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Tire Testing: High Speed Test, Dynamic Aging, Oven Aging, and Adhesion Strength

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DEPT OF TRANSPORTATION

Background

This document provides descriptions of the test parameters used by Smithers Scientific Services as directed by NHTSA in performing laboratory tests for high-speed, aging, and adhesion strength tire tests. Test results are shown in the attached spreadsheets. High speed, dynamic aging, and oven aging test results are summarized on the same spreadsheet. Adhesion strength test results are contained in separate spreadsheets and are labeled according to the type of preconditioning that was conducted.

I. High Speed Tire Testing

Each tire shall be mounted on a suitable road wheel and subjected to the following test conditions:

1. Inflate the tires using normal compressed atmospheric air. The cold tire inflation pressure shall be as follows:
    1. 220 kpa (32 psi) for standard load P-metric tires
    2. 320 kpa (46 psi) for load range C, LT tires

3. 410 kpa (59 psi) for load range D, LT tires

4. 550 kpa (80 psi) for load range E, LT tires

2. Install each tire on a rotating drum tire testing machine, with a drum diameter of 1700 mm (67 inches), and conduct a break-in conditioning using the following test conditions:

   1. The tire load shall be 85 percent of rated load capacity
   2. The test speed shall be 80 km/h (50 mph)
   3. Ambient temperature shall be 40^0 C (104^0 F)
   4. Duration of break-in shall be 15 minutes

   After the break-in conditioning has been conducted, allow the tire and wheel assembly to cool to room temperature. Adjust the cold inflation pressure as specified in Item 1. above.

3. Install each tire on a rotating drum tire testing machine, with a drum diameter of 1700 mm (67 inches), and test the tire using the following test conditions:

   1. The tire load shall be 85 percent of rated load capacity
   2. Ambient temperature shall be 40^0 C (104^0 F)
   3. Test speed shall be as follows:

      1. Increase speed from 0 to 140 km/hr (87 mph) in a period of 10 minutes

2. Test speed shall then be 140 km/hr (87 mph) for 30 minutes

3. Test speed shall then be 150 km/hr (93 mph) for 30 minutes

4. Test speed shall then be 160 km/hr (99 mph) for 30 minutes

4. Test each tire until a test time of 100 minutes is reached, or until the tire experiences catastrophic failure, whichever occurs first. For failed tires, note the test time at which the tire failed.

5. For tires that complete the test without catastrophic failure, conduct a shearography evaluation to determine the amount of separation between the bonds.

II. Dynamic Aging Tire Testing

The dynamic aging tire test simulates accelerated aging of a tire using laboratory methods. Each tire shall be mounted on a suitable road wheel and subjected to the following test conditions:

1. Inflate the tires using a gaseous blend of 50 percent O_2 and 50 percent N_2 by volume.

2. The cold tire inflation pressure shall be as follows:

   1. 275 kpa (40 psi) for standard load P-metric tires

2. 393 kpa (57 psi) for load range C, LT tires

3. 448 kpa (65 psi) for load range D, LT tires

4. 552 kpa (80 psi) for load range E, LT tires

3. Install each tire on a rotating drum tire testing machine, with a drum diameter of 1700 mm (67 inches), and test the tire for 250 hours using the following test conditions:

   1. Test speed is 97 km/h (60 mph)

   2. Ambient air temperature is 38° C (100° F)

   3. Tire load shall be as follows:

      1. 111 percent of rated load for standard P-metric tires

      2. 112 percent of rated load for load range C, LT tires

      3. 98 percent of rated load for load range D, LT tires

      4. 92 percent of rated load for load range E, LT tires

4. Test each tire until a test time of 250 hours is reached, or until the tire experiences failure, whichever occurs first. For failed tires, record the test time at which the tire failed.

   Note: After first 4 hours of running time, stop and check hot inflation pressure. Stop momentarily and check/adjust hot inflation pressure each 24 hours thereafter.

5. For tires that complete the test without failure, conduct a shearography evaluation to determine the amount of disbonding between the belts in the tire.

III. Oven Aging Tire Testing

This test consists of a 14-day oven aging preconditioning combined with a 24-hour endurance test to simulate accelerated aging of a tire using laboratory methods. The test parameters are as follows:

1. Condition each tire in an environmental chamber under the following conditions:
    1. Chamber temperature is 75° C (167° F)
    2. Filling gas in chamber is normal atmospheric air
    3. Duration of conditioning is 14 days (336 hours)

Remove the tire from the environmental chamber at the completion of the conditioning and allow tire to cool to room temperature. Mount tire on a suitable road wheel and conduct the drum test as follows:

2. Inflate the tires using normal compressed atmospheric air. The cold tire inflation pressure shall be as follows:

    180 kpa (26 psi) for standard load P-metric tires

    260 kpa (38 psi) for load range C, LT tires

340 kpa (49 psi) for load range D, LT tires

450 kpa (65 psi) for load range E, LT tires

3. Install each tire on a rotating drum tire testing machine, with a drum diameter of 1700 mm (67 inches), and test the tire for 24 hours using the following test conditions:

   a. The tire load shall be as follows:

      1. 8 hours at 90% load

      2. 8 hours at 100% load

      3. 8 hours at 110% load

   b. Test speed, 120 km/h (75 mph)

   c. Ambient temperature, 40^0 C (104^0 F)

   d. Distance at completion of test, 2,880 km (1800 miles)

4. Test each tire until a test time of 24 hours is reached, or until the tire experiences failure, whichever occurs first. For failed tires, not the test time at which the tire failed.

5. For tires that complete the test without failure, conduct a shearography evaluation to determine the amount of disbonding between the belts in the tire.

IV. Adhesion Strength Tire Testing

The adhesion test is a tension test of the tire belt interface to determine the strength of the bond between the belts. Adhesion testing was conducted in accordance with the American Society for Testing and Materials (ASTM) D413-98, Standard Test Method for Rubber Property-Adhesion to Flexible Substrate. Each tire has two one-inch (nominal) cross sections cut from the tire, with End 1 taken just ahead of the tire identification number and End 2 taken 180 degrees from that position. Each such section was then cut apart at the middle of the tread and the resulting samples are either from the serial side (SS) of the tire or the opposite serial side (OSS) of the tire. This provides a total of four samples per tire.

Each sample is then prepared and mounted on a tension testing machine, and is pulled apart from the tread centerline towards the shoulder of the tire. The resulting force data are then divided by the actual width of the tire sample as measured, so that results are expressed as separation force per inch of width. The peak value during the tension test was recorded and the average value over the duration of the tension test was calculated and is provided in the results. The Smithers test procedure provides additional details (see attachment 1).

Part 1: NHTSA (under a previous contract with Standards Testing Laboratories) had previously conducted 50-hour endurance testing on 8 brands of P-metric tires and 4 brands of light truck

(LT) tires using a rotating 1700 mm (67 inches) drum test machine. This testing consisted of the following test parameters:

1. Inflate the tires using normal compressed air. The cold tire inflation pressure shall be as follows:
    a. 180 kpa (26 psi) for standard load P-metric tires
    b. 260 kpa (38 psi) for load range C, LT tires
    c. 340 kpa (49 psi) for load range D, LT tires
    d. 450 kpa (65 psi) for load range E, LT tires

2. Install each tire on a 1700 mm (67 inches) drum tire testing machine, and test the tire for 50 hours using the following test conditions:
    a. Tire load shall be as follows:
        1. 8 hours at 100 % load
        2. 10 hours at 110 % load
        3. 32 hours at 115 % load
    b. Test speed, 120 km/h (75 mph)
    c. Ambient temperature, 38^0 C (100^0 F)
    d. Distance at completion of test: 6,000 km (3728 miles)

The adhesion test results for these tires are shown in the adhesion spreadsheets identified as "Conditioning: 50-Hour Endurance Test." Note that only tires which had previously completed

the 50-hour endurance test without catastrophic failure were subjected to adhesion testing.

