rating 520

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 99

Tire Position Left Front Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.328	0.344	0.344	0.328		
TDC + 90°	0.328	0.344	0.344	0.328		
TDC + 180°	0.328	0.344	0.344	0.328		
TDC + 270°	0.328	0.344	0.344	0.328		
Average	0.328125	0.34375	0.34375	0.328125		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) _____

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.281	0.281	0.281	0.266		
TDC + 90°	0.266	0.297	0.281	0.266		
TDC + 180°	0.250	0.297	0.281	0.250		
TDC + 270°	0.266	0.297	0.281	0.266		
Average	0.265625	0.29296875	0.28125	0.2617188		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application CVPI

Tire Manufacturer Cooper

Tire Brand Name CS4

Tire Build Date 4910

DOT Code U97A CLT 4910

UTQG Treadwear Rating 520

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 99

Tire Position Right Front Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.313	0.328	0.328	0.313		
TDC + 90°	0.313	0.328	0.328	0.313		
TDC + 180°	0.313	0.328	0.328	0.313		
TDC + 270°	0.313	0.328	0.328	0.313		
Average	0.3125	0.328125	0.328125	0.3125		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) _____

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.266	0.297	0.297	0.281		
TDC + 90°	0.250	0.281	0.281	0.266		
TDC + 180°	0.266	0.297	0.297	0.266		
TDC + 270°	0.250	0.297	0.297	0.266		
Average	0.2578125	0.29296875	0.2929688	0.2695313		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application CVPI

Tire Manufacturer Cooper

Tire Brand Name CS4

Tire Build Date 4910

DOT Code U97A CLT 4910

UTQG Treadwear Rating 520

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 99

Tire Position Left Rear Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.313	0.328	0.328	0.297		
TDC + 90°	0.313	0.328	0.328	0.297		
TDC + 180°	0.313	0.328	0.328	0.297		
TDC + 270°	0.313	0.328	0.328	0.297		
Average	0.3125	0.328125	0.328125	0.296875		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) _____

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.250	0.250	0.266	0.266		
TDC + 90°	0.250	0.266	0.266	0.250		
TDC + 180°	0.250	0.266	0.281	0.266		
TDC + 270°	0.266	0.266	0.281	0.266		
Average	0.2539063	0.26171875	0.2734375	0.2617188		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

2011 NIJ-MSP Tire Test Form
Tire Info Sheet

Vehicle Application CVPI

Tire Manufacturer Cooper

Tire Brand Name CS4

Tire Build Date 4910

DOT Code U97A CLT 4910

UTQG Treadwear Rating 520

UTQG Load Rating A

UTQG Traction Rating A

Speed Rating V

Load Index 99

Tire Position Right Rear Initial Cold Inflation Pressure (psi) 35

Initial Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.313	0.328	0.344	0.313		
TDC + 90°	0.313	0.328	0.344	0.313		
TDC + 180°	0.313	0.328	0.344	0.313		
TDC + 270°	0.313	0.328	0.344	0.313		
Average	0.3125	0.328125	0.34375	0.3125		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Final Cold Inflation Pressure (psi) _____

Final Tire Tread Depth (Inches) by Groove Number

Position	Groove					
	1	2	3	4	5	6
TDC	0.250	0.250	0.281	0.266		
TDC + 90°	0.250	0.250	0.266	0.266		
TDC + 180°	0.250	0.234	0.281	0.250		
TDC + 270°	0.250	0.250	0.266	0.250		
Average	0.25	0.24609375	0.2734375	0.2578125		

TDC = Valve stem location when facing tire and degrees are measured clockwise from TDC

Stage 3-New Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Conduct five 60 -> 0 mph full ABS stops (one per lap)

Location Track Straightaway Dry Asphalt
 Date 6/7/11
 Driver Jim Flegel
 Target
 Velocity,
 MPH 60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Index	Adjustment w/ Index
1	60.15	136.80	136.14	0.9826	133.77
2	60.43	137.42	135.49	0.9826	133.13
3	60.53	140.34	137.88	0.9826	135.48
4	59.98	137.35	137.43	0.9826	135.04
5	60.72	138.65	135.37	0.9826	133.02
= Average 60 mph SD feet			136.46		134.09
= Standard Deviation, 60 mph SD feet			1.14		1.12

Stage 5-New Tire Wet Asphalt Braking in a Turn Stopping Distance Tests
(driver + full instrumentation + full fuel)

Conduct 10 40 -> 0 mph full ABS stops (one per lap, five in each direction)

Location Turn 6 (Sprinklers On)
 Date 6/7/11
 Driver Jim Flegel
 Target
 Velocity,
 MPH 40

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Run Direction
1	39.42	77.80	80.09	CW
2	37.97	67.07	74.45	CW
3	38.82	65.81	69.87	CW
4	38.78	73.78	78.50	CW
5	41.14	78.51	74.23	CW
6	41.10	101.47	96.11	CCW
7	41.59	96.27	89.07	CCW
8	41.58	92.70	85.78	CCW
9	40.01	81.80	81.76	CCW
10	39.32	96.10	99.45	CCW

= Average 30 mph SD feet 82.93

= Standard Deviation, 60 mph SD feet 9.66

Stage 6-New Tire Steady State Turn Max Lateral on Dry Asphalt

Control vehicle/tire runs three 60->0 mph full ABS (one per lap) on dynamics pad for reference purposes.

