DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

49 CFR Part 571

[Docket No. NHTSA–00–8011]

RIN 2127–AI54

Federal Motor Vehicle Safety Standards; Tires

AGENCY: National Highway Traffic Safety Administration (NHTSA), Department of Transportation.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: The Transportation Recall Enhancement, Accountability, and Documentation Act of 2000 mandates a rulemaking proceeding to revise and update our safety performance requirements for tires. In response, this document proposes to establish new and more stringent tire performance requirements in a new Federal motor vehicle safety standard that would apply to all new tires for use on vehicles with a gross vehicle weight rating of 10,000 pounds or less. The agency recently proposed to establish a new tire standard, Standard No. 139, in a December 2001 NPRM on tire safety information. Today's document proposes to include the new tire performance requirements in that standard.

This document seeks comments on the proposed new standard, including its applicability and test procedures, modifications to related existing standards, and lead time provided for manufacturers to achieve compliance. It also seeks comments on the possible future specification of shearography analysis, a technique which evaluates the condition of a tire using laser technology. Finally, it seeks comments on NHTSA's research plans.

DATES: You should submit your comments early enough to ensure that Docket Management receives them not later than May 6, 2002.

ADDRESSES: You may submit your comments in writing to: Docket Management, Room PL–401, 400 Seventh Street, SW., Washington, DC, 20590. Alternatively, you may submit your comments electronically by logging onto the Docket Management System website at *http://dms.dot.gov*. Click on ''Help & Information'' or ''Help/Info'' to view instructions for filing your comments electronically. Regardless of how you submit your comments, you should mention the docket number of this document.

FOR FURTHER INFORMATION CONTACT: For technical and policy issues: Mr. George Soodoo or Mr. Joseph Scott, Office of Crash Avoidance Standards, National Highway Traffic Safety Administration, 400 Seventh Street, SW., Washington, DC 20590. Telephone: (202) 366–2720. Fax: (202) 366–4329.

For legal issues: Nancy Bell, Attorney Advisor, Office of the Chief Counsel, NCC–20, National Highway Traffic Safety Administration, 400 Seventh Street, SW., Washington, DC 20590. Telephone: (202) 366–2992. Fax: (202) 366–3820.

SUPPLEMENTARY INFORMATION: You may read the materials placed in the docket for this document (*e.g.,* the comments submitted in response to this document by other interested persons) by going to the street address given above under **ADDRESSES.** The hours of the Docket Management System (DMS) are indicated above in the same location.

You may also read the materials on the Internet. To do so, take the following steps:

(1) Go to the Web page of the Department of Transportation DMS (*http://dms.dot.gov/*).

(2) On that page, click on ''search'' near the top of the page or scroll down to the words ''Search the DMS Web'' and click on them.

(3) On the next page (*http://dms.dot.gov/search/*), scroll down to ''Docket Number'' and type in the four-digit docket number (8011) shown in the title at the beginning of this document. After typing the docket number, click on ''search.''

(4) On the next page (''Docket Summary Information''), which contains docket summary information for the materials in the docket you selected, scroll down to ''search results'' and click on the desired materials. You may download the materials.

Table of Contents

I. Executive Summary and Overview
II. Background
III. Existing Tire Standards—Performance Requirements
IV. Current Safety Problem—Outdated Performance Requirements
A. Transition From Bias Ply to Radial Tires
B. Safety Problems Associated with Tires
1. Population of Tire Related Crashes
2. Geographical and Seasonal Effects
3. Tire Problems by Tire Type and Light Truck Type
4. Crashes Indirectly Caused by Tire Problems
C. Implications of Changes in U.S. Light Vehicle Market
V. Agency Response to Safety Problem
A. Relationship Between TREAD Act and Tire Harmonization
B. Submissions to NHTSA Tire Upgrade Docket (Docket No. NHTSA–2000–8011)
1. Rubber Manufacturers Association December 2000 Testing Protocol
A. Passenger Tires—High Speed Test
B. Passenger Tires—Endurance Test
C. Light Truck Tires—High Speed
D. Light Truck Tires—Endurance Test
2. Other Substantive Submissions
C. NHTSA Tire Testing at Standards Testing Lab
1. High Speed Testing
2. Endurance Testing
3. Low Inflation Pressure Testing
4. Conclusions From Testing Results
VI. Agency Proposal
A. Summary of Proposal
B. Application of the New Standard
C. Proposed Test Procedures
1. High Speed Test
a. Ambient Temperature
b. Load
c. Inflation Pressure
d. Speed
e. Duration
2. Endurance Test
a. Ambient Temperature
b. Load
c. Inflation Pressure
d. Speed
e. Duration
3. Low Inflation Pressure Performance Tests
a. Low Pressure—Tire Pressure Monitoring System Test
b. Low Pressure—High Speed Test
4. Road Hazard Impact Test
5. Bead Unseating
6. Aging Effects
a. Adhesion (Peel) Test
b. Michelin's Long Term Durability Endurance Test
c. Oven Aging
D. Deletion of FMVSS No. 109
E. Modification to FMVSS Nos. 110 and 120
F. Modification to FMVSS Nos. 117 and 129
G. De-rating of P-metric tires
H. Other NHTSA Research Plans
1. Bead Unseating Research
2. Road Hazard Impact Test (SAE J1981) Research
I. Additional Considerations
1. Lead time
2. Shearography Analysis
3. Revised Test Speed in Uniform Tire Quality Temperature Grading Requirement
4. Request for Comments on Particular Issues
VII. Benefits
VIII. Costs
A. Original Equipment Tire and Vehicle Costs
B. Total Annual Costs
C. Testing Costs
D. Request for Comments on Costs and Benefits of Individual Tests
IX. Effective Date
X. Rulemaking Analyses and Notices
A. Executive Order 12866 and DOT Regulatory Policies and Procedures
B. Regulatory Flexibility Act
C. National Environmental Policy Act
D. Executive Order 13132 (Federalism)
E. Unfunded Mandates Act
F. Civil Justice Reform

G. National Technology Transfer and Advancement Act
H. Paperwork Reduction Act
I. Plain Language
XI. Submission of Comments
XII. Proposed Regulatory Text

I. Executive Summary and Overview

Section 10 of the Transportation Recall Enhancement, Accountability, and Documentation (TREAD) Act mandates that the agency issue a final rule to revise and update its tire performance standards. However, the Act gives the agency substantial discretion over the substance of the final rule. The Act does not specify what revisions or updatings should be made. For example, it does not specify which particular existing tests should be improved or how much they should be improved. Likewise, it does not specify which particular new tests should be added or how stringent they should be. However, the legislative history does contain specific references to some tests like aging tests.

In response to section 10, the agency comprehensively examined possible ways of revising and updating its tire standards. In doing so, it placed particular emphasis on improving the ability of tires to withstand the effects of factors mentioned during the consideration and enactment of the TREAD Act such as tire heat build up, low inflation, and aging. The agency has examined the value of modifying the existing tests in its tire standards. In addition, it has examined the value of adopting several new tests.

As a result of these efforts, the agency has identified an array of amendments for revising and updating its tire standards and thereby improving tire performance. Some would upgrade existing tests, while the others would add new ones.

The agency recently proposed to establish a new tire standard, Standard No. 139, in a December 2001 NPRM on tire safety information (Docket No. NHTSA–01–11157, 66 FR 65536, December 19, 2001). Today's document proposes to include the new tire performance requirements in that standard. The standard would apply to light vehicle tires. As used in the December 2001 proposal, ''light vehicles'' are vehicles (except motorcycles) with a gross vehicle weight rating (GVWR) of 10,000 pounds or less.

Under today's proposal, the new standard would contain requirements and test procedures addressing the following aspects of tire performance: Tire Dimension, High Speed, Endurance, Road Hazard Impact, Bead Unseating, Low Inflation Pressure, and Aging Effects.[1]

The proposed High Speed and Endurance tests would replace the current High Speed and Endurance tests in FMVSS No. 109, New Pneumatic Tires—Passenger Cars, 49 CFR 571.109, with a more stringent combination of testing parameters (ambient temperature, load, inflation pressure, speed, and duration.) Most significantly, the proposed High Speed test specifies test speeds (140, 150 and 160 km/h (88, 94, and 100 mph)) that are substantially higher than those currently specified in FMVSS No. 109 (120, 128, 136 km/h (75, 80, 85 mph)). Likewise, the proposed Endurance Test specifies a test speed 50 percent faster (120 km/h (75 mph)) than that currently specified in FMVSS No. 109 (80 km/h (50 mph)), as well as a duration 6 hours longer (40 hours total) than that currently specified in FMVSS No. 109 (34 hours total). At the specified test speed (120 km/h), the Proposed Endurance Test distance (4800 km) is almost double the distance accumulated than under the current Endurance Test (2720 km at 80 km/h). These new testing parameters are based on NHTSA's activities undertaken in response to the TREAD Act, including extensive agency testing, data gathering and analyses as well as agency review of other existing international, industry and National standards and proposals, and submissions by the public.

The proposed Road Hazard Impact Test and the Bead Unseating Test are modeled on SAE Recommended Practice J1981, Road Hazard Impact Test for Wheel and Tire Assemblies (Passenger Car, Light Truck, and Multipurpose Vehicles), and the Toyota Air Loss Test, respectively. These new tests would replace the Strength and Bead Unseating Resistance tests in the current FMVSS No. 109 with tests that are more dynamic as opposed to quasi-static.

In addition to the tests cited above, the proposed standard contains tests for two new aspects of performance: Low Inflation Pressure Performance and Aging Effects. By creating tests for these aspects of performance, the agency is attempting to address concerns raised by members of Congress in hearings that preceded the enactment of the TREAD Act that NHTSA's current test requirements do not evaluate how well tires perform when significantly underinflated or after being subjected to environmental variables, such as heat, which accelerate aging. In particular, underinflation and heat were factors highlighted as contributing to failure of the Firestone ATX and Wilderness tires in the TREAD hearings, and in the agency's Firestone investigation (NHTSA Office of Defects Investigation (ODI) investigation number EA00–023).

[1] See 66 FR 65536 for the proposed tire information requirements. For the convenience of the reader, we have placed in the docket for today's NPRM a document that shows how the tire safety information and performance requirements may appear together in Standard No. 139.

To test Low Inflation Pressure Performance, the agency is proposing two alternative tests based on agency testing and data analyses. Both tests utilize tires significantly under-inflated, for instance 20 psi for P-metric tires (the low inflation pressure threshold requirement for warning lamp activation in the proposed Tire Pressure Monitoring System (TPMS) standard, Docket No. NHTSA–00–8572 (66 FR 38982, July 26, 2001)), as the ''inflation pressure'' testing parameter for standard load P-metric tires. To test for resistance to Aging Effects, the agency proposes three alternative tests that would evaluate a tire's long term durability through methods different than and/or beyond those required by both the current and the proposed Endurance Test parameters. The three tests use peel strength testing, long-term durability endurance requirements, and oven aging, respectively. The agency solicits comments on which of the two proposed tests for addressing Low Inflation Pressure Performance, and which of the three tests proposed for addressing Aging Effects, should be chosen for the new standard.