Part 2: New tires were purchased (1 sample each of 8 P-metric and 4 LT tire brands) and subjected to a 24-hour endurance test. Each of these tires successfully completing this test were then adhesion tested. The test parameters of the 24-hour endurance test are as follows:

1. Inflate the tires using normal compressed atmospheric air. The cold tire inflation pressure shall be as follows:
    1. 180 kpa (26 psi) for standard load P-metric tires
    2. 260 kpa (38 psi) for load range C, LT tires
    3. 340 kpa (49 psi) for load range D, LT tires
    4. 450 kpa (65 psi) for load range E, LT tires

2. Install each tire on a rotating drum tire testing machine, with a drum diameter of 1700 mm (67 inches), and test the tire for 24 hours using the following test conditions:
    a. The tire load shall be as follows:
        1. 8 hours at 90% load
        2. 8 hours at 100% load
        3. 8 hours at 110% load
    b. Test speed, 120 km/h (75 mph)

c. Ambient temperature, 40^0 C (104^0 F)

d. Distance at completion of test, 2,880 km (1800 miles)

3. Test each tire until a test time of 24 hours is reached, or until the tire experiences catastrophic failure, whichever occurs first. For failed tires, note the test time at which the tire failed.

4. For tires that complete the test without catastrophic failure, conduct a shearography evaluation to determine the amount of separation between the bonds of the belts in the tire.

5. Each tire that completes the shearography inspection shall then be evaluated for adhesion strength, as described above, using four samples per tire.

The adhesion test results for these tires are shown in the adhesion spreadsheets identified as "Conditioning: 24-Hour Endurance Test."

Part 3: Two samples of 8 brands of P-metric and 4 brands of LT tires were purchase and adhesion tested without any type of preconditioning. The adhesion test results for these tires are shown in the adhesion spreadsheets identified as "Conditioning: None"

ATTACHMENT 1

Test Procedure: PTP-004-TS
Type Test: Peel Force to Flexible Substrate – Tire Sections

Specification: Reference ASTM D413-98

Revision: #1 (1/16/02)

SAMPLE PREPARATION

s1) Cut two 1-1/4" (nominally) radial sections from the tire. If possible, sections should be taken from portions of the tire 180 degrees apart. Identify sections as "End 1" and "End 2".

s2) Buff ends of cut sections.

s3) Cut off tread lugs to a depth of 1/8" above the bottom of the tread grooves.

s4) Cut section in half by cutting down the centerline creating a SS (serial side) test specimen and a OSS (opposite serial side) test specimen. Once completed there will be two specimens for each section (4 total). Label the test specimens End 1 SS, End 1 OSS, End 2 SS, and End 2 OSS

s5) Using a sharp razor or cutting device score along the buffed section edge between belt #1 and belt #2 to a depth of 1/8".

s6) Prepare individual tabs on each section for the test grips by cutting a distance of 1" from the center towards the shoulder between belt #1 and belt #2.

PRE-CONDITIONING

p1) Condition the test specimen for at least 16 hours at 70-77° F prior to testing.

p2) For tests at temperature other than room temperature, condition the specimens for a time sufficient to reach equilibrium at the test temperature (approximately 30 minutes).

TEST PROCEDURE

m1) Place the separated ends (tabs) of the test specimen between the grips (top and bottom).

m2) The test shall be run until the separation has progressed a distance of at least 4 inches or until the ends of the belts are reached.

m3) Measure the average width of the separated specimen to the nearest 0.05" in order to calculate the peel force in lbs. per inch.

m4) Examine the load chart to determine the best area of the graph to use for calculating the average load. Typically the area used is between the first peak in force and the significant increase or decrease in force seen as the separation reaches the belt edges. Do not include any test data collected after the separation has reached the end of belt #2.

REPORT

r1) Report the following information:

a) Average peel force value (lbs./inch) for the separation range selected.