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise) until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G	Index	Adjustment w/ Index
1	CW	47.69	1.01	0.95	0.97
		Max Lat	1.01		
1	CCW	45.98	0.94	0.95	0.90
		Max Lat	0.94		

Temperature of rotor and tire during endurance test

Vehicle CVPI Cooper Tire

Lap Sequence	LF		LR		RR		RF	
	Rotor	Tire	Rotor	Tire	Rotor	Tire	Rotor	Tire
After 10 Laps	819	158	337	164	312	167	778	190
After 20 Laps	901	173	396	176	418	182	864	205
After 30 Laps	829	167	411	169	450	185	778	198
After 40 Laps	834	174	434	175	495	183	805	195
After 50 Laps								
After 60 Laps								
After 70 Laps								
After 80 Laps								
After 90 Laps								
Post Test								

Stage 8-Worn Tire Dry Asphalt Stopping Distance Tests
(driver + full instrumentation + full fuel)

Control tire runs this stage

Conduct five 60 -> 0 mph full ABS stops (one per lap)

For each stop record initial vehicle speed, stopping distance

Location	Track Straightaway Dry Asphalt
Date	6/7/11
Driver	Jim Flegel
Target Velocity, MPH	60

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet
1			
2			
3			
4			
5			

= Average 60 mph SD feet

= Standard Deviation, 60 mph SD feet

Stage 9-Worn Tire Wet Jennite Stopping Distance Tests
(driver + full instrumentation + full fuel)

Conduct 10 35 -> 0 mph full ABS stops (one per lap)
For each stop record initial vehicle speed, stopping distance

Location Wet Jennite (Sprinklers On)
Date 6/7/11
Driver Jim Flegel
Target
Velocity,
MPH 35

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

= Average 30 mph SD feet
= Standard Deviation, 60 mph SD feet

Stage 10-Worn Tire Wet Asphalt Braking in a Turn Stopping Distance Tests
(driver + full instrumentation + full fuel)

Conduct 10 40 -> 0 mph full ABS stops (one per lap, five in each direction)
 For each stop record initial vehicle speed, stopping distance, run direction (CW, CCW)

Location Turn 6 (Sprinklers On)
 Date 6/7/11
 Driver Jim Flegel
 Target
 Velocity,
 MPH 40

Stop #	Initial Velocity, MPH	Stopping Distance, Feet	V ² Corrected SD, Feet	Run Direction
1				CW
2				CW
3				CW
4				CW
5				CW
6				CCW
7				CCW
8				CCW
9				CCW
10				CCW

= Average 30 mph SD feet
 = Standard Deviation, 60 mph SD feet

Stage 11-Worn Tire Steady State Turn Max Lateral on Dry Asphalt

Test aborted due to excess tire wear

**Control vehicle/tire runs three 60->0 mph full ABS (one per lap)
on dynamics pad for reference purposes.**

Execute steady state turns in 300-foot diameter circle

Lap 1 – 30 mph

Lap 2 – spinout -> increase vehicle speed by 2 mph each lap

Conduct steady state turn tests in both direction (clockwise, counter clockwise)
until reaching loss of stability or failure to maintain turn radius.

Record highest vehicle speed for which vehicle maintains turn radius/stability.

Run #	Direction	Velocity	Lateral Accel,G
1	CW		0
		Max Lat.	0
	CCW		0
		Max Lat.	0

Stage 12- End of Test Tire Wear Check

Measure tire tread depth in each groove at four locations and record results in tire sheet

Left Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.046875	-0.0625	-0.0625	-0.0625	0	0
TDC + 90°	-0.0625	-0.046875	-0.0625	-0.0625	0	0
TDC + 180°	-0.078125	-0.046875	-0.0625	-0.078125	0	0
TDC + 270°	-0.0625	-0.046875	-0.0625	-0.0625	0	0
Average	-0.0625	-0.050781	-0.0625	-0.066406	0	0

Right Front	Groove					
Position	1	2	3	4	5	6
TDC	-0.046875	-0.03125	-0.03125	-0.03125	0	0
TDC + 90°	-0.0625	-0.046875	-0.046875	-0.046875	0	0
TDC + 180°	-0.046875	-0.03125	-0.03125	-0.046875	0	0
TDC + 270°	-0.0625	-0.03125	-0.03125	-0.046875	0	0
Average	-0.054688	-0.035156	-0.035156	-0.042969	0	0

Left Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.0625	-0.078125	-0.0625	-0.03125	0	0
TDC + 90°	-0.0625	-0.0625	-0.0625	-0.046875	0	0
TDC + 180°	-0.0625	-0.0625	-0.046875	-0.03125	0	0
TDC + 270°	-0.046875	-0.0625	-0.046875	-0.03125	0	0
Average	-0.058594	-0.066406	-0.054688	-0.035156	0	0