In addition to proposing test procedures for the new standard, the agency also discusses in this document its ongoing and future research plans on tire safety, and seeks comments on the future use of shearography analysis (a method of analysis using laser technology) for evaluating the condition of tires subjected to the proposed testing procedures and the plans for revising the Uniform Tire Quality Grading Temperature Grading Requirement testing speeds so that they are consistent with the test speeds in the proposed High Speed tests.

Finally, the agency discusses revising FMVSS Nos. 110, Tire selection and rims, for passenger cars, 49 CFR 571.110, and 120, Tire selection and rims for motor vehicles other than passenger cars, 49 CFR 571.120, to reflect the applicability of the proposed light vehicle tire standard to vehicles up to 10,000 pounds GVWR, and revising FMVSS Nos. 117, Retreaded pneumatic tires, 49 CFR 571.117, and 129, New non-pneumatic tires for passenger cars, 49 CFR 571.129, to replace the performance tests which reference or mirror those in FMVSS No. 109 with those specified in the proposed new light vehicle tire standard.

Wishing to adopt only those amendments that contribute to improved safety, and mindful of the principles for regulatory decisionmaking set forth in Executive Order 12866, Regulatory Planning and Review, NHTSA has examined the benefits and costs of these amendments. Its efforts to do so, however, have been limited by several factors. Two factors stand out. One is the limited time allowed by the schedule specified in the TREAD Act for completing this rulemaking. That has limited the amount and variety of information that the agency could obtain and testing that the agency could conduct to examine the effects of different versions of the amendments under consideration. The other is the difficulty inherent in crash avoidance rulemakings, stemming from the multiplicity of the factors contributing to the occurrence of any crash and the difficulty of ascertaining the relative contribution of each factor, in linking specific improvements in safety requirements with specific reductions in crashes and resulting deaths and injuries. Together, these limitations have made it difficult to assess and compare the benefits and costs of this rulemaking.

At this time, the agency believes that improving tires will be beneficial in reducing tire failures and crashes resulting from tire failures. However, we do not have a good estimate of the extent to which the improvements will improve safety. We have made an estimate of the target population—373 fatalities and 9,247 injuries in the target population. If the improvements needed to pass the high-speed and endurance tests (estimated to be 22 percent) related directly to an improvement in safety, the total potential improvement would be 82 lives saved (373* .22) and 2,034 injuries avoided. Since 32.8 percent of the tires currently do not pass the proposed requirements, the benefits would be 27 lives saved (373 * 0.22 * 0.328) and 667 injuries reduced.

The agency emphasizes that not all benefits could be quantified. Specifically, the agency believes that there will be other, currently non-quantifiable, benefits from the proposed Aging test and aspects of the proposal that address the overloading of vehicles. Additionally, there could be benefits from the proposed Low Inflation Pressure Performance tests and from the proposed Road Hazard and Bead Unseating tests.

The agency's estimate of the price increase to improve tires up to the performance levels required in the High Speed and Endurance tests is $3 per affected tire. Based on testing, we estimate that about one-third (32.8 percent) of all tires would need improvements to pass those two tests. If the cost for these improved tires were spread across the entire new light vehicle fleet, the average new vehicle price increase would, we estimate, be $4.09 per vehicle. The overall annual cost of these tests for new original equipment (64 million tires) and replacement tires (223 million tires) is estimated at $282 million for a total of 287 million tires sold annually and the net costs per equivalent life saved would be about $7.2 million.

We do not anticipate an increase in costs for the proposed Road Hazard Impact and Bead Unseating tests because our testing indicates that most of current production tires would pass these tests. The agency has not conducted sufficient testing of the proposed Aging tests to anticipate their potential costs. The agency believes, however, that most manufacturers already perform an aging test. Therefore, it is likely that the incremental cost of adding an aging test would be minimal.

With regard to the Low Inflation Pressure Performance tests, one alternative would provide no added costs because agency testing indicates that current production tires pass the test. Tires tested to the other alternative have a higher failure margin. Costs for this test cannot be characterized by the agency at this point.

The agency is concerned about the overall costs of this rulemaking and the net costs per equivalent life saved. While the agency believes that its proposed amendments represent a reasoned proposal that is based on best currently available information and that would improve tire safety, it is concerned about the apparent overall costs of those amendments. The agency is particularly concerned that the cost per equivalent life saved is significantly higher than that in most NHTSA vehicle safety rulemakings.

Because of the broad mandate from Congress and the uncertainty associated with the analysis of benefits and costs, the agency believes that the most appropriate course of action is for it to seek public comment on the full array of potential amendments that it has identified. As a result of this NPRM, the agency anticipates receiving cost data and other information that will enable it to refine its assessment of benefits and costs. The agency will then be in a better position to pick and choose among the proposed amendments. Its intention is to use that information to fashion a final rule consistent with the principles of Executive Order 12866.

II. Background

The Transportation Recall Enhancement, Accountability, and Documentation (TREAD) Act, Pub. L. 106–414, signed into law on November 1, 2000, requires the agency to address numerous vehicle safety matters through rulemaking. Section 10 of the Act directs the Secretary of Transportation to conduct a rulemaking to revise and update the tire safety standards published at 49 CFR 571.109 and 571.119, and to complete the rulemaking, i.e., issue a final rule, by June 1, 2002.[2]

III. Existing Tire Standards—Performance Requirements

The following discussion summarizes current provisions relating to tires.

FMVSS No. 109, New pneumatic tires, 49 CFR 571.109, specifies the requirements for all tires manufactured for use on passenger cars manufactured after 1948. This standard, which was issued in 1967 under the National Traffic and Motor Vehicle Safety Act (Safety Act), specifies dimensions for tires used on passenger cars and requires that the tires meet specified strength, resistance to bead unseating, endurance, and high speed requirements, and be labeled with certain safety information. FMVSS No. 109 applies to passenger car (P-metric) tires produced for use on passenger cars, multipurpose passenger vehicles (MPV), and light trucks (sport utility vehicles (SUV), vans, minivans, and pickup trucks). The standard was adopted from the Society of Automotive Engineers (SAE) recommended practice J918c, Passenger Car Tire Performance Requirements and Test Procedures, which was first issued by the SAE in June 1965. [3] The current FMVSS No. 109 includes four performance requirements for tires:

- A strength test, which evaluates the strength of the reinforcing materials in the tire;
- A resistance-to-bead unseating test, which evaluates how well the tire bead

[2] The title of section 10 is ''Endurance and resistance standards for tires.'' The section reads in full as follows:

The Secretary of Transportation shall conduct a rulemaking to revise and update the tire standards published at 49 CFR 571.109 and 49 CFR 571.119. The Secretary shall complete the rulemaking under this section not later than June 1, 2002.

[3] SAE is an organization which develops voluntary standards for aerospace, automotive and other industries. Many of SAE's recommended practices are developed using technical information supplied by vehicle manufacturers and automotive test laboratories.

is seated on the rim (regulating the tire-rim interface guards against sudden loss of tire air pressure when a tire is subjected to lateral forces such as during severe turning maneuvers);

• An endurance test, which evaluates resistance to heat buildup when the tire is run at its rated load nonstop for a total of 34 hours, and

• A high speed test, which evaluates resistance to heat buildup when the tire is run at 88 percent of its maximum load at speeds of 75 mph, 80 mph, and 85 mph for 30 minutes at each speed.

For the purposes of testing tires to determine their compliance with these requirements, the standard specifies values for several factors, such as tire inflation pressure, the load [4] on the tire, and the rim on which a tire is mounted. The standard specifies permissible inflation pressures (or wheel sizes, in the case of bead unseating test) to facilitate compliance testing. The standard requires that each passenger car tire must have a maximum permissible inflation pressure labeled on its sidewall (S4.3). Section 4.2.1(b) lists the permissible maximum pressures: 32, 36, 40, or 60 pounds per square inch (psi) or 240, 280, 290, 300, 330, 340, 350, or 390 kiloPascals (kPa). A manufacturer's selection of a maximum pressure has the effect of determining the pressures at which its tire is tested. For each permissible maximum pressure, Table II of the standard specifies pressures at which the standard's tests must be conducted. The intent of this provision is to limit the number of possible maximum inflation pressures and thereby reduce the likelihood of having tires of the same size on the same vehicle with one maximum load value, but with different maximum permissible inflation pressures.

Closely related to FMVSS No. 109 is FMVSS No. 110, Tire selection and rims, 49 CFR 571.110. FMVSS No. 110 requires that each passenger car be equipped with tires that comply with FMVSS No. 109, that tires on the cars be capable of carrying the GVWR of that vehicle, that the rims on the car be appropriate for use with the tires, and that certain information about the car and its tires appear on a placard in the passenger car. FMVSS No. 110 also specifies rim dimension requirements and further specifies that, in the event of a sudden loss of inflation pressure at a speed of 97 km/h (60 mph), rims must retain a deflated tire until the vehicle can be stopped with a controlled braking application. FMVSS No. 110 initially became effective in April 1968.

FMVSS No. 117, Retreaded pneumatic tires, 49 CFR 571.117, establishes performance, labeling, and certification requirements for retreaded pneumatic passenger car tires. Among other things, the standard requires retreaded passenger car tires to comply with the tubeless tire resistance to bead unseating and the tire strength requirements of FMVSS No. 109. FMVSS No. 117 also specifies requirements for casings to be used for retreading, and certification and labeling requirements.

FMVSS No. 119, New pneumatic tires for vehicles other than passenger cars, 49 CFR 571.119, specifies performance and labeling requirements for new pneumatic tires designed for highway use on multipurpose passenger vehicles, trucks, buses, trailers and motorcycles manufactured after 1948, and which requires treadwear indicators in tires, and rim matching information concerning those tires. Under this standard, each tire has to meet requirements that are qualitatively similar to those in FMVSS No. 109 for passenger car tires. The high speed performance test in this standard only applies to motorcycle tires and to non-speed-restricted tires of 14.5-inch nominal rim diameter or less marked load range A, B, C, or D. In addition, FMVSS No. 119 does not contain a resistance-to-bead unseating test.

A tire under FMVSS No. 119 is generally required to meet the performance requirements when mounted on any rim listed as suitable for its size designation in the publications, current at the time of the tire's manufacture, of the tire and rim associations that are listed in the standard. Further, the tire is required to meet the dimensional requirements when mounted on any such rim of the width listed in the load-inflation tables of this standard. In addition to the permanent marking for any non-matching listed rims, each tire manufacturer is required to attach to the tire, for the information of distributors, dealers and users, a label listing the designations of rims appropriate for use with the tire.