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TID	Test Type	Brand / Tire Name	Tire Size	Test Load as a % of rated load	Test Load	Rated Load	Test Inflation Kpa	Test Inflation Psi	Total Time	Test Speeds (Kph)	Test Speed (Mph)	Ambient Temperature (Degrees C)	Observations/Status
MD11MMWV0801	High Speed	Goodyear Wrangler AT	LT245/75R16 LR"E"	85	2586	3042	550	80	100 min	140/150/160	87/93/99	40	No defects
MD11MMWV0801	High Speed	Goodyear Wrangler AT	LT245/75R16 LR"E"	85	2586	3042	550	80	100 min	140/150/160	87/93/99	40	No defects
MD11MMWV0801	High Speed	Goodyear Wrangler AT	LT245/75R16 LR"E"	85	2586	3042	550	80	100 min	140/150/160	87/93/99	40	No defects
MD11MMWV0801	High Speed	Goodyear Wrangler AT	LT245/75R16 LR"E"	85	2586	3042	550	80	100 min	140/150/160	87/93/99	40	No defects
MD11MMWV0801	High Speed	Goodyear Wrangler AT	LT245/75R16 LR"E"	85	2586	3042	550	80	100 min	140/150/160	87/93/99	40	No defects
MD11MMWV0801	Dynamic Aging	Goodyear Wrangler AT	LT245/75R16 LR"E"	92	2799	3042	550	80	250 hr	97	60	38	No defects
MD11MMWV0801	Dynamic Aging	Goodyear Wrangler AT	LT245/75R16 LR"E"	92	2799	3042	550	80	250 hr	97	60	38	No defects
MD11MMWV0801	Dynamic Aging	Goodyear Wrangler AT	LT245/75R16 LR"E"	92	2799	3042	550	80	250hr	97	60	38	No defects
MD11MMWV0801	Oven Aging	Goodyear Wrangler AT	LT245/75R16 LR"E"	90/100/110	2738/3042/3346	3042	450	65	24 h	120	75	40	No defects
MD11MMWV0701	Oven Aging	Goodyear Wrangler AT	LT245/75R16 LR"E"	90/100/110	2738/3042/3346	3042	450	65	24 h	120	75	40	No defects
MD11MMWV0801	Oven Aging	Goodyear Wrangler AT	LT245/75R16 LR"E"	90/100/110	2738/3042/3346	3042	450	65	0.02	120	75	40	*machine malfunction
ANHLBH7J3501	High Speed	BF Goodrich Cientra Plus	P235/75R15	85	1724	2028	220	32	100 min	140/150/160	87/93/99	40	No defects
ANHLBH7J3601	High Speed	BF Goodrich Cientra Plus	P235/75R15	85	1724	2028	220	32	100 min	140/150/160	87/93/99	40	No defects
ANHLBH7J3501	High Speed	BF Goodrich Cientra Plus	P235/75R15	85	1724	2028	220	32	100 min	140/150/160	87/93/99	40	No defects
ANHLBH7J3501	High Speed	BF Goodrich Cientra Plus	P235/75R15	85	1724	2028	220	32	100 min	140/150/160	87/93/99	40	No defects
ANHLBH7J3601	High Speed	BF Goodrich Cientra Plus	P235/75R15	85	1724	2028	220	32	100 min	140/150/160	87/93/99	40	No defects
ANHLBH7J3501	Dynamic Aging	BF Goodrich Cientra Plus	P235/75R15	111	2251	2028	275	40	250 hr	97	60	38	Cracking around bead
ANHLBH7J3601	Dynamic Aging	BF Goodrich Cientra Plus	P235/75R15	111	2251	2028	275	40	250 hr	97	60	38	Bead splitting, cracking (oss)
ANHLBH7J2300	Dynamic Aging	BF Goodrich Cientra Plus	P235/75R15	111	2251	2028	275	40	214.52	97	60	38	Sidewall blow-out (oss)
ANHLBH7J3601	Oven Aging	BF Goodrich Cientra Plus	P235/75R15	90/100/110	1825/2028/2231	2028	180	26	24 h	120	75	40	No defects
ANHLBH7J3601	Oven Aging	BF Goodrich Cientra Plus	P235/75R15	90/100/110	1825/2028/2231	2028	180	26	24 h	120	75	40	No defects
ANHLBH7J3501	Oven Aging	BF Goodrich Cientra Plus	P235/75R15	90/100/110	1825/2028/2231	2028	180	26	24 h	120	75	40	No defects
8XHL1PY1601	High Speed	Firestone Wilderness AT	P235/75R15	85	1724	2028	220	32	100 min	140/150/160	87/93/99	40	No defects
8XHL1PY1601	High Speed	Firestone Wilderness AT	P235/75R15	85	1724	2028	220	32	100 min	140/150/160	87/93/99	40	No defects
8XHL1PY1601	High Speed	Firestone Wilderness AT	P235/75R15	85	1724	2028	220	32	100 min	140/150/160	87/93/99	40	No defects
8XHL1PY1601	High Speed	Firestone Wilderness AT	P235/75R15	85	1724	2028	220	32	100 min	140/150/160	87/93/99	40	No defects
8XHL1PY1601	High Speed	Firestone Wilderness AT	P235/75R15	85	1724	2028	220	32	100 min	140/150/160	87/93/99	40	No defects
8XHL1PY1601	Dynamic Aging	Firestone Wilderness AT	P235/75R15	111	2251	2028	275	40	250 hr	97	60	38	No defects
8XHL1PY1601	Dynamic Aging	Firestone Wilderness AT	P235/75R15	111	2251	2028	275	40	250hr	97	60	38	No defects
8XHL1PY1501	Dynamic Aging	Firestone Wilderness AT	P235/75R15	111	2251	2028	275	40	250hr	97	60	38	No defects
8XHL1PY1601	Oven Aging	Firestone Wilderness AT	P235/75R15	90/100/110	1825/2028/2231	2028	180	26	24 h	120	75	40	No defects
8XHL1PY1601	Oven Aging	Firestone Wilderness AT	P235/75R15	90/100/110	1825/2028/2231	2028	180	26	24 h	120	75	40	No defects
8XHL1PY1601	Oven Aging	Firestone Wilderness AT	P235/75R15	90/100/110	1825/2028/2231	2028	180	26	24 h	120	75	40	No defects
CXA622N4200	High Speed	Toyo Proxes H4	P225/60R16	85	1368	1609	220	32	100 min	140/150/160	87/93/99	40	No defects
CXA622N2901	High Speed	Toyo Proxes H4	P225/60R16	85	1368	1609	220	32	100 min	140/150/160	87/93/99	40	No defects
CXA622N3001	High Speed	Toyo Proxes H4	P225/60R16	85	1368	1609	220	32	100 min	140/150/160	87/93/99	40	No defects
CXA622N3001	High Speed	Toyo Proxes H4	P225/60R16	85	1368	1609	220	32	100 min	140/150/160	87/93/99	40	No defects
CXA622N3001	High Speed	Toyo Proxes H4	P225/60R16	85	1368	1609	220	32	100 min	140/150/160	87/93/99	40	No defects
CXA622N3001	Dynamic Aging	Toyo Proxes H4	P225/60R16	111	1786	1609	275	40	250hr	97	60	38	No defects
CXA622N3001	Dynamic Aging	Toyo Proxes H4	P225/60R16	111	1786	1609	275	40	250hr	97	60	38	No defects
CXA622N3001	Dynamic Aging	Toyo Proxes H4	P225/60R16	111	1786	1609	275	40	250 hr	97	60	38	No defects
CXA622N2901	Oven Aging	Toyo Proxes H4	P225/60R16	90/100/110	1448/1609/1770	1609	180	26	24 h	120	75	40	No defects
CXA622N3001	Oven Aging	Toyo Proxes H4	P225/60R16	90/100/110	1448/1609/1770	1609	180	26	24 h	120	75	40	No defects
CXA622N4200	Oven Aging	Toyo Proxes H4	P225/60R16	90/100/110	1448/1609/1770	1609	180	26	24 h	120	75	40	No defects
M3DDD1JX3201	High Speed	Michelin Rainforce MX4	P235/75R15	85	1724	2028	220	32	100 min	140/150/160	87/93/99	40	No defects
M3DDD1JX3201	High Speed	Michelin Rainforce MX4	P235/75R15	85	1724	2028	220	32	100 min	140/150/160	87/93/99	40	No defects