Right Rear	Groove					
Position	1	2	3	4	5	6
TDC	-0.0625	-0.078125	-0.0625	-0.046875	0	0
TDC + 90°	-0.0625	-0.078125	-0.078125	-0.046875	0	0
TDC + 180°	-0.0625	-0.09375	-0.0625	-0.0625	0	0
TDC + 270°	-0.0625	-0.078125	-0.078125	-0.0625	0	0
Average	-0.0625	-0.082031	-0.070313	-0.054688	0	0

About the National Institute of Justice

The National Institute of Justice — the research, development and evaluation agency of the U.S. Department of Justice — is dedicated to improving knowledge and understanding of crime and justice issues through science. NIJ provides objective and independent knowledge and tools to reduce crime and promote justice, particularly at the state and local levels.

NIJ's pursuit of this mission is guided by the following principles:

- Research can make a difference in individual lives, in the safety of communities and in creating a more effective and fair justice system.
- Government-funded research must adhere to processes of fair and open competition guided by rigorous peer review.
- NIJ's research agenda must respond to the real world needs of victims, communities and criminal justice professionals.
- NIJ must encourage and support innovative and rigorous research methods that can provide answers to basic research questions as well as practical, applied solutions to crime.

Partnerships with other agencies and organizations, public and private, are essential to NIJ's success.

Strategic Goals

The National Institute of Justice is committed to being a transformative force in the criminal justice field by meeting five strategic challenges:

- Fostering science-based criminal justice practice — supporting rigorous scientific research to ensure the safety of families, neighborhoods and communities. Learn how NIJ tests and evaluates programs, practices and equipment.
- Translating knowledge to practice — disseminating rigorous scientific research to criminal justice professionals to advance what works best in preventing and reducing crime. Learn about how NIJ moves research from knowledge to practice.
- Advancing technology — building a more effective, fair and efficient criminal justice system through technology. Learn about NIJ's research, development, testing and evaluation process.
- Working across disciplines — connecting the physical, forensic and social sciences to reduce crime and promote justice.
- Adopting a global perspective — understanding crime in its social context within the United States and globally. Visit NIJ's International Center.

Translational criminology is NIJ's strategy for transforming criminal justice through research. By bringing evidence to bear on crime policies and practices, NIJ forms a bridge between the work of research and the real-life challenges of fighting crime and enhancing justice. Transformation through research is a cyclical process. Continually, NIJ draws on the needs of practitioners to inform its research agenda; the cycle of transformation continues as research findings are conveyed and translated by researchers in ways that reshape practice and policy. The links in this transforming process take several forms:

- Technology working groups that provide practical insights about technology needs and challenges among criminal justice professionals.
- Topical work groups and strategic planning meetings that take stock of the current state of research knowledge.
- "Listening sessions" with practitioner, policy and research groups.

-
- Cutting-edge communication tools, including print and electronic media, to help NIJ constituents make sense of the research and put it to use.
 - An annual national conference to assemble more than 1,000 criminal justice researchers and practitioners across the social, physical and forensic science fields.
 - Building a cumulative body of knowledge with ongoing input from practitioners, policymakers and the research community to advance policy and practice.

NIJ supports research, evaluation and development in the following areas:

- Causes and correlates of crime.
- Crime prevention and control, increasing community safety.
- Prevention of violence and victimization.
- Forensic sciences, including the use of DNA evidence.
- Corrections practice and policy, including community corrections.
- Law enforcement, including technology, to improve police effectiveness, legitimacy, accountability and safety.
- Courts and adjudication.

The NIJ Director

The NIJ Director is appointed by the President and confirmed by the Senate. The Director establishes the Institute's objectives, guided by the needs of the field and the priorities of the Office of Justice Programs and the U.S. Department of Justice.

About the National Law Enforcement and Corrections Technology Center System

One office and three types of centers comprise the NLECTC system. These are:

- The Office of Law Enforcement Standards, which is a component of the Department of Commerce's National Institute of Standards and Technology.
- The National Center.
- The Technology Centers of Excellence.
- The Regional Centers.

All of these components work together as part of an integrated NLECTC system.

The Office of Law Enforcement Standards assists the National Institute of Justice to develop performance standards.

The National Center serves as the technology information clearinghouse of the NLECTC system. It also administers NIJ's equipment Compliance-Testing Program.

The Technology Centers of Excellence are the authoritative resource within the NLECTC system for practitioners and developers in their technology area(s) of focus. Their primary role is to assist in the transition of technology from the laboratory into practice. They accomplish this mainly through activities related to the testing, evaluation and demonstration of new technologies and through provision of technology assistance to first adopting agencies. Each Center of Excellence supports one or more of NIJ's technology investment portfolios.

The Regional Centers are the initial point of entry for practitioners to the NLECTC system and provide generalized technology assistance to agencies within their regions. As needed, they forward requests for specialized assistance to the appropriate Center of Excellence. They also support the Centers of Excellence in coordinating technology demonstrations and evaluations with agencies within their regions.

To receive more information or to add your name to the NLECTC mailing list, call (800) 248-2742 or (301) 519-5060, or write:

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