FMVSS No. 120, Tire Selection and rims for motor vehicles other than passenger cars, 49 CFR 571.120, requires that vehicles other than passenger cars equipped with pneumatic tires be equipped with rims that are listed by the tire manufacturer as suitable for use with those tires and that rims be labeled with certain information. It also requires that these vehicles shall be equipped with tires and rims that are adequate to support the fully-loaded vehicle under contemplated operating conditions.

The primary effect of Standard No. 120 is to specify the minimum load-carrying characteristics of tires not already subject to the passenger car tire and rim selection requirements of FMVSS No. 110.

Tire selection under FMVSS No. 120 consists of two elements. With one exception, each vehicle must be equipped with tires that comply with FMVSS No. 119 and the load rating of those tires on each axle of the vehicle must together at least equal the gross axle weight rating (GAWR) for that axle. If the certification label lists more than one GAWR-tire combination for the axle, the sum of the tire's maximum load ratings must meet or exceed the GAWR that corresponds to the tire's size designation. If more than one combination is listed, but the size designation of the actual tires on the vehicle is not among those listed, then the sum of the load ratings must simply meet or exceed the lowest GAWR that does appear.

FMVSS No. 120 also contains a requirement related to the use of passenger car tires on vehicles other than passenger cars. The requirement states that when a tire that is subject to FMVSS No. 109 is installed on a multipurpose passenger vehicle, truck, bus, or trailer, the tire's load rating must be reduced by a factor of 1.10 by dividing by 1.10 before determining whether the tires on an axle are adequate for the GAWR. This 10 percent de-rating of P-metric tires provides a greater load reserve when these tires are installed on vehicles other than passenger cars. The reduction in the load rating is intended to provide a safety margin for the generally harsher treatment, such as heavier loading and possible off-road use, that passenger car tires receive when installed on a MPV, truck, bus or trailer, instead of on a passenger car.

FMVSS No. 129, New non-pneumatic tires for passenger cars, 49 CFR 571.129, includes definitions relevant to non-pneumatic tires and specifies performance requirements, testing procedures, and labeling requirements for these tires. To regulate performance, the standard contains performance requirements and tests related to physical dimensions, lateral strength, strength (in vertical loading), tire endurance, and high speed performance. The performance requirements and tests in FMVSS No. 129 were based upon those contained in FMVSS No. 109.

The FMVSS No. 129 labeling requirements are similar to those set

[4] Load percentages stated throughout this document, unless otherwise specified, are based on the sidewall maximum rated load.

forth in section S4.3 of FMVSS No. 109 for size, designation, load, rating, rim size and type designation, manufacturer or brand name, certification, and tire identification number. The standard also includes temporary use and maximum speed labeling requirements and allows methods of permanent marking other than ''molding'' in anticipation of the difficulty of molding required information on non-pneumatic designs. FMVSS No. 129 initially became effective in August 1990.

IV. Current Safety Problem—Outdated Performance Requirements

A. Transition From Bias Ply to Radial Tires

When FMVSS No. 109 was issued in 1967, nearly all (more than 99 percent) of passenger car tires in the U.S. were of bias, or bias belt construction. The test procedures that appear in FMVSS No. 109 were developed in a bias tire environment. Today, bias tires have been almost completely replaced by radial tires on passenger cars. The use of radial tires has grown to the extent that they represent more than 95 percent of passenger tires in both the U.S. and Europe and are used on most new light vehicles sold in the U.S.[5] NHTSA does not require radial tires, but regulates their performance through FMVSS Nos. 109 and 119.

Radial tires are less susceptible than bias ply tires to most types of failures. Also, radial tire design resulted in significant improvements in tire performance compared with bias ply tires, thus making it easier for radial tires to comply with the requirements of FMVSS No. 109 than for bias tires.

A bias passenger car tire carcass is typically made up of two or four plies of cord material that run from bead to bead at an angle of approximately 35 degrees to the centerline of the tire. Alternating plies are applied at alternating angles during tire manufacture so that the cord paths of alternating plies criss-cross. This type of construction provides a very strong, durable carcass for the tire. However, it has drawbacks. Because the ply cords criss-cross and all the cords are anchored to the beads, the carcass is stiff and relatively inflexible. This type of construction prevents different parts of the tire from acting independently of one another when forces are applied to the tire. As a result, a bias construction is susceptible to impact breaks because it does not easily absorb road irregularities.

By comparison, a radial passenger car tire carcass is typically made up of one or two plies of cord material that run from bead to bead at an angle of approximately 90 degrees to the centerline of the tire. As a result, the cords do not criss-cross. Because the cords do not criss-cross and because the opposite ends of each cord are anchored to the beads at points that are directly opposite to each other, the radial tire carcass is very flexible. The radial tire is reinforced and stabilized by a belt that runs circumferentially around the tire under the tread. This construction allows the sidewalls to act independently of the belt and tread area when forces are applied to the tire. This ''independent'' action is what allows the sidewalls to readily absorb road irregularities without overstressing the cords. Impact breaks caused by cord rupture do not occur in radial-ply passenger car tires. This ''independent'' action also allows two important things to happen during cornering: (1) The tread of a radial tire remains fully in contact with the road over the entire tread width, and (2) the ply cords and sidewall are able to absorb the cornering forces without exerting the twisting force on the beads that are exerted by bias constructions.

These characteristics of a radial tire construction are what make the existing high speed test, endurance test, strength test[6], and bead-unseating test appear to be ineffective in differentiating among today's radial tires with respect to these aspects of performance.

B. Safety Problems Associated With Tires

Tire under-inflation, high ambient temperatures, and vehicle load are among the factors being considered in the ongoing evaluation of the radial tire failures that have occurred in recent years. Data concerning tire failure, blowouts, and rollovers are discussed below.

1. Population of Tire Related Crashes

Several crash files contain information on ''general'' tire related problems that precipitate crashes. These files are the National Automotive Sampling System—Crashworthiness Data System (NASS–CDS)[7] and the Fatality Analysis Reporting System (FARS).[8]

[5] Statistics relating to the increase in use of radial tires since 1968, as reported in the Rubber Manufacturers Association's *(RMA's) Factbook 2000—U.S. Tire Shipment Activity Report for Statistical Year 1999 (RMA 2000 Yearbook),* are as follows:

- OE Passenger Tires Shipments: (included are all P-metric tires even if destined for light truck usage) In 1970 radial tires comprised 0.5 percent of the market and bias/bias ply tires comprised 99.5 percent. In 1999 radial tires comprised 93.7 percent of the market and bias/bias ply tires comprised 6.3 percent.
- Replacement Market Passenger Tire Shipments: (Replacement shipments include all domestically produced and imported tires sent to the U.S. replacement market. Figures include all sizes and types of tires designed for standard highway passenger car service, including P-Metric tires destined for light trucks.) In 1970 radials comprised 2.1 percent of market and in 1999 radials comprised 99.8 percent of market.
- Production of Passenger Tires: (Passenger tire production covers all tires produced in the United States whether for domestic consumption or for export. Figures represent the production for all sizes and types of tires designed for standard highway passenger car service and include P-Metric tires destined for use on light trucks.) In 1970 radial tires comprised 0.0 percent of tires produced. In 1999 radial tires comprised 99.1 percent of tires produced.
- OE Light Truck Tires Shipments: (Light truck tire original equipment shipments covers all tires sent to manufacturers or original equipment vehicles in the U.S. and includes all sizes/types of tires designed by the participants for fitment to light truck.) In 1980 radial tires comprised 14.8 percent of shipments and in 1999 radial tires comprised 98.3 percent of shipments.
- Replacement Light Truck Tires Shipments: (Light truck tire replacement shipments designates all tire shipments sent for replacement purposes to the domestic tire market in the U.S. and includes all sizes/types of tires designed by the participants for fitment to light truck.) In 1980 radials comprised 9.9 percent of shipments and in 1999 radials comprised 94.5 percent of shipments.
- Production of Light Truck Tires: (Tires produced in US whether for domestic consumption or for export outside the United States—does not include P-metric tires). In 1980 radials comprised 7.1 percent of production and in 1999 radials comprised 98.7 percent of production.

[6] The FMVSS 109 plunger energy or strength test was designed to evaluate the strength of the reinforcing materials in bias ply tires, typically rayon, nylon or polyester, and it continues to serve a purpose for these tires. However, a radial tire is not susceptible to the kind of failure for which this test was designed to prevent. The flexible sidewalls of radial tires easily absorb the shock of road irregularities.

Because of the belt package, radial tires far exceed the strength requirements of the test and many times the plunger bottoms out on the rim instead of breaking the reinforcing materials in the radial tire. During the years 1996 through 1998 RMA members reported conducting nearly 19,000 plunger energy (strength) tests on radial tires. There were no reported failures.

[7] For the NASS–CDS system, trained investigators collect data on a sample of tow-away crashes around the country. These data can be ''weighted up'' to national estimates. A NASS–CDS General Vehicle Form contains the following information: A critical pre-crash event, such as vehicle loss of control due to a blowout or flat tire. This category includes only part of the tire-related problems which cause crashes. This coding would only be used when the tire went flat or there was a blowout that caused a loss of control of the vehicle, resulting in a crash.

[8] In FARS, tire problems are noted after the crash, if they are noted at all. The FARS file does not indicate whether the tire problem caused the crash, influenced the severity of the crash, or just occurred during the crash. For example, some crashes may have been caused by a tire blowout, while in others the vehicle may have slid sideways and struck a curb, causing a flat tire which may or may not have influenced whether the vehicle experienced rollover. Thus, while an indication of a tire problem in the FARS file give some indication as to the

NASS–CDS data for 1995 through 1998 indicate that there are an estimated 23,464 tow-away crashes per year caused by blowouts or flat tires.

ESTIMATED ANNUAL AVERAGE NUMBER (1995–98 NASS) AND RATES OF BLOWOUTS OR FLAT TIRES CAUSING TOW-AWAY CRASHES

	Tire related cases	Percent tire related
Passenger Cars Total	10,169	0.31
Rollover	1,837 (18%)	1.87
Non-rollover	8,332 (82%)	0.26
Light Trucks Total	13,294	0.99
Rollover	9,577 (72%)	6.88
Non-rollover	3,717 (28%)	0.31
Light Vehicles Total	23,463	0.51
Rollover	11,414 (49%)	4.81
Non-rollover	12,049 (51%)	0.28

Therefore, about one half of one percent of all crashes are caused by these tire problems. The rate of blowout-caused crashes for light trucks (0.99 percent) is more than three times the rate of those crashes for passenger cars (0.31 percent). Blowouts cause a much higher proportion of rollover crashes (4.81) than non-rollover crashes (0.28); and again more than three times the rate in light trucks (6.88 percent) than in passenger cars (1.87 percent).