TID	Test Type	Brand / Tire Name	Tire Size	Test Load as a % of rated load	Test Load	Rated Load	Test Inflation Kpa	Test Inflation Psi	Total Time	Test Speeds (Kph)	Test Speed (Mph)	Ambient Temperature (Degrees C)	Observations/Status
M3DDD1JX3201	High Speed	Michelin Rainforce MX4	P235/75R15	85	1724	2028	220	32	100 min	140/150/160	87/93/99	40	Bead damage (oss)
M3DDD1JX3201	High Speed	Michelin Rainforce MX4	P235/75R15	85	1724	2028	220	32	100 min	140/150/160	87/93/99	40	Bead damage (oss) & (ss)
M3DDD1JX3201	High Speed	Michelin Rainforce MX4	P235/75R15	85	1724	2028	220	32	100 min	140/150/160	87/93/99	40	No defects
M3DDD1JX3201	Dynamic Aging	Michelin Rainforce MX4	P235/75R15	111	2251	2028	275	40	250 hr	97	60	38	No defects
M3DDD1JX3201	Dynamic Aging	Michelin Rainforce MX4	P235/75R15	111	2251	2028	275	40	250hr	97	60	38	No defects
M3DDD1JX3201	Dynamic Aging	Michelin Rainforce MX4	P235/75R15	111	2251	2028	275	40	250hr	97	60	38	No defects
M3DDD1JX3201	Oven Aging	Michelin Rainforce MX4	P235/75R15	90/100/110	1825/2028/2231	2028	180	26	24 h	120	75	40	No defects
M3DDD1JX3201	Oven Aging	Michelin Rainforce MX4	P235/75R15	90/100/110	1825/2028/2231	2028	180	26	24 h	120	75	40	No defects
M3DDD1JX3201	Oven Aging	Michelin Rainforce MX4	P235/75R15	90/100/110	1825/2028/2231	2028	180	26	24 h	120	75	40	No defects
FBD6TBV2801	High Speed	Yokohama Geolander A/T	LT235/75R15 LR"C"	85	1687	1985	320	46	100 min	140/150/160	87/93/99	40	No defects
FBD6TBV2901	High Speed	Yokohama Geolander A/T	LT235/75R15 LR"C"	85	1687	1985	320	46	102 min	140/150/160	87/93/99	40	No defects
FBD6TBV2801	High Speed	Yokohama Geolander A/T	LT235/75R15 LR"C"	85	1687	1985	320	46	100 min	140/150/160	87/93/99	40	No defects
FBD6TBV1901	High Speed	Yokohama Geolander A/T	LT235/75R15 LR"C"	85	1687	1985	320	46	100 min	140/150/160	87/93/99	40	No defects
FBD6TBV0501	High Speed	Yokohama Geolander A/T	LT235/75R15 LR"C"	85	1687	1985	320	46	102 min	140/150/160	87/93/99	40	No defects
FBD6TBV2901	Dynamic Aging	Yokohama Geolander A/T	LT235/75R15 LR"C"	112	2223	1985	393	57	250hr	97	60	38	No defects
FBD6TBV2801	Dynamic Aging	Yokohama Geolander A/T	LT235/75R15 LR"C"	112	2223	1985	393	57	250 hr	97	60	38	No defects
FBD6TBV2801	Dynamic Aging	Yokohama Geolander A/T	LT235/75R15 LR"C"	112	2223	1985	393	57	250 hr	97	60	38	No defects
FBD6TBV2801	Oven Aging	Yokohama Geolander A/T	LT235/75R15 LR"C"	90/100/110	1787/1985/2184	1985	260	38	24 h	120	75	40	No defects
FBD6TBV2801	Oven Aging	Yokohama Geolander A/T	LT235/75R15 LR"C"	90/100/110	1787/1985/2184	1985	260	38	24 h	120	75	40	No defects
FBD6TBV2801	Oven Aging	Yokohama Geolander A/T	LT235/75R15 LR"C"	90/100/110	1787/1985/2184	1985	260	38	24 h	120	75	40	No defects
BEXOEM9U4001	High Speed	Uniroyal Tiger Paw Touring HR	P225/60R16	85	1368	1609	220	32	100 min	140/150/160	87/93/99	40	No defects
BEXOEM9U4001	High Speed	Uniroyal Tiger Paw Touring HR	P225/60R16	85	1368	1609	220	32	100 min	140/150/160	87/93/99	40	No defects
BEXOEM9U4001	High Speed	Uniroyal Tiger Paw Touring HR	P225/60R16	85	1368	1609	220	32	100 min	140/150/160	87/93/99	40	No defects
BEXOEM9U4001	High Speed	Uniroyal Tiger Paw Touring HR	P225/60R16	85	1368	1609	220	32	100 min	140/150/160	87/93/99	40	No defects
BEXOEM9U4001	High Speed	Uniroyal Tiger Paw Touring HR	P225/60R16	85	1368	1609	220	32	100 min	140/150/160	87/93/99	40	No defects
BEXOEM9U4001	Dynamic Aging	Uniroyal Tiger Paw Touring HR	P225/60R16	111	1786	1609	275	40	250hr	97	60	38	No defects
BEXOEM9U4001	Dynamic Aging	Uniroyal Tiger Paw Touring HR	P225/60R16	111	1786	1609	275	40	250hr	97	60	38	No defects
BEXOEM9U4001	Dynamic Aging	Uniroyal Tiger Paw Touring HR	P225/60R16	111	1786	1609	275	40	250hr	97	60	38	No defects
BEXOEM9U4001	Oven Aging	Uniroyal Tiger Paw Touring HR	P225/60R16	90/100/110	1448/1609/1770	1609	180	26	11.65 h	120	75	40	sidewall seperation both sides
BEXOEM9U4001	Oven Aging	Uniroyal Tiger Paw Touring HR	P225/60R16	90/100/110	1448/1609/1770	1609	180	26	24 h	120	75	40	No defects
BEXOEM9U4001	Oven Aging	Uniroyal Tiger Paw Touring HR	P225/60R16	90/100/110	1448/1609/1770	1609	180	26	24 h	120	75	40	No defects
UTHLC4D3901	High Speed	Cooper Lifeliner Classic II	P235/75R15	85	1724	2028	220	32	100 min	140/150/160	87/93/99	40	No defects
UTHLC4D3901	High Speed	Cooper Lifeliner Classic II	P235/75R15	85	1724	2028	220	32	102 min	140/150/160	87/93/99	40	No defects
UTHLC4D3901	High Speed	Cooper Lifeliner Classic II	P235/75R15	85	1724	2028	220	32	102 min	140/150/160	87/93/99	40	No defects
UTHLC4D3901	High Speed	Cooper Lifeliner Classic II	P235/75R15	85	1724	2028	220	32	100 min	140/150/160	87/93/99	40	No defects
UTHLC4D3901	High Speed	Cooper Lifeliner Classic II	P235/75R15	85	1724	2028	220	32	102 min	140/150/160	87/93/99	40	No defects
UTHLC4D3901	Dynamic Aging	Cooper Lifeliner Classic II	P235/75R15	111	2251	2028	275	40	250hr	97	60	38	No defects
UTHLC4D3901	Dynamic Aging	Cooper Lifeliner Classic II	P235/75R15	111	2251	2028	275	40	250hr	97	60	38	No defects
UTHLC4D3901	Dynamic Aging	Cooper Lifeliner Classic II	P235/75R15	111	2251	2028	275	40	250hr	97	60	38	No defects
UTHLC4D3901	Oven Aging	Cooper Lifeliner Classic II	P235/75R15	90/100/110	1825/2028/2231	2028	180	26	24 h	120	75	40	No defects
UTHLC4D3901	Oven Aging	Cooper Lifeliner Classic II	P235/75R15	90/100/110	1825/2028/2231	2028	180	26	24 h	120	75	40	No defects
UTHLC4D3901	Oven Aging	Cooper Lifeliner Classic II	P235/75R15	90/100/110	1825/2028/2231	2028	180	26	24 h	120	75	40	No defects
MDURNTHR3001	High Speed	Goodyear Regatta 2	P205/65R15	85	1190	1400	220	32	100 min	140/150/160	87/93/99	40	No defects
MDURNTHR3001	High Speed	Goodyear Regatta 2	P205/65R15	85	1190	1400	220	32	100 min	140/150/160	87/93/99	40	No defects
MDURNTHR3001	High Speed	Goodyear Regatta 2	P205/65R15	85	1190	1400	220	32	100 min	140/150/160	87/93/99	40	No defects
MDURNTHR3001	High Speed	Goodyear Regatta 2	P205/65R15	85	1190	1400	220	32	100 min	140/150/160	87/93/99	40	No defects
MDURNTHR3001	High Speed	Goodyear Regatta 2	P205/65R15	85	1190	1400	220	32	100 min	140/150/160	87/93/99	40	No defects

TID	Test Type	Brand / Tire Name	Tire Size	Test Load as a % of rated load	Test Load	Rated Load	Test Inflation Kpa	Test Inflation Psi	Total Time	Test Speeds (Kph)	Test Speed (Mph)	(Degrees C)	Observations/Status
MDURNTHR3001	Dynamic Aging	Goodyear Regatta 2	P205/65R15	111	1554	1400	275	40	250hr	97	60	38	No defects
MDURNTHR3001	Dynamic Aging	Goodyear Regatta 2	P205/65R15	111	1554	1400	275	40	250hr	97	60	38	No defects
MDURNTHR3001	Dynamic Aging	Goodyear Regatta 2	P205/65R15	111	1554	1400	275	40	250 hr	97	60	38	No defects
MDURNTHR3001	Oven Aging	Goodyear Regatta 2	P205/65R15	90/100/110	1260/1400/1540	1400	180	26	24 h	120	75	40	No defects
MDURNTHR2901	Oven Aging	Goodyear Regatta 2	P205/65R15	90/100/110	1260/1400/1540	1400	180	26	24 h	120	75	40	No defects
MDURNTHR3001	Oven Aging	Goodyear Regatta 2	P205/65R15	90/100/110	1260/1400/1540	1400	180	26	24 h	120	75	40	No defects
XLM383243600	High Speed	Pirelli Scorpion A/T	LT235/75R15 LR"C"	85	1687	1985	320	46	100 min	140/150/160	87/93/99	40	No defects
XLM383243600	High Speed	Pirelli Scorpion A/T	LT235/75R15 LR"C"	85	1687	1985	320	46	100 min	140/150/160	87/93/99	40	No defects
XLM383243400	High Speed	Pirelli Scorpion A/T	LT235/75R15 LR"C"	85	1687	1985	320	46	100 min	140/150/160	87/93/99	40	No defects
XLM383243000	High Speed	Pirelli Scorpion A/T	LT235/75R15 LR"C"	85	1687	1985	320	46	100 min	140/150/160	87/93/99	40	No defects
XLM383243000	High Speed	Pirelli Scorpion A/T	LT235/75R15 LR"C"	85	1687	1985	320	46	100 min	140/150/160	87/93/99	40	No defects
XLM383243700	Dynamic Aging	Pirelli Scorpion A/T	LT235/75R15 LR"C"	112	2223	1985	393	57	250hr	97	60	38	No defects
XLM383243600	Dynamic Aging	Pirelli Scorpion A/T	LT235/75R15 LR"C"	112	2223	1985	393	57	250 hr	97	60	38	No defects
XLM383243500	Dynamic Aging	Pirelli Scorpion A/T	LT235/75R15 LR"C"	112	2223	1985	393	57	250 hr	97	60	38	No defects
XLM383243600	Oven Aging	Pirelli Scorpion A/T	LT235/75R15 LR"C"	90/100/110	1787/1985/2184	1985	260	38	24 h	120	75	40	No defects
XLM383243600	Oven Aging	Pirelli Scorpion A/T	LT235/75R15 LR"C"	90/100/110	1787/1985/2184	1985	260	38	.15 h	120	75	40	*machine malfunction
XLM383243600	Oven Aging	Pirelli Scorpion A/T	LT235/75R15 LR"C"	90/100/110	1787/1985/2184	1985	260	38	24 h	120	75	40	No defects
DBURC36119	High Speed	Duplop D65 Touring	P205/65R15	85	1190	1400	220	32	100 min	140/150/160	87/93/99	40	No defects
DBURC361401	High Speed	Duplop D65 Touring	P205/65R15	85	1190	1400	220	32	100 min	140/150/160	87/93/99	40	No defects
DBURC361401	High Speed	Duplop D65 Touring	P205/65R15	85	1190	1400	220	32	100 min	140/150/160	87/93/99	40	No defects
DBURC361401	High Speed	Duplop D65 Touring	P205/65R15	85	1190	1400	220	32	100 min	140/150/160	87/93/99	40	No defects
DBURC361401	High Speed	Duplop D65 Touring	P205/65R15	85	1190	1400	220	32	100 min	140/150/160	87/93/99	40	No defects
DBURC361401	Dynamic Aging	Duplop D65 Touring	P205/65R15	111	1554	1400	275	40	250hr	97	60	38	No defects
DBURC361401	Dynamic Aging	Duplop D65 Touring	P205/65R15	111	1554	1400	275	40	250hr	97	60	38	No defects
DBURC361401	Dynamic Aging	Duplop D65 Touring	P205/65R15	111	1554	1400	275	40	250 hr	97	60	38	No defects
DBURC361401	Oven Aging	Duplop D65 Touring	P205/65R15	90/100/110	1260/1400/1540	1400	180	26	24 h	120	75	40	No defects
DBURC361401	Oven Aging	Duplop D65 Touring	P205/65R15	90/100/110	1260/1400/1540	1400	180	26	24 h	120	75	40	Tread shoulder chunking serial side
DBURC361401	Oven Aging	Duplop D65 Touring	P205/65R15	90/100/110	1260/1400/1540	1400	180	26	24 h	120	75	40	No defects
EHA3CMB0801	High Speed	Bridgestone R273 SWPII	LT245/75R16 LR"E"	85	2586	3042	550	80	100 min	140/150/160	87/93/99	40	No defects
EHA3CMB4800	High Speed	Bridgestone R273 SWPII	LT245/75R16 LR"E"	85	2586	3042	550	80	100 min	140/150/160	87/93/99	40	No defects
EHA3CMB4800	High Speed	Bridgestone R273 SWPII	LT245/75R16 LR"E"	85	2586	3042	550	80	100 min	140/150/160	87/93/99	40	No defects
EHA3CMB4700	High Speed	Bridgestone R273 SWPII	LT245/75R16 LR"E"	85	2586	3042	550	80	100 min	140/150/160	87/93/99	40	No defects
EHA3CMB4400	High Speed	Bridgestone R273 SWPII	LT245/75R16 LR"E"	85	2586	3042	550	80	100 min	140/150/160	87/93/99	40	No defects
EHA3CMB4800	Dynamic Aging	Bridgestone R273 SWPII	LT245/75R16 LR"E"	92	2799	3042	550	80	250hr	97	60	38	No defects
EHA3CMB4800	Dynamic Aging	Bridgestone R273 SWPII	LT245/75R16 LR"E"	92	2799	3042	550	80	250hr	97	60	38	No defects
EHA3CMB4800	Dynamic Aging	Bridgestone R273 SWPII	LT245/75R16 LR"E"	92	2799	3042	550	80	250hr	97	60	38	No defects
EHA3CMB0701	Oven Aging	Bridgestone R273 SWPII	LT245/75R16 LR"E"	90/100/110	2738/3042/3346	3042	450	65	24 h	120	75	40	No defects
EHA3CMB4800	Oven Aging	Bridgestone R273 SWPII	LT245/75R16 LR"E"	90/100/110	2738/3042/3346	3042	450	65	24 h	120	75	40	No defects
EHA3CMB4800	Oven Aging	Bridgestone R273 SWPII	LT245/75R16 LR"E"	90/100/110	2738/3042/3346	3042	450	65	24 h	120	75	40	No defects

* "Machine Malfunction" indicates testing equipment failure which prevented completion of that test