FARS data for 1995 through 1998 show that 1.10 percent of all light vehicles in fatal crashes were coded with tire problems. Light trucks had slightly higher rates of tire problems (1.20 percent) than passenger cars (1.04 percent). The annual average number of vehicles with tire problems in FARS was 535 (313 passenger cars and 222 light trucks).

2. Geographical and Seasonal Effects

The agency further examined the FARS data to determine whether heat is a factor in tire problems. We examined two surrogates for heat: (1) The region of the U.S. in which the crash occurred, and (2) the season in which the crash occurred. The highest rates of tire problems occurred in light trucks in southern states in the summertime, followed by light trucks in northern states in the summertime, and then by passenger cars in southern states in the summertime. The lowest rates occurred in winter and fall.

GEOGRAPHICAL AND SEASONAL ANALYSIS OF TIRE PROBLEMS (PERCENT OF VEHICLES) IN FARS WITH TIRE PROBLEMS

	Passenger cars (percent)	Light trucks (percent)	All light vehicles (percent)
Northern States:			
Winter	1.01	0.80	0.94
Spring	1.12	1.01	1.08
Summer	0.98	1.46	1.15
Fall	1.04	0.93	1.00
Southern States:			
Winter	0.87	0.99	0.92
Spring	1.09	1.27	1.16
Summer	1.31	1.99	1.59
Fall	0.89	1.07	1.00

Winter = December, January, February; Spring = March, April, May; Summer = June, July, August; Fall = September, October, November.
Southern States = AZ, NM, OK, TX, AR, LA, KY, TN, NC, SC, GA, AL, MS, and FL; Northern States = all others.

Based on these data, tires on light trucks appear to be more affected by higher ambient temperatures than tires on passenger cars.

3. Tire Problems by Tire Type and Light Truck Type

The agency also examined tire problems in the NASS–CDS from 1992 to 1999 by types of light trucks and vehicle size to determine whether LT tires used on light trucks exhibited more problems than P-metric tires. LT tires are used on vehicle classes identified for this analysis as Van Large B and Pickup Large B groups of vehicles. These groups of vehicles typically represent the 3/4 ton and 1-ton vans and pick-ups. P-metric tires are used on most of the other light trucks. The data indicate that the average percentage of light trucks in the NASS–CDS having a LT tire problem is 0.84 (10/1,186), while the average percent of light trucks having a P-metric tire problem is 0.47 percent (53/11,226).

potential magnitude of the tire problem in fatal crashes, it can neither be considered the lowest possible number because the tire might not have caused the crash, nor the highest number of cases because not all crashes with tire problems might have been coded by the police.

TIRE PROBLEMS BY LIGHT TRUCK VEHICLE TYPE 1992 TO 1999 NASS–CDS UNWEIGHTED DATA[9]

Light truck type	No. of cases with a tire problem	Total No. of cases	Percent of cases with a tire problem
Van—Compact	11	2,125	0.52
Van—Large A	3	431	0.70
Van—Large B	4	501	0.80
Pickup—Compact	13	3,155	0.41
Pickup—Large A	7	1,849	0.38
Pickup—Large B	6	685	0.88
SUV—Compact	16	3,147	0.51
SUV—Large	3	519	0.58
Total	63	12,412	0.51

The Van—Large A group includes vehicles such as the Ford Econoline 150.
The Van—Large B group includes vehicles such as the Ford Econoline 250/350.
The Pickup—Large A group includes vehicles such as the Ford F 150.
The Pickup—Large B group includes vehicles such as the Ford F 250/350.

These larger Pickups and vans, however, are also vehicles that carry heavier loads and are more likely to be more overloaded than lighter trucks. In addition, these heavier vehicles are often used at construction sites and may be more apt to encounter nail punctures and experience flat tires. Thus, there may be usage issues that increase the percentage of tire problems for these larger trucks, rather than exclusively a qualitative difference between P-metric and LT tires.

4. Crashes Indirectly Caused by Tire Problems

While the agency has not attempted to estimate the extent to which improved tires would reduce the chance of having a flat tire it has looked at crashes indirectly caused by or involved with tire problems.

The agency has identified several types of such crashes. For instance, if a driver stops his vehicle on the side of the road due to a flat tire, curious passing drivers often slow down to view the incident. This can cause congestion, potentially resulting in a rear impact involving two or more of the passing vehicles toward the rear of the congested traffic. Another crash type indirectly caused by tire problems involves tire repair on the shoulder of the road. Sometimes drivers repairing tires or seeking assistance due to tire problems are struck, as pedestrians, by other vehicles. These phenomena are not captured in NHTSA's data files. However, Pennsylvania, Washington, and Ohio have data files that allow for combining and search for codes for this phenomena; for instance, searching simultaneously for ''Flat tire or blowout'' and ''Playing or working on a vehicle'' and ''Pedestrians.'' Our examination of these files for calendar year 1999 for Ohio and Pennsylvania and 1996 for Washington showed the following information:

STATE DATA ON TIRE PROBLEMS AND PEDESTRIANS

	Ohio	Washington	Pennsylvania
Pedestrians Injured	3,685	2,068	5,226
Pedestrians Injured While Playing or Working on Vehicle	50 (1.4%)	27 (1.3%)	56 (1.1%)
Pedestrians Injured While Working on Vehicle with Tire Problem	0	2	0
Total crashes	385,704	140,215	144,169

The combined percentage of total crashes with tire problems in these three states (3,100/670,088 = 0.46) is consistent with the NASS–CDS data percentage of 0.51 percent. The portion of pedestrians coded as being injured while working on a vehicle with tire problems is 2/10,979 = 0.018 percent. Applying this to the estimated number of pedestrians injured annually across the U.S. (85,000 from NASS–GES) results in an estimated 15 pedestrians injured per year. The agency, however, does not have data to estimate how many pedestrian injuries could be reduced by having better tires.

C. Implications of Changes in U.S. Light Vehicle Market

Sales of light trucks have risen steadily for over the past 20 years and now account for almost half of the U.S. light vehicle market—more than twice their market share as recently as 1983. (*Industries in Transition*, 1/01/00; *Journal of Transportation and Statistics*, December 2000.) While 9.0 million passenger cars were sold in 2000, the consumer preference for light truck vehicles continued to grow, with sales reaching approximately 8.4 million units, just short of parity with passenger car sales. (*Automotive News 2001 Market Data Book*). According to analysts and manufacturers, sales of light trucks are expected to surpass sales of cars by approximately 100,000 units this year and the light truck segment is likely to reach ''around 60%'' before stabilizing. (*Auto & Truck Manufacturers Industry Report*, 5/15/00).

In addition to purchasing more SUVs, Americans have shifted toward a significantly higher use of minivans, pickup trucks, and SUVs for personal travel. (*Journal of Transportation and Statistics*, December 2000). The 1995 Nationwide Personal Transportation Survey (NPTS) data set suggests that the average light duty truck (LDT) (pickup trucks, SUVs, and minivans) is used over longer distances and with more people aboard than passenger cars.[10] Additionally, SUVs are popular for long distance weekend travel.

Approximately 90 percent of these light trucks use passenger car (P-metric) tires. The other 10 percent use load range C, D, or E tires which are LT tires and are typically used on heavier light trucks with a gross vehicle weight rating (GVWR) between 6,000 and 10,000 pounds.[11] Sales growth of heavier light trucks, those that have GVWRs above 6,000 pounds, increased at a much faster rate than their lighter counterparts, with larger SUVs (6,000–10,000 pounds GVWR) showing an average increase of 38 percent annually between 1990 and 1998.

V. Agency Response to Safety Problem

A. Relationship Between TREAD Act and Tire Harmonization (Work in UN/ECE's World Forum for Harmonization of Vehicle Regulations (WP.29))

Prior to this rulemaking, NHTSA embarked on a program of global harmonization for light vehicle tire standards under the auspices of the United Nations/Economic Commission for Europe's (UN/ECE) World Forum for Harmonization of Vehicle Regulations (WP.29).[12] NHTSA, within the WP.29's Working Party on Brakes and Running Gear (GRRF),[13] has been working cooperatively with other countries to develop a global tire standard that could better assess the safety performance of modern tires.

In July 1999, NHTSA participated in a GRRF meeting in London, England which initiated deliberations to develop a global technical regulation for tires with other countries. An industry developed standard, Global Tire Standard 2000 for New Pneumatic Car Tires (GTS–2000),[14] was used as a basis for initial discussions on harmonization at that meeting. GTS–2000 would substitute a single high-speed test for the four performance tests in FMVSS No. 109 for most radial tires.[15] More specifically, GTS–2000 would replace the current FMVSS No. 109 high speed test with the high-speed test required by ECE–R30 (the European tire regulation for tires used on light passenger vehicles), including temporary spares. It would also limit the application of the other three tests currently required by FMVSS No. 109, namely the strength test, the bead unseating test, and the endurance test, to bias tires and low speed rated radial tires because industry believes that these three tests have relevance to bias and bias-belted tires, but little, if any, relevance to radial tires, with the single exception of the endurance test for low speed (160 km/h/99 mph, or less) radial tires.

Since the July 1999 meeting, the GRRF has been considering a draft global technical regulation (GTR). Prior to the enactment of the TREAD Act, tentative consensus within an ad hoc tire harmonization working group of the GRRF concerning the draft GTR had been reached on the following issues: (1) To adopt the ECE R30 high speed test methodology[16] in place of the FMVSS 109 high speed test, (2) to keep the current FMVSS 109 resistance-to-bead unseating test until NHTSA develops an alternative that is more appropriate for radial tires, and (3) to develop an optional requirement for testing wet grip. Other issues also under discussion in the ad hoc group prior to the TREAD Act included: (a) the U.S.'s suggestion to lower the inflation pressures in and increase the duration of the high speed test (current ECE R30 test), (b) the U.S.'s suggestion to agree on the need for tire labeling requirements that are unique to the U.S., such as maximum inflation pressure, and UTQG consumer information, (c) the U.S.'s suggestion to identify requirements that should be included as optional requirements, (d) assigning to the UN the responsibility for tire plant code registration for a global standard, and (e) the U.S.'s suggestion to increase the ambient temperature for the high speed test.

In a February 2001 submission to the docket (Docket No. NHTSA–2000–8011), the Chairman of the GRRF Tire Harmonization Working Group recommended on behalf of the GRRF that NHTSA adopt a draft text that reflects the current state of deliberations for developing a harmonized tire standard.

B. Submissions to NHTSA Tire Upgrade Docket (Docket No. NHTSA–2000–8011)

In September 2000, NHTSA opened a docket, NHTSA–2000–8011, entitled ''Tire Testing—Federal Motor Vehicle Safety Standard (FMVSS 109).'' The purpose of this docket was to collect tire test data and receive feedback on its high speed and endurance performance testing matrices.