Conditioning: None

Tire ID	Manufacturer	Size	DOT	Weight	*SS/OSS	*End1/ End2	Peak Peel Force lbs/in	Avg Peel Force lbs/in
JW3-1	Pirelli Scorpion A/T	LT235/75R15 104/101S MTS	XL M3 8324 3600	36.14	SS	End 1	68.8	52.6
					SS	End 2	63.8	47.9
					OSS	End 1	90.1	60.4
					OSS	End 2	84.1	54.4
JW3-2	Pirelli Scorpion A/T	LT235/75R15 104/101S MTS	XL M3 8324 3600	36.12	SS	End 1	57.3	46.7
					SS	End 2	64.6	49.7
					OSS	End 1	88.2	60.5
					OSS	End 2	82.0	57.0
JW3-3	Bridgestone R273 SWP II	LT245/75R16 120/116Q MTS	EHA3 CMB 3701	46.18	SS	End 1	39.3	29.7
					SS	End 2	38.1	28.7
					OSS	End 1	36.7	29.3
					OSS	End 2	34.9	28.6
JW3-4	Bridgestone R273 SWP	LT245/75R16 120/116R MTS	7BA3 PKA 049	40.74	SS	End 1	36.2	27.5
					SS	End 2	30.0	25.6
					OSS	End 1	44.4	30.7
					OSS	End 2	32.9	25.4
JW3-5	Cooper Lifeliner Classic II	P235/75R15 105S MTS	UTHL C4D 3901 - D9R -	28.58	SS	End 1	70.3	61.5
					SS	End 2	72.9	58.7
					OSS	End 1	76.4	62.5
					OSS	End 2	70.1	60.1
JW3-6	Cooper Lifeliner Classic II	P235/75R15 105S MTS	UTHL C4D 3901 - D9R -	28.50	SS	End 1	72.5	61.7
					SS	End 2	69.3	59.3
					OSS	End 1	74.6	63.4
					OSS	End 2	70.5	61.9
JW3-7	Firestone Wilderness AT	P235/75R15 105S MTS	8XHL 1PY 1601	28.50	SS	End 1	110.8	68.0
					SS	End 2	99.3	66.7
					OSS	End 1	92.8	64.5
					OSS	End 2	83.6	62.9
JW3-8	Firestone Wilderness AT	P235/75R15 105S MTS	VNHL 1PY 0201	29.60	SS	End 1	84.0	54.1
					SS	End 2	85.8	58.4
					OSS	End 1	93.5	55.9
					OSS	End 2	74.4	54.1
JW3-9	Yokohama Geolandar A/T + II	L235/75R15 104/101S	FBD6 TBV 1901	37.46	SS	End 1	54.5	45.2
					SS	End 2	57.6	46.1
					OSS	End 1	59.4	42.5
					OSS	End 2	59.4	44.1
JW3-10	Yokohama Geolandar A/T + II	L235/75R15 104/101S	FBD6 TBV 1901	36.92	SS	End 1	63.4	45.3
					SS	End 2	59.8	47.2
					OSS	End 1	65.1	45.6
					OSS	End 2	60.0	49.1
JW3-11	Goodyear Wrangler HT	LT245/75R16 120/116R MTS	MD11 MMWV 2101	46.22	SS	End 1	63.7	40.7
					SS	End 2	54.7	36.0
					OSS	End 1	57.3	43.4
					OSS	End 2	51.3	35.5
JW3-12	Goodyear Wrangler HT	LT245/75R16 120/116R MTS	MD11 MMWV 2601	46.08	SS	End 1	46.3	29.1
					SS	End 2	43.2	32.5
					OSS	End 1	53.2	33.8
					OSS	End 2	62.3	35.9

Conditioning: None

*Refer to accompanying test procedure for a complete description of the test samples

Conditioning: None

Tire ID	Manufacturer	Size	DOT	Weight	SS/OSS	End1/ End2	Peak Peel Force lbs/in	Avg Peel Force lbs/in
JW4-1	BFG Clentra Plus Steel Belted	P235/75R15 MTS	ANHL BH7J 3501	28.74	SS	End 1	103.1	76.7
					SS	End 2	86.5	66.5
					OSS	End 1	100.4	76.9
					OSS	End 2	99.3	71.0
JW4-2	BFG Clentra Plus Steel Belted	P235/75R15 MTS	ANHL BH7J 3501	29.32	SS	End 1	99.2	70.3
					SS	End 2	89.5	66.9
					OSS	End 1	95.1	73.6
					OSS	End 2	101.6	72.4
JW4-3	Michelin Rain Force MX4	P235/75R15 105S MTS	M3DD D1JX 3301	29.12	SS	End 1	69.3	45.6
					SS	End 2	69.7	42.9
					OSS	End 1	64.7	43.8
					OSS	End 2	77.3	46.7
JW4-4	Michelin Rain Force MX4	P235/75R15 105S MTS	M3DD D1JX 3301	29.28	SS	End 1	61.0	42.2
					SS	End 2	61.1	43.1
					OSS	End 1	65.2	44.6
					OSS	End 2	73.4	44.8
JW4-5	Dunlop D65 Touring	P205/65R15 92T MTS	DBUR C36 1401	20.18	SS	End 1	80.1	63.6
					SS	End 2	71.0	54.4
					OSS	End 1	71.3	59.2
					OSS	End 2	82.5	56.2
JW4-6	Dunlop D65 Touring	P205/65R15 92T MTS	DBUR C36 1001	20.14	SS	End 1	69.6	56.2
					SS	End 2	63.8	51.9
					OSS	End 1	67.7	53.4
					OSS	End 2	66.8	56.7
JW4-7	Goodyear Regatta 2	P205/65R15 92T	MDUR NTHR 3001	21.10	SS	End 1	56.6	44.4
					SS	End 2	56.1	43.8
					OSS	End 1	49.1	39.0
					OSS	End 2	48.7	38.8
JW4-8	Goodyear Regatta 2	P205/65R15 92T	MDUR NTHR 3001	20.88	SS	End 1	47.4	39.2
					SS	End 2	57.7	39.0
					OSS	End 1	47.4	35.0
					OSS	End 2	46.3	34.9
JW4-9	Uniroyal Tiger Paw Touring HR	P225/60R16 97H MTS	BEXO EM9U 0301	25.46	SS	End 1	89.9	69.1
					SS	End 2	86.7	71.5
					OSS	End 1	81.0	64.9
					OSS	End 2	80.3	67.1
JW4-10	Uniroyal Tiger Paw Touring HR	P225/60R16 97H MTS	BEXO EM9U 2801	25.50	SS	End 1	93.7	71.8
					SS	End 2	81.4	65.3
					OSS	End 1	83.4	66.5
					OSS	End 2	78.8	62.0
JW4-11	Toyo Proxes H4	P225/60R16 97H MTS	CXA6 22N 3001	23.82	SS	End 1	73.1	56.4
					SS	End 2	68.1	54.5
					OSS	End 1	74.9	59.5
					OSS	End 2	65.3	53.8
JW4-12	Toyo Proxes H4	P225/60R16 97H MTS	CXA6 22N 2901	23.70	SS	End 1	66.4	54.7
					SS	End 2	75.7	60.1
					OSS	End 1	85.6	60.7
					OSS	End 2	82.9	62.9

Conditioning: None

*Refer to accompanying test procedure for a complete description of the test samples