As of the issuance of this document, comments and recommendations from 7 entities have been received in the docket. Substantive comments and recommendations in response to NHTSA's testing matrices are discussed below. Additionally, Toyota Motor Company (Toyota) submitted a copy of its Air Loss Test Procedure.

[10] Passenger cars average 12,258 miles per year during the first 6 years after purchase, while light trucks average 12,683 miles per year during the same time period. NPTS data also indicates that minivans make the most person-trips per day, followed by SUVs, passenger cars, and finally pickups. SUVs are estimated to make, on average, 4.6% more person-trips per day than passenger cars.

[11] The net impact on original equipment passenger car tire shipments in 1999 reflects an increase of 3.9 million units for a record total of 61 million units, or a 6.8 percent growth over 1998's figure of 57.1 million units. Continued growth in the sales and production of light truck vehicles also drove the number of original equipment light truck (LT) tires to a record high of approximately 8.4 million units or a 25.2 percent increase over 1998's figures. (*RMA 2000 Yearbook*)

[12] Formerly, ''Working Party on the Construction of Vehicles (WP.29).'' The Forum's website is http://www.unece.org/trans/main/welcwp29.htm

[13] The GRRF is a Working Party within WP.29 which is responsible for developing draft global technical regulations on brakes, tires, wheels, and other chassis components of motor vehicles.

[14] On January 25, 1999, the Rubber Manufacturers Association (RMA), along with five other petitioners, submitted a petition requesting the agency to begin a rulemaking proceeding to amend FMVSS No. 109 by adopting a new standard. According to the petitioners, GTS–2000 is a suggestion for a harmonized standard that the tire industry believes incorporates the best safety practices, including those from the U.S., Europe, Japan, China, and Australia. On June 8, 1999, NHTSA granted this petition.

[15] As described by RMA, GTS–2000 lists the following test criteria: (1) Physical dimensions for overall width and outer diameter; (2) strength test (plunger energy) for bias ply and bias-belted tires; (3) bead unseating resistance tests for bias-ply and bias-belted tires; (4) low speed (not less than 50 mph) endurance tests for bias-ply and bias belted tires plus all radial tires with a speed symbol of Q or below; and (5) high speed endurance tests for all tires (bias-ply, bias-belted, and radial). In addition, it contains labeling requirements covering tire pressure, load rating and tire construction.

[16] The ECE Regulation 30 includes a single performance requirement, the high speed test, which is conducted at a speed close to and up to the rated speed of the tire. The methodology used in ECE R30 and suggested by the tire industry in GTS–2000 for tire harmonization determines the test speed based on the tire's speed symbol rated speed. The following chart illustrates the rated speed in km/h for each speed symbol.

Speed symbol and Rated Speed—km/h:

F—80
G—90
J—100
K—110
L—120
M—130
N—140
P—150
Q—160
R—170
S—180
T—190
U—200
H—210
V—240
W—270
Y—300
ZR—>300

These speeds range from a minimum of 140 km/h (88 mph) to 300 km/h (188 mph) for W, Y categories. The total test time is 50 minutes. The inflation pressures for the ECE R30 high speed test are typically much higher than those recommended by vehicle manufacturers for vehicle operation.

1. RMA December 2000 Testing Protocol

In December 2000, RMA presented to NHTSA a test protocol (RMA 2000) that was designed and administered with the participation of the following tire companies: Bridgestone/Firestone, Continental/General, Cooper Tire and Rubber, Michelin, Goodyear, Pirelli, Yokohama. The test protocol is divided into the following principal parts: Passenger Car Tire High Speed, Passenger Car Tire Endurance, Light Truck High Speed, and Light Truck Tire Endurance. One hundred thirty-two tests on approximately 900 tires were included in this protocol. A brief summary of RMA 2000's conclusions and recommendations are discussed below.

a. Passenger Tires—High Speed Test

RMA 2000 concluded that

[t]he SAE test [J1561] conditions were found to be the most consistent discriminators required for completion of the rated speed within the customary one-hour duration.[17] Test inflation pressure had the greatest effect in determining completion of the rated speed. Maximum load was also shown to have an effect on performance, although not as great as inflation.

RMA 2000 recommended that the agency revise the High Speed Performance test in FMVSS No. 109 to reflect the conditions found in SAE J1561:

(1) Test speed and duration: (Initial Test Speed (ITS) = Tire's rated speed minus 40 km/h), 6 speed steps, each 10 min in duration: (1) 0 to ITS, (2) ITS, (3) ITS + 10 km/h, (4) ITS + 20 km/h, (5) ITS + 30 km/h, (6) ITS + 40 km/h.[18]

(2) Inflation pressures (kPa): 240 for speed rating through N, 260 for P, Q, R, & S, 280 for T, U, & H, 300 for V & Z, 320 for W & Y.

(3) Load and ambient temperature: 80 percent of maximum rated load, 38°C ± 3°C.

b. Passenger Tires—Endurance Test

RMA concluded that ''the results seem to indicate that speed, followed closely by inflation pressure, are key determinants affecting the number of hours to failure.''

RMA recommended revising the Endurance test in FMVSS No. 109 to include the following parameters:

(1) Inflation pressure: 180 kPa.

(2) Test speed: constant at 120 Km/h.

(3) Duration and load: 8 hours at 85 percent of maximum rated load, 8 hours at 90 percent of maximum rated load, 8 hours at 100 percent of maximum rated load.

(4) Ambient temperature: 38°C ± 3°C.

c. Light Truck Tires—High Speed Test

RMA concluded that

[f]or load range C tires an analysis of the results shows the maximum load conditions of 90 percent to be more realistic than the 80 percent. Also, it appears that the inflation pressure of 350 kPa is the most suitable for this test. For load range E tires the data showed that conditions of 90 percent maximum load and 550 kPa pressure, while not particularly discerning for the Q speed rated tires did become much more rigorous for the R speed rated tires (no S rated tires were included in the load range E tests).

RMA recommended that NHTSA incorporate a test similar to SAE J1633 or ISO 10454 into its light truck tire standard, using maximum inflation pressure, limited to tires marked ''LT'' or ''C'' and load range A–E or Load Index 124 or below. The parameters are as follows:

(1) Speed and duration (ITS = Tire's rated speed −20 km/h): 3-speed steps: 0 to ITS for 10 min, ITS for 10 min, ITS + 10 km/h for 10 min, ITS + 20 km/h for 30 min.

(2) Inflation pressure corresponding to maximum load.

(3) Load: 90 percent of maximum.

(4) Ambient temperature: 38°C +/−3°C.

d. Light Truck Tires—Endurance Test

RMA 2000 concluded that

[a]s with passenger car endurance tests, speed is deemed to be the greatest determinate of tire failure, followed closely by inflation pressure * * * In the FMVSS 119 test it wasn't until load limits became unrealistically high that tires begin to fail. However, in the four test protocols using combinations of the test conditions cited above, average hours to failure were more realistically demonstrated when testing at 120 km/h using the inflation pressures corresponding to the maximum load rating marked on the tire (350 kPa for load range C, and 550 kPa for load range E).

RMA 2000 recommended revising the light truck tire standard to include the following test parameters:

(1) Inflation pressure: at pressure corresponding to the maximum load rating marked on the tire.

(2) Speed: constant at 120 Km/h.

(3) Duration and load: Load range A, B, C, & D for 8 hours at 75 percent of maximum rated load, 8 hours at 97 percent of maximum rated load, and 8 hours at 114 percent of maximum rated load. Load Range E for 8 hours at 70 percent of maximum rated load, 8 hours at 88 percent of maximum rated load, and 8 hours at 106 percent of maximum rated load.

(4) Ambient Temperature: 38°C +/−3°C.

2. Other Substantive Submissions

In February 2001, Michelin presented its suggested Endurance Certification Test to NHTSA. This is an endurance test for long term durability, which evaluates the following factors: belt edge stress, long-term cyclic fatigue and compound evolution. The following table illustrates the parameters of this test:

	Metric passenger car		Light truck			
			Load range			
	Standard load	Extra load	B	C	D	E
Test Temperature (°F)	100+/−5		100+/−5			

[17] The SAE J1561 Test parameters, which are also consistent with International Standards Organization (ISO) 10191 testing conditions, are as follows:

(1) Test speed and duration: (ITS = Tire's rated speed minus 40 km/h), 6 speed steps, each 10 min in duration: (1) 0 to ITS, (2) ITS, (3) ITS + 10 km/h, (4) ITS + 20 km/h, (5) ITS + 30 km/h, (6) ITS + 40 km/h.

(2) Inflation pressure: 240, 260, 280, 300, or 320 kPa based on speed rating.

(3) Load: 80 percent.

(4) Ambient Temperature: 38° C.

[18] The following chart illustrates the rated speed in km/h for each speed symbol. ''ZR'' is an open ended speed category for tires with a maximum speed capability above 240 km/h, but is also used specifically for tires having a maximum speed capability above 300 km/h.

Speed symbol and rated speed—km/h:

F—80
G—90
J—100
K—110
L—120
M—130
N—140
P—150
Q—160
R—170
S—180
T—190
U—200
H—210
V—240
W—270
Y—300
ZR—> 300

	Metric passenger car		Light truck			
			Load range			
	Standard load	Extra load	B	C	D	E
Speed (mph)	60		60			
Filling Gas	$50\%O_2/50\%N_2$		$50\%O_2/50\%N_2$			
Load (lbs)—% Max Single	111		142	112	98	92
Initial Pressure (psi)—Regulated	40	46	57	57	65	80
Regulated						

In May 2001, Michelin supplemented its requested endurance test with a discussion of the influence of its long term durability endurance test variables on tire endurance and crack propagation.

Michelin has also recommended replacing the current high speed test with ISO 10191. ISO 10191 contains test variables substantially similar to those in SAE J1561 and those recommended by RMA 2000 for the high speed test for passenger tires.

In a November 2000 submission to the docket, GM provided the following general comments on the first phase of NHTSA's tire testing matrix: (1) Increased high speed capability will result directly in compromises with mass, fuel economy (rolling resistance) and ride comfort, (2) correlation of laboratory tests with performance of tires in the field environment is necessary and tires with known acceptable field performance should serve as reference to acceptable performance on such laboratory tests, (3) tests that take the tire to failure can always be developed but may not indicate poor performance and tire failures on these tests should not be interpreted as an indication of unacceptable performance, (4) the definition of failure for these tests should be clarified, and (5) it is recommended that temperature monitoring be included in the testing.

GM also submitted a number of comments on NHTSA's test matrices. These comments, specific to NHTSA's preliminary test parameters, are not discussed in detail here, but are available for review in the docket.