Conditioning: 24-Hour Endurance Test

Tire ID	Manufacturer	Size	DOT	Inflation Kpa/Psi	Weight	*SS/OSS	*End1/ End2	Peak Peel Force lbs/in	Avg Peel Force lbs/in
JW5-1	Firestone Wilderness AT	P235/75R15 105S MTS	8XHL 1 PY 1601	180/26	28.50	SS	End 1	110.3	63.0
						SS	End 2	96.8	58.7
						OSS	End 1	84.6	55.1
						OSS	End 2	80.6	53.7
JW5-2	Cooper Lifeliner Classic II	P235/75R15 105S MTS	UTHL C4D 3901 - D9R -	180/26	28.46	SS	End 1	71.7	54.6
						SS	End 2	68.6	55.6
						OSS	End 1	68.1	52.3
						OSS	End 2	67.4	55.7
JW5-3	Michelin Rain Force MX4	P235/75R15 105S MTS	M3DD D1JX 3301	180/26	29.10	SS	End 1	67.1	41.1
						SS	End 2	69.8	44.1
						OSS	End 1	66.0	41.0
						OSS	End 2	87.0	49.3
JW5-4	BFG Clentra Plus Steel Belted	P235/75R15 MTS	ANHL BH7J 3501	180/26	29.02	SS	End 1	96.6	65.3
						SS	End 2	99.4	70.2
						OSS	End 1	94.4	64.2
						OSS	End 2	103.1	64.7
JW5-5	Yokohama Geolander A/T + II	LT235/75R15 104/101S	FBD6 TBV 1901	260/38	37.40	SS	End 1	54.6	43.3
						SS	End 2	54.4	41.6
						OSS	End 1	64.4	45.8
						OSS	End 2	55.8	41.7
JW5-6	Pirelli Scorpion A/T	LT235/75R15 104/101S MTS	XL M3 8324 3300	260/38	36.00	SS	End 1	93.4	53.3
						SS	End 2	71.5	52.1
						OSS	End 1	80.2	52.1
						OSS	End 2	78.2	51.2
JW5-7	Bridgestone R273 SWP	LT245/75R16 120/116R MTS	7BA3PKA 049	450/65	41.32	SS	End 1	22.9	19.9
						SS	End 2	23.5	21.5
						OSS	End 1	24.6	22.5
						OSS	End 2	23.7	22.4
JW5-8	Goodyear Wrangler HT	LT245/75R16 120/116R MTS	MD11 MMWV 2601	450/65	45.64	SS	End 1	42.5	28.2
						SS	End 2	64.0	43.2 Pulled into top belt
						OSS	End 1	30.7	26.1
						OSS	End 2	43.1	29.7
JW5-9	Goodyear Regatta 2	P205/65R15 92T	MDUR NTHR 3001	180/26	21.24	SS	End 1	39.5	33.4
						SS	End 2	55.4	39.2
						OSS	End 1	44.6	33.9
						OSS	End 2	41.4	31.3
JW5-10	Dunlop Touring D65	P205/65R15 92T MTS	DBYR C36 1001	180/26	20.38	SS	End 1	57.6	46.9
						SS	End 2	66.4	50.9
						OSS	End 1	61.6	49.0
						OSS	End 2	68.0	51.9
JW5-11	Toyo Proxes H4	P225/60R16 97H MTS	CXA6 22N 3001	180/26	23.76	SS	End 1	71.0	52.8
						SS	End 2	73.1	54.2
						OSS	End 1	64.9	52.3
						OSS	End 2	68.9	52.1
JW5-12	Uniroyal Tiger Paw Touring HR	P225/60R16 97H MTS	BEXU EM9U 3700	180/26	26.14	SS	End 1	94.7	68.3
						SS	End 2	77.6	62.7
						OSS	End 1	85.4	68.8
						OSS	End 2	71.1	60.1

Conditioning: 24-Hour Endurance Test

*Refer to accompanying test procedure for a complete description of the test samples

Test speed is 120Kph, (75Mph)
Ambient temperature is 38C, (100F)
Tire is loaded to 90, 100, and 110% of rated load for 8 hour each
Total run time is 24 hours for a total simulated distance of 2880 Km, (1800 Miles)

Conditioning: 50-Hour Endurance Test

Tire ID	Manufacturer	Size	DOT	Inflation Kpa/Psi	Weight	*SS/OSS	*End1/ End2	Peak Peel Force lbs/in	Avg Peel Force lbs/in
NH-06	Firestone Wilderness AT	P235/75R15 1055 MTS	NVHL 1PY 0201	180/26	29.52	SS	End 1	76.2	48.8
						SS	End 2	71.1	48.2
						OSS	End 1	77.6	51.3
						OSS	End 2	77.5	50.6
NH-130	BFG Clentra Plus Steel Belted	P235/75R15 105S MTS	ANHL BH7J 0401	180/26	29.14	SS	End 1	70.8	53.2
						SS	End 2	68.8	54.3
						OSS	End 1	71.1	51.9
						OSS	End 2	76.0	54.5
NH-160	Uniroyal Tiger Paw Touring HR	P225/60R16 97 H MTS	BEXUE M9U 0501	180/26	25.42	SS	End 1	89.0	64.9
						SS	End 2	85.6	64.6
						OSS	End 1	75.3	58.4
						OSS	End 2	79.8	60.1
NH-07	Firestone Wilderness AT	P235/75R15 105S MTS	VNHL 1PY 0201	180/26	29.86	SS	End 1	84.7	51.0
						SS	End 2	79.5	*****
						OSS	End 1	75.5	53.8
						OSS	End 2	*****	*****
NH-250	Cooper Lifeliner Classic II	P235-75R15 105S MTS	UTHL C4D 5000	180/26	28.92	SS	End 1	61.3	48.6
						SS	End 2	62.3	52.7
						OSS	End 1	62.6	51.4
						OSS	End 2	69.0	52.8
NH-128	BFG Clentra Plus Steel Belted	P235/75R15 MTS	ANHL BH7J 0401	180/26	28.76	SS	End 1	74.2	55.8
						SS	End 2	73.0	53.6
						OSS	End 1	76.7	56.3
						OSS	End 2	79.7	55.7
NH-159	Uniroyal Tiger Paw Touring HR	P225/60R16 97H MTS	BEXU EM9U 0501	180/26	25.18	SS	End 1	84.5	61.9
						SS	End 2	83.1	61.8
						OSS	End 1	67.1	54.7
						OSS	End 2	73.7	54.0
NH-246	Cooper Lifeliner Classic II	P235-75R15 105S MTS	UTHL C4D 5000 - C7L-	180/26	29.2	SS	End 1	68.7	51.9
						SS	End 2	69.7	51.6
						OSS	End 1	64.0	52.5
						OSS	End 2	58.9	49.3
NH-307	Michelin Radial XH4	P235/75R15 1055 XH4 MTS	B3DD A47X 4500	180/26	29.44	SS	End 1	60.1	40.0
						SS	End 2	67.6	47.1
						OSS	End 1	67.2	38.1
						OSS	End 2	62.7	39.9
NH-99	Dunlop D65 Touring	P205/65R15 92T MTS	DBUR C36 3200	180/26	20.36	SS	End 1	54.9	44.3
						SS	End 2	55.4	43.0
						OSS	End 1	57.4	44.4
						OSS	End 2	65.3	46.5
NH-97	Dunlop D65 Touring	P205/65R15 92T MTS	DBUR C36 3200	180/26	20.16	SS	End 1	44.2	39.0
						SS	End 2	52.0	44.5
						OSS	End 1	49.1	42.3
						OSS	End 2	44.8	38.4
NH-277	Goodyear Regatta 2	P205/65R15 92T	MDUR NTHR 5200	180/26	21.34	SS	End 1	59.4	40.6
						SS	End 2	64.5	44.9
						OSS	End 1	36.4	28.0
						OSS	End 2	34.1	28.8

Conditioning: 50-Hour Endurance Test

*Refer to accompanying test procedure for a complete description of the test samples
****Test machine failure

Test speed is 120Kph, (75Mph)
Ambient temperatureis 40C, (104F)
Tire is loaded to 90, 100, and 110% of rated load for 8, 10, and 32 hours respectively
Total run time is 50 hours for a total simulated distance of 6000 Km, (3728 Miles)