C. NHTSA Tire Testing at Standards Testing Lab (STL)

Shortly after the enactment of the TREAD Act, the agency initiated tire testing at Standards Testing Labs (STL) in November 2000 to evaluate the high-speed performance, endurance performance, and low inflation pressure performance of a limited number of current production tires. The agency developed a test matrix which focused on the five main parameters currently used in tire testing under FMVSS Nos. 109 and 119: load, inflation pressure, speed, duration, and ambient temperature. Copies of the test matrix and testing results for P-metric tires and for LT tires is available in the docket (see the Tire Test Matrix in NHTSA Docket No. 2000–8011–1).

1. High Speed Testing

The high speed tests included a wide range of values for the test parameters to facilitate evaluation of the performance of a variety of tires used on light vehicles. A baseline high speed test was performed on each of the tire brands using the GTS–2000 high speed test for P-metric tires and FMVSS No. 109 for the LT tires.[19]

The Phase I test matrix included loads of 80, 90, and 100 percent[20]; inflation pressures of 180 kPa, 210 kPa and 240 kPa; durations at each speed step of 10 minutes, 20 minutes and 30 minutes; and four speeds steps beginning at an initial test speed (ITS) 30 km/h below the rated speed of the tire, and increasing in 10-km/h increments up to the rated speed (ITS + 30km/h). Some tests were conducted to failure, beyond the rated speed of the tires, to assess the performance margin for the tires. In this phase of testing, nine P-metric tire brands and three LT tire brands were tested using 28 tires per brand, one tire for each of the 28 high speed tests performed. The total number of tires tested to the high speed test in this phase was 336 tires.

The test results from the Phase I tests show that all but one of the tires completed the baseline high speed tests up to their rated speed without failure. The results of the matrix tests indicate that all the parameters have an impact on tire failure in the high-speed test; however, a decrease in inflation pressure appeared to have the greatest impact on time to failure in the high-speed test. For example, at an inflation pressure of 180 kPa using 20-minute speed intervals, the results of the P-metric tire tests indicate 3 of 9 tire failures, while at 240 kPa, under similar test conditions, all 9 tires completed the high speed test. The data also indicate that RMA 2000's suggested 10-minute test duration at each speed appears to be too short to properly evaluate the high speed performance of a tire. In the agency's testing, few failures occurred at the 10-minute steps, and all tires tested were able to complete many of the tests conducted using 10-minute speed intervals. In general, the most stringent mix of parameters was 100 percent load, low inflation pressure of 180 kPa, combined with the longest test duration for each speed step, 30 minutes. This test condition resulted in only one of nine P-metric tires completing the high speed test. A similar test condition for the test on three LT tires resulted in one tire completing the high speed test. The agency notes that these severe test conditions enabled us to evaluate the high speed performance limits of some current production tires.

The agency conducted additional high speed testing using a Phase II matrix. This second phase of the high-speed testing included 12 tire brands (8 P-metric and 4 LT tires) with a sample of five tires per test per brand. The test parameters included loads at 80 and 85 percent; inflation pressures at 210 kPa and 220 kPa; duration of 20 minutes; and speeds similar to the ITS plus 10, 20, 30 km/h method used in Phase I, and also three fixed speeds of 160, 170, and 180 km/h for 30 minutes at each speed step. For the LT tires tested to the high-speed test, the parameters were similar as those used for P-metric tires, except that the inflation pressures were changed to reflect the higher maximum inflation pressures on those tires.

The test results from the second phase testing demonstrated that there is variability in the manufacturing quality of tires since a mix of passes and failures occurred within the 5 samples tested for each brand.

2. Endurance Testing

The endurance testing was also comprised of two phases of matrix testing. The baseline endurance test used for the P-metric tires was the one

[19] LT tires were not included in GTS–2000 nor are they required to comply with the high speed test in FMVSS No. 119.

[20] As stated earlier in this document, load percentages, unless otherwise specified, are based on the sidewall maximum rated load.

in GTS–2000 for radial tires rated ''Q'' or below. For LT tires, the FMVSS No. 119 endurance test was used as the baseline. The agency also conducted endurance testing with load combinations of 100/115/125 percent load, test speeds of 120 and 140 km/h, inflation pressures of 160 kPa and 200 kPa for P-metric tires, and for a duration of 50 hours. Similar parameters were used for LT tires, except with different inflation pressures since these tires have higher maximum inflation pressures than P-metric tires.

All the tires completed the baseline endurance tests without any failures. The results of the matrix tests for endurance indicate that the higher test speed, 140 km/h, had a large impact on the time to failure, even at the higher inflation pressure of 200 kPa. The high load percentages also contributed significantly to the short time to failure, especially for some of the LT tires.

The second phase of the endurance testing included test parameters closer to those that the agency is proposing in this NPRM. The parameters were as follows: lower loads of 100/110/115 percent combined with a test speed of 120 km/h at 180 kPa inflation pressure for a duration of 50 hours; higher loads of 100/115/125 percent combined with a lower test speed of 100 km/h at 180 kPa inflation pressure for 50 hours.

The results of the second phase of endurance testing indicate that fewer failures occurred in Phase II testing with the combination of high load (100/115/125 percent) and lower speed (100 km/h) than under the parameters of Phase 1 testing. In Phase 2, 7 of the 8 P-metric tires completed the test without any failures in any of the 5 samples of each brand tested. The 4 LT tires tested also performed well with one failure in the five samples in 3 of the 4 brands tested. One brand completed the test with all 5 tires completing the 50-hour test. The test conditions that produced the most failures in the P-metric tires were the higher load combinations at 120 km/h. These conditions, surprisingly, did not produce many failures in the LT tires tested.

3. Low Inflation Pressure Testing

The agency also conducted a test at low inflation pressures (140 kPa (20 psi) inflation pressure for P-metric tires), at a speed of 120 km/h (75 mph) for a duration of 90 minutes, on the same tires (2 samples of each of the 12 brands) that successfully completed the endurance test. The purpose of this test was to evaluate tire performance at a low inflation pressure threshold level, 20 psi, being proposed for tire pressure monitoring systems for light vehicles.[21] Similar tests were performed using the LT tires, but at low inflation pressures values commensurate with 58 percent of their maximum inflation pressure. These low threshold values were selected based on the lowest inflation pressure at which a tire load is provided by the tire industry standardizing bodies. The test results indicate that all 24 tires tested completed the 90 minute test low inflation pressure test without failure.

4. Conclusions From Testing Results

In summary, the results of the high speed and endurance tests indicated that the agency can develop and propose test requirements that are realistic in terms of the test parameters, yet more stringent than the current FMVSS No. 109, FMVSS No. 119 requirements, European Regulation ECE R 30, GTS 2000, and RMA 2000. The proposed test requirements differentiate tires with better high speed and endurance performance from those with lesser performance. The low pressure validation tests indicate that tires that were able to successfully complete the endurance testing can also complete an additional 90-minute test at a low inflation pressure, 140 kPa for P-metric tires, thus providing an adequate safeguard for consumers to take corrective action when the low pressure warning lamp proposed under the tire pressure monitoring system rulemaking is activated at a ''significantly'' under-inflated level.

VI. Agency Proposal

A. Summary of Proposal

The agency is proposing a single standard for light vehicle tires, FMVSS No. 139, New Pneumatic Tires for Light Vehicles, which would require light vehicle tires to meet a high-speed test, an endurance test, a low inflation pressure performance test, a resistance-to-bead unseating test, a road hazard impact/strength test, and an accelerated aging test. This standard would require tires for passenger cars, multipurpose passenger vehicles, trucks, buses and trailers with a gross vehicle weight rating (GVWR) of 4,536 kilograms (10,000 pounds) or less, manufactured on or after November 1, 2003, to comply with the test requirements. Therefore, this proposal is applicable to LT tires up to load range E.[22] The following chart compares the types of test requirements that currently exist, those that have been suggested by third parties, and those are being proposed by this agency:

TABLE 1.—COMPARISON OF TYPES OF TIRE PERFORMANCE REQUIREMENTS IN VARIOUS EXISTING AND DRAFT TIRE STANDARDS

Tests	FMVSS 109	FMVSS 119	GRRF Draft GTR	GTS–2000	RMA 2000	ECE R30	Proposed FMVSS 139
High Speed	X	....	X*	X†	X	X	X
Endurance	X	X	X*	X**	X	....	X
Low pressure performance	....	....	....	....	....	....	X
Strength; or Road Hazard Impact	X	X	....	....	....	....	X
Bead Unseating	X	....	X***	....	....	....	X
Accelerated Aging	....	....	....	....	....	....	X

* Endurance test for radial tires rated ''Q'' and below. Identical testing parameters as FMVSS No. 109 Endurance Test.
** Endurance test for radial tires rated ''Q'' and below.
*** Identical testing parameters as FMVSS No. 109 Bead Unseating Test.
† Testing parameters have not been agreed upon by the ad hoc working group.

[21] In its recent TPMS NPRM, Docket No. NHTSA–2000–8572, the agency proposed two options for activation of the warning lamp: 1) 20 percent below the recommended cold inflation pressure or 140 kPa (20 psi) whichever is higher; and 2) 25 percent below the recommended cold inflation pressure or 140 kPa (20psi), whichever is higher.

[22] This load range is typically used on large SUVs, vans, and trucks.

Both the proposed High Speed Test and the Endurance test contain testing parameters (ambient temperature, load, inflation pressure, speed, and duration) that make the tests more stringent than those tests currently found in FMVSS Nos. 109 and 119, as well as the tests suggested by industry. Most significantly, the proposed High Speed test specifies test speeds (140, 150 and 160 km/h (88, 94, and 100 mph)) substantially higher than those specified in FMVSS No. 109 (120, 128, 136 km/h (75, 80, 85 mph)). Likewise, the proposed Endurance Test specifies a test speed 50% faster (120 km/h (75 mph)) than that currently specified in FMVSS 109 (80km/h (50 mph)), as well as a duration 6 hours longer (40 hours total) than that currently specified in FMVSS 109 (34 hours total). At the specified test speed (120 km/h), the Proposed Endurance Test mileage (3,000) is almost double the mileage that a tire endures under the current Endurance Test (1,700 miles at 80 km/h).

The proposal also contains two alternative Low Inflation Pressure tests which seek to ensure a minimum level of performance safety in tires when they are underinflated to 140 kPa. The agency requests comments on which test is more appropriate to be included in the new standard.

In place of the current strength test in FMVSS No. 109, the agency proposes that the new standard contain a Road Hazard Impact test which is modeled after a SAE recommended practice. This test, which simulates a tire impacting a road hazard, such a pothole or curb, provides both a more stringent and more real world test than the FMVSS No. 109 ''plunger test.''

The proposal would also replace the current FMVSS No. 109 Bead Unseating Test with a new Bead Unseating test which is based on a test currently used by Toyota. Industry has previously recommended to the agency that the current bead unseating test be deleted from the standard because radial tires are easily able to satisfy the test. Results from the agency's 1997–1998 rollover testing, however, provide a strong rationale for upgrading, rather than deleting, the bead unseating requirement in FMVSS No. 109. The Toyota test uses test forces more stringent than those in current FMVSS No. 109 which were developed for bias ply tires and are typically not stringent enough for radial tires.

To address the deterioration of tire performance caused by aging, the proposal contains three alternatives for an Aging Effects Tests. These tests, the Adhesion (Peel) Test, Michelin's Long-term Durability Endurance test, and Oven Aging all seek to expose tires to the type of failures experienced by consumers at 40,000 kilometers or beyond. The agency requests comments on which test is most appropriate to be included in the new standard.

The proposal would also revise FMVSS Nos. 110 and 120 to reflect the applicability of the new standard and would revise certain of the tests in FMVSS Nos. 117 and 129 to ensure that all light vehicle tires are required to comply with the identical minimum performance requirements. Lastly, the proposal discusses NHTSA's ongoing and future Road Hazard Impact Test and Bead Unseating Test research plans, the lead time for implementation of the new tire standard, the use of shearography analysis, and the revision of the requirements for the test speeds in UTQG Temperature Grading Requirement to mirror those in the proposed High Speed Test.

NHTSA believes that the proposed upgraded standard would specify more stringent and real-world, yet practicable, tests that would provide a higher level of operation safety and performance for tires on today's light vehicles.

B. Applicability

FMVSS No. 139 would apply to new pneumatic tires for use on motor vehicles with a GVWR of 10,000 pounds or less, manufactured after 1975, except for motorcycles. Given the increasing consumer preference for light truck use for passenger purposes, the agency is proposing that the safety requirements for passenger car tires also be made applicable to LT tires (load range C, D, and E) used on light trucks.

Currently, the performance requirements for LT tires in FMVSS No. 119 are less stringent than the requirements for P-metric tires in FMVSS No. 109. LT tires are required to comply with a strength test and a low speed endurance test, but are not required to be tested to a high speed performance test or a resistance-to-bead unseating test as required under FMVSS No. 109. However, LT tires are increasingly used in the same type of on-road service as P-metric tires on light vehicles. Further, recent sales data for heavier light trucks indicate that the use of these tires on passenger vehicles will continue to increase in the near future.

NHTSA is not proposing to require that FMVSS No. 139 apply to motorcycle tires because motorcycle tires are of a design and construction unlike the types of vehicle tires that would be subject to the proposed standard (*e.g.,* tread, load carrying capacity) and motorcycle tires still often use inner tubes. Further, the agency is not currently aware of any safety problems associated with motorcycle tires.

NHTSA is also not proposing to require that the new standard be applicable to tires beyond load range E, which are typically used on medium (10,001–26,000 lbs. GVWR) and heavy (greater than 26,001 lbs. GVWR) vehicles, and temporary spare tires,[23] for two reasons. This rulemaking is required by the TREAD Act, and must be completed by June 2002. To meet this statutory deadline, the agency has limited its tire upgrade research and analysis to conventional tires for light vehicles. The issues associated with upgrading performance standards for tires on medium and heavy vehicles and temporary spare tires are different from the issues associated with upgrading performance standards for conventional tires on light vehicles. For example, medium and heavy vehicles are equipped with tires that are much larger and have higher pressure levels than the tires used on light vehicles. Temporary spare tires are smaller, have higher inflation pressures, and are intended for shorter distance and lower speed driving than conventional light vehicle tires. Given the TREAD Act deadline on this rulemaking, the agency does not have the time to study and analyze sufficiently the different issues presented by medium and heavy vehicle tires and temporary spare tires. NHTSA will examine these types of tires after we have completed this rulemaking.

C. Proposed Test Procedures

1. High Speed Test

NHTSA proposes that the High Speed test be conducted using the following five parameters:

(1) *Ambient Temperature:* 40°C (104°F).

(2) *Load:* 85 percent.

(3) *Inflation Pressure:* 220 kPa (32 psi) for standard P-metric tires; 320 kPa (46 psi), 410 kPa (60 psi), 500 kPa (73 psi), for LT tires load range C, D and E, respectively.

(4) *Speed:* 140, 150, 160 km/h (88, 94, 100 mph).

(5) *Duration:* 30 minutes for each speed.

A tire complies with the proposed requirements if, at the end of the high speed test, there is no visual evidence of tread, sidewall, ply, cord, inner liner, or bead separation, chunking, broken cords, cracking, or open splices, and the

[23] For the purposes of this notice, a temporary spare tire is a compact tire intended for temporary use. It is typically labeled for limited durations and speeds.

tire pressure is not less than the initial test pressure.

The agency proposes a high speed test with three pre-selected speeds. This testing methodology is different from that in two alternatives which were considered by the agency: (1) GTS–2000, and (2) a high speed test using identical parameters to those proposed above, except that the test speeds are based on the rated speed of the tire (initial test speed (ITS), ITS + 10, ITS + 20, ITS + 30) for durations of 20 minutes at each speed step with a 10-minute warm-up from 0 km/h-ITS.[24]

The methodology suggested by the tire industry in GTS–2000 for tire harmonization and the second alternative determines the test speed based on the tire's speed symbol rated speed. The following chart illustrates the rated speed in km/h for each speed symbol.

Speed symbol	Rated speed—km/h
F	80
G	90
J	100
K	110
L	120
M	130
N	140
P	150
Q	160
R	170
S	180
T	190
U	200
H	210
V	240
W	270
Y	300
ZR	> 300

The initial test speed (ITS) in GTS–2000 is the rated speed of the tire minus 40 km/h. The test is conducted at the following speed steps: ITS, ITS+10 km/h, ITS+20 km/h, ITS+30 km/h and ITS+40 km/h. The final speed step, ITS+40 km/h, is identical to the rated speed of the tire. Similarly, the ITS in the second alternative is the rated speed of the tire minus 30 km/h. The test is conducted at the following speed steps: ITS, ITS+10 km/h, ITS+20 km/h, and ITS+30 km/h, with the final speed step being identical to the rate speed of the tire. Therefore, under both alternatives, each tire with a different speed rating is tested at different speeds during the high speed test.

Historically, the agency establishes uniform minimum performance requirements for its safety standards for the item of motor vehicle equipment. Testing for compliance using the tire's rated speed differs from that philosophy since it does not establish a single absolute minimum requirement for all tires, but establishes a relative requirement based on each tire's maximum design capabilities.

The agency's proposal, based on pre-selected test speeds and independent of the rated speed of the tire, establishes the same minimum requirement for all tires, regardless of the designed level of performance. We believe that such a methodology is equitable for all tire manufacturers and does not impose higher safety standard requirements on a tire with a higher level of performance.

The following table illustrates an at-a-glance comparison of the other standards and suggestions discussed in this document.[25]

TABLE 2.—HIGH SPEED TEST COMPARISON

Test parameters	FMVSS 109	GTS 2000	RMA 2000	ECE 30	Proposed FMVSS 139
Ambient (°C)	38	25	38	25±5	40
Load (%):					
P-metric	88	80	80	80	85
LT			90		
Inflation Pressure (kPa):					
Standard load P-metric	220				220
Extra load P-metric	260				260
LT load range C/D/E			sidewall max		320/410/500
SpeedRating (Std/Extra):					
L,M,N		240/280	240/280		
P,Q,R,S		260/300	260/300	260/300	
T,U,H		280/320	280/320	280/320	
V		300/340	300/340	300/340	
W,Y		320/360	320/360	320/360	
Test speed* (km/h)	120, 128, 136	0–ITS, ITS, +10, +20, +30.	0–ITS, ITS, +10, +20, +30 +40.	ITS, +10, +20, +30	140, 150, 160
Duration (mins)	90	60	60	60	90

* For GTS–2000, RMA 2000, and ECE 30, initial test speed (ITS) is defined as the tire's rated speed minus 40 km/h.

An explanation of the proposed parameters is provided below.

a. Ambient Temperature

The proposed ambient temperature is 40°C. This temperature is a slight increase over the temperature, 38°C, currently specified in FMVSS No. 109. This temperature reflects the typical daytime temperatures in the South and Southwestern regions of the U.S. during the Summer. As discussed earlier, the highest rates of tire problems occurred in the southern states in the summertime.

b. Load

The load proposed for the high-speed test is 85 percent. The load percent currently specified in FMVSS No. 109 is 88 percent. As discussed in greater detail below, decreasing the load from 88 percent to 85 percent increases the tire reserve needed by a vehicle under normal loading conditions from 12 percent to 15 percent, resulting in a larger margin of safety when a vehicle is loaded to its GVWR or its tires are underinflated.

[24] Analysis of the results of the NHTSA's high speed testing at STL indicate that less than 25 percent of the p-metric tires would have failed the second alternative (3 of 8 p-metric brands had at least one failure in the five samples tested and for LT tires there was a 5% failure rate in the 5 tire brands tested).

[25] FMVSS No. 119 does not currently include a high speed test for LT tires with a rim diameter above 14.5 inches.

Changing the load from 88 percent to 85 percent in the high speed test would affect the current requirement in S4.2.2 of FMVSS No. 110 which states that the vehicle normal load on the tire is to be no greater than the applicable load used in the high speed performance test. ''Tire reserve load'' refers to a tire's remaining load-carrying capability when the tire is inflated to the vehicle manufacturer's recommended inflation pressure and the vehicle is loaded to its gross vehicle weight rating (GVWR).[26] When a tire is loaded to 88 percent of the maximum load labeled on the tire sidewall, the unused 12 percent is considered the reserve load of the tire under normal loading conditions (curb weight of the vehicle plus three occupants in a vehicle with a designated seating capacity of five or more.) A change from 88 percent to 85 percent load on the tire for the high speed test would, in essence, require a vehicle manufacturer to increase the reserve load under normal loading from 12 percent to 15 percent. This requirement may, in turn, necessitate the use of a larger tire size on some vehicles since the load limit on existing tires may not be sufficiently high to provide a load reserve of 15 percent of the tire's maximum rated load.

In addition, the requirement for a 12 percent tire reserve under normal loading conditions currently applies only to passenger cars. This notice proposes to require light trucks for the first time to have a specified tire reserve under normal loading conditions. Light trucks would have to provide the same 15 percent reserve proposed for passenger cars.