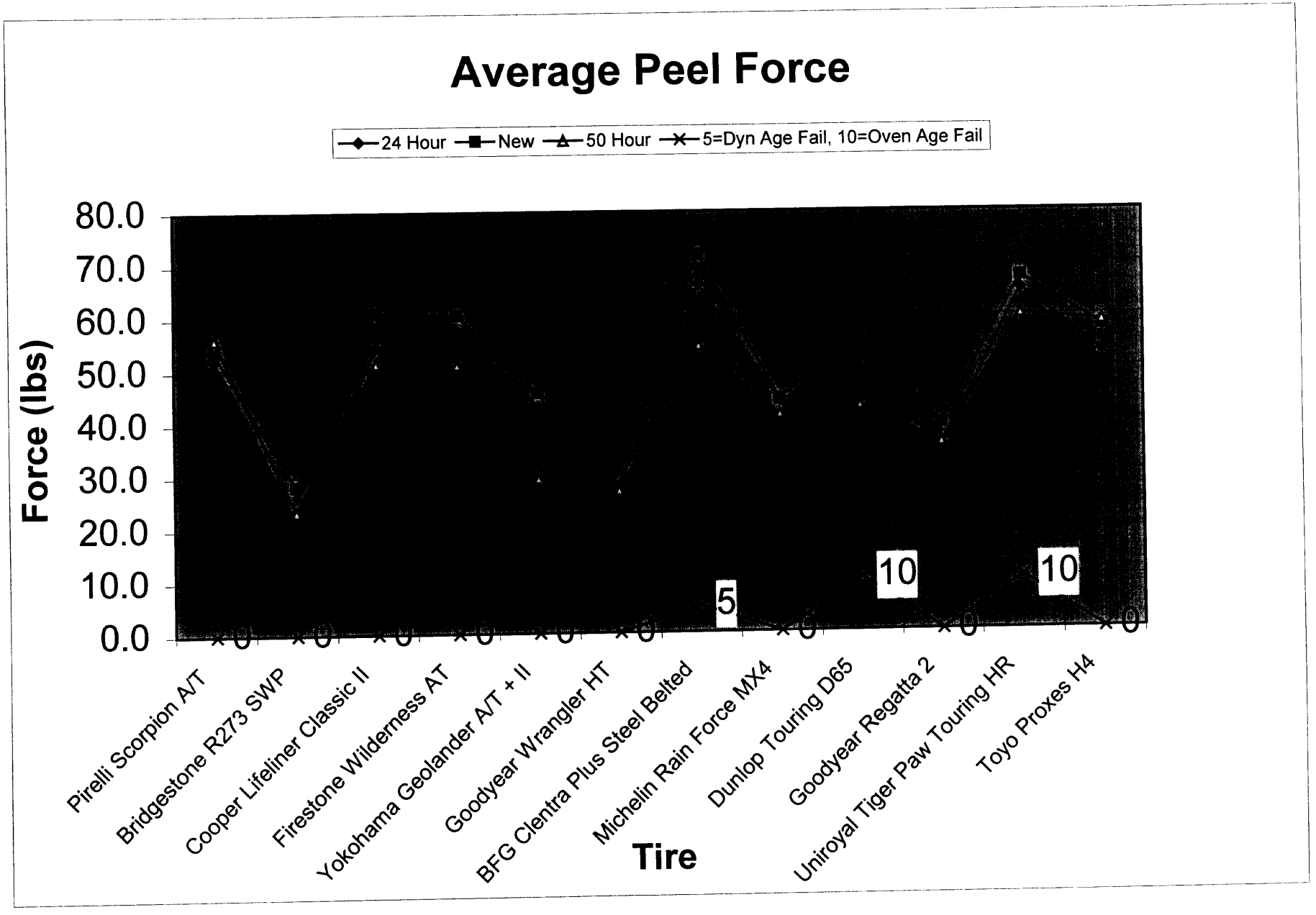
Conditioning: 50-Hour Endurance Test

Tire ID	Manufacturer	Size	DOT	Inflation Kpa/Psi	Weight	*SS/OSS	*End1/ End2	Peak Peel Force lbs/in	Avg Peel Force lbs/in
NH-70	Pirelli Scorpion A/T	LT235/75R15	XL M3 8324 3500	260/38	35.94	SS	End 1	87.7	58.4
						SS	End 2	79.5	55.5
						OSS	End 1	90.6	54.1
						OSS	End 2	89.0	59.3
NH-39	Goodyear Wangler HT	LT245/75R16	MD11 MMWV (N/A)	450/65	45.48	SS	End 1	39.6	30.2
						SS	End 2	60.5	36.8
						OSS	End 1	61.3	38.9
						OSS	End 2	54.6	38.2
NH-187	Bridgestone R273 SWP II	LT245/75R16 120/116QMTS	EHA3 CMB5100	450/65	45.92	SS	End 1	26.0	21.6
						SS	End 2	25.5	22.9
						OSS	End 1	25.2	21.4
						OSS	End 2	27.0	23.0
NH-339	Toyo Proxes H4	P225/60R16 97H MTS	CXA6 22W 5000	180/26	23.94	SS	End 1	76.7	54.0
						SS	End 2	76.5	60.8
						OSS	End 1	79.8	57.6
						OSS	End 2	100.0	65.0
NH-67	Pirelli Scorpion A/T	LT2341/75R15 104/101S	XL M3 8324 3500	260/38	35.15	SS	End 1	87.1	56.2
						SS	End 2	99.8	61.8
						OSS	End 1	81.6	55.6
						OSS	End 2	91.4	54.3
NH-37	Goodyear Wangler HT	LT245/75R16	MD11 MMWV 3900	450/65	45.08	SS	End 1	25.5	23.2
						SS	End 2	24.0	22.4
						OSS	End 1	24.4	20.8
						OSS	End 2	23.9	21.5
NH-340	Toyo Proxes H4	P225/60R16 97H MTS	CXA6 22W 5000	180/26	23.94	SS	End 1	67.4	52.0
						SS	End 2	77.2	60.2
						OSS	End 1	75.9	55.4
						OSS	End 2	84.7	64.1
NH-69	Pirelli Scorpion A/T	LT235/75R15 104/101S MTS	XL M3 8324 3500	260/38	35.46	SS	End 1	92.7	58.0
						SS	End 2	99.7	53.5
						OSS	End 1	95.8	57.0
						OSS	End 2	93.7	50.6
NH-217	Yokohama Geolandor A/T	LT235/75R15 104/101S	FBD6 TAD 259	260/38	37.4	SS	End 1	32.5	27.7
						SS	End 2	38.7	31.3
						OSS	End 1	30.8	25.1
						OSS	End 2	36.7	27.9
NH-220	Yokohama Geolandor A/T	LT235/75R15 104/101S	FBD6 TAD 419	260/38	36.98	SS	End 1	62.9	31.5
						SS	End 2	41.4	31.1
						OSS	End 1	36.1	29.1
						OSS	End 2	34.6	27.3
NH-218	Yokohama Geolandor A/T	LT235/75R15 104/101S	FBD6 TAD 419	260/38	36.76	SS	End 1	38.7	28.8
						SS	End 2	45.7	29.4
						OSS	End 1	56.6	34.8
						OSS	End 2	39.1	27.4
NH-188	Bridgestone R273 SWP II	LT245/75R16 120/116Q MTS	EHA3 CMB 5100	450/65	46.16	SS	End 1	26.8	23.1
						SS	End 2	45.2	24.8
						OSS	End 1	31.0	25.7
						OSS	End 2	29.8	24.2
NH-38	Goodyear Wrangler HT	LT245/75R16 120/116R	MD11 MMWV 3900	450/65	44.88	SS	End 1	26.0	21.3
						SS	End 2	28.1	22.6
						OSS	End 1	27.4	23.4
						OSS	End 2	30.1	23.9

Conditioning: 50-Hour Endurance Test

*Refer to accompanying test procedure for a complete description of the test samples

Test speed is 120Kph, (75Mph)
Ambient temperature is 40C, (104F)
Tire is loaded to 90, 100, and 110% of rated load for 8, 10, and 32 hours respectively
Total run time is 50 hours for a total simulated distance of 6000 Km, (3728 Miles)


Average Peel Force
24 Hour
New
50 Hour
5=Dyn Age Fail, 10=Oven Age Fail
Force (lbs)
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
5
10
10
Pirelli Scorpion A/T
Bridgestone R273 SWP
Cooper Lifeliner Classic II
Firestone Wilderness AT
Yokohama Geolander A/T + II
Goodyear Wrangler HT
BFG Clentra Plus Steel Belted
Michelin Rain Force MX4
Dunlop Touring D65
Goodyear Regatta 2
Uniroyal Tiger Paw Touring HR
Toyo Proxes H4
Tire