The agency also proposes revised language in FMVSS No. 110 to clarify that the test load that is compared with the vehicle normal load must be determined at the vehicle manufacturer's recommended cold tire inflation pressure, and not at the maximum tire load limit on the sidewall. The agency believes that since the vehicle normal load defines loading during normal operation of the vehicle, it is appropriate to require the load to be determined at the vehicle's recommended cold tire inflation pressure.[27]

Although 85 percent loading for the high speed testing of tires represents a slight decrease from the current 88 percent specification in FMVSS No. 109, test data from the agency's testing and from RMA testing indicate that tire failure is more sensitive to speed and inflation pressure than to loading variations in the 80 to 90 percent range.[28] The agency believes that a speed increase from 75, 80 and 85 mph to speeds up to 160 km/h (100 mph) would contribute to a more stringent test which would more than offset a small decrease in test load requirements. In Phase I of the agency's testing, 5 of 9 P-metric tires failed at 90 percent load and 2 of 9 failed at 80 percent. Phase II of the testing included testing of 8 P-metric tire brands, 5 samples each, at 80 and 85 percent loads, and with all other test parameters remaining constant (inflation pressure-220 kPa, 20-minute steps, speeds ITS to ITS + 30 km/h). In these tests, fewer tire failures occurred at 85 percent load than at 80 percent load.[29] At 85 percent load, 5 of 8 tire brands had no tire failures in their 5 samples and the other three brands had at least one failure in the five samples. One brand experienced failures in all 5 samples tested to the high speed test. Four brands of LT tires were also tested and all samples for each of the brands completed the high speed test at 85 percent load without any failures. This testing appears to confirm that small increases in tire load have less of an impact on time to failure as compared with changes in inflation pressure and test speed.

c. Inflation Pressure

The agency proposes a test inflation pressure of 220 kPa (32 psi) for all unrated and speed rated P-metric tires and 260 kPa for extra load tires. The proposed P-metric tire pressure is the same as that specified in FMVSS No. 109. The agency proposes the following inflation pressures for LT tires based upon their higher maximum inflation pressures: 320 kPa for load range C, 410 kPa for load range D, and 500 kPa for load range E tires. During its testing, the agency incorrectly used 600 kPa as the maximum load rate inflation pressure for LT tires with load range ''E'', and calculated test pressures utilizing 600 kPa. Based on the Tire and Rim Association (T&RA) Yearbook, load range E tires have an inflation pressure of 550 kPa at its maximum load rating. Therefore, the test inflation pressures are revised accordingly.

The proposed inflation pressures are based on surveys showing that tires are typically operated at some level of underinflation.[30] Given the tire pressure survey data, the agency selected the proposed test pressures based on the level of underinflation experienced during normal vehicle operation. The 220 kPa value represents an under-inflation of 20 kPa (3 psi) or 8 percent from the 240 kPa maximum inflation pressure, and 260 kPa represents an under-inflation of 20 kPa (3 psi) or 7 percent from the 280 kPa maximum inflation pressure.

Although 220 kPa is the same test pressure specified in FMVSS No. 109, this test pressure, in conjunction with the new proposed test speeds, represents a more stringent test than that contained in FMVSS No. 109. Agency testing results indicate that 220 kPa is a test inflation pressure that would be appropriate for the high speed test given the parameters of speed, load and test duration.

RMA suggested basing the test inflation pressure on the rated speed of the tire. Tires rated P, Q, R, and S would be tested at 260 kPa; tires rated T, U, and H are tested at 280 kPa; tires rated V are tested at 300 kPa; and tires rated W, Y, and Z are tested at 320 kPa.[31] The agency believes that these inflation pressure values are too high for high speed testing because (1) they do not reflect values that are similar to the cold inflation pressures recommended by vehicle manufacturers, and (2) they do not correspond well with the real-world inflation pressures recently obtained

[26] A reserve load margin is provided by manufacturers to account for overloading of the vehicle, under-inflation of the tires, or both.

[27] Vehicle normal load on the tire means that load on an individual tire that is determined by distributing to each axle its share of the curb weight, accessory weight, and normal occupant weight and dividing by 2.

[28] RMA's test data indicate that the time to failure for P235/75R15 tires decreased by 4 minutes when the load was increased from 80 percent to 90 percent. However, time to failure on the same type (brand, model, and size) tires decreased by 16 minutes when the inflation pressure was reduced by 9 psi.

[29] The agency reviewed the production dates for the tires tested to the above loads at 80 percent and 85 percent loads to determine whether the production dates of the tires may have affected the failure rates. No correlation between production date and failure at the lower load percentages is concluded because all of the tires were produced during 2000 and 2001. The agency concludes that a combination of minor quality differences in the tires, test procedures, and the relatively small (5 percent) load change may account for the fewer tire failures at the higher load factor.

[30] A tire pressure survey conducted by Viergutz, et al., on 8,900 tires in 1978 reported that almost 80 percent of all tires were under-inflated with approximately 50 percent under-inflated by 4 psi (28 kPa) or more below the recommended pressure. The average amount of under-inflation recorded in this survey was approximately 3.2 psi (22kPa) below the recommended amount. More recently, data from the 2001 NASS Tire Pressure Study, conducted on over 11,000 vehicles, indicate that about 60 percent of P-metric tires used on passenger cars were under-inflated with about 40 percent being under-inflated by 3 psi or more below the recommended inflation pressure. For P-metric tires used on light trucks, about 70 percent were under-inflated, with about 50 percent under-inflated by 3 psi or more below the recommended inflation pressure.

[31] In some cases, RMA's proposed test inflation pressures are higher than those labeled on the tire sidewall.

from the vehicles measured during a recent NHTSA sponsored consumer tire pressure survey.[32] Further, the agency has stated in previous rulemakings that standard load tires with higher maximum inflation pressures (300 and 350 kPa) are not capable of carrying additional load at higher inflation pressures beyond 240 kPa. They should be tested at an inflation pressure similar to that of the 240 kPa maximum inflation pressure tires. (53 FR 17950, 5/19/88; 53 FR 936, 1/18/88)

d. Speed

The proposed test speeds, 140, 150 and 160 km/h (88, 94, and 100 mph) represent a substantially increased stringency from the test speeds currently used in FMVSS No. 109 and 119 for which tires are tested at 75, 80, and 85 mph for 30 minutes at each speed. This approach would more closely mirror the upper limit of real world operational speeds beyond which drivers have few opportunities to operate their vehicles and eliminate from production any tires whose production just achieved the lowest rung of Temperature resistance rating in our Uniform Tire Quality Grading System (UTQGS), ''C'' rated tires.

The agency considered proposing a higher threshold test speed of 180 km/h so that speed rated tires with a speed rating lower than ''S'' (180 km/h) would not have been able to comply with the high speed test. In the U.S., light vehicles are typically equipped with tires speed rated no lower than Q (160 km/h). GM suggested that the agency consider basing our test speed on the speed rating of the tire since many of their light trucks are equipped with LT tires rated Q and R, 160 km/h (100 mph) and 170 km/h (106 mph), respectively. NHTSA, however, believes that an upper test speed threshold of 160 km/h (100 mph) ensures a minimum level of safe operation that is 25–30 mph beyond typical speed limits on interstate highways in the U.S.

Under the UTQG test procedure, a tire is rated C if it fails to complete the test at 100 mph for 30 minutes. The test is initiated at 75 mph for 30 minutes and then successively increased in 5 mph increments for 30 minutes each until the tire has run at 115 mph for 30 minutes. Therefore, tires with a temperature rating of C would be able to complete 30 minutes at speeds of 75, 80, 85, 90, and 95 mph (120, 128, 136, 144, and 152 km/h), but not complete the 100-mph (160 km/h) step. NHTSA, as mentioned above, believes that testing at an upper test speed threshold of 160 km/h (100 mph) ensures a minimum level of safe operation.

As discussed above, NHTSA used test speeds based on the speed rating of the tires for its high speed testing at STL (see the Tire Test Matrix in Docket No, NHTSA–00–8011–1). While representing a departure from the methodology of utilizing three predetermined test speeds (as proposed above and currently used in the FMVSS Nos. 109 and 119 high speed tests), this approach is identical to that contained in ECE R 30, GTS–2000, RMA 2000, and in SAE Recommended Practice J15161, Laboratory Speed Test Procedure for Passenger Car Tires. NHTSA seeks comment on whether test speeds based on speed ratings would be more appropriate, than those proposed above, for the High Speed Test and, more specifically, whether the method for determining test speeds contained in NHTSA's high speed testing matrix or the two alternatives mentioned above would be appropriate for the High Speed Test in the final rule.

e. Duration

NHTSA proposes a 30-minute test duration for each of the 3 speed steps, 140, 150, and 160 km/h. The total test time equals 90 minutes. The 30-minute duration allows the tire to attain and maintain its operating temperature at each speed step so that the tire's performance could be evaluated during a steady rate of speed for a duration longer than 10 minutes.

Based on its testing, the agency believes that RMA 2000's 10 minute duration at each speed step (10 minute speed build-up from 0 km/h to ITS, then five 10 minute speed steps) is too short to provide a proper evaluation of high-speed performance. Very few failures occurred in the agency's testing using the 10-minute duration for speed steps. Additionally, RMA's recommendation reduces the duration currently specified in FMVSS No. 109 by almost 50 percent.

3. Endurance Test

NHTSA proposes that the Endurance test be conducted using the following five parameters:

(1) *Ambient temperature:* 40°C.

(2) *Load:* 90 percent, 100 percent, 110 percent.

(3) Inflation Pressure—180 kPa (26 psi) for P-metric, 260 kPa (38 psi), 340 kPa (50 psi), and 410 kPa (59 psi), for LT load range C, D and E, respectively.

(4) Speed—120 km/h (75 mph).

(5) Duration (hrs): 8, 10, 22 (total 40) at the corresponding loads listed above.

A tire complies with the proposed requirements if, at the end of the endurance test, there is no visual evidence of tread, sidewall, ply, cord, inner liner, or bead separation, chunking, broken cords, cracking, or open splices, and the tire pressure is not less than the initial test pressure.

This combination of these parameters for P-metric tires represents a more real-world test and an increase in stringency over FMVSS No. 109's endurance test with an 18 percent increase in the duration, a 10 percent increase in the load, and a 50 percent increase in speed.

Two alternatives to the proposed test parameters were considered by the agency: (1) RMA 2000, and (2) an endurance test using identical parameters to those proposed above except for test loads at 100/110/115 percent for durations of 8, 10, 32 (total 50).

RMA 2000 includes no change in the load combination of 85/90/100 percent and a 10-hour (almost 30%) decrease in duration from the current standard, FMVSS No. 109. The load and duration increase of the second alternative to a load combination of 100/110/115 and a 16-hour (almost 50%) increase in duration from FMVSS No. 109 would fail over 40 percent of P-metric tires and 20 percent of LT tires tested.[33]

The agency proposes an endurance test that has parameters different from the two alternatives in load and duration. The agency believes that, given the change in the composition of the light vehicle market in the U.S. over the past 10 years towards a greater proportion of light trucks and vans being used for passenger purposes, the load values for an endurance tire test should be increased up to 110 percent to reflect the greater likelihood of vehicle overloading that is more likely to occur with light trucks and vans than with passenger cars. Further, the agency believes that an increase in duration for the test is warranted reflecting the increased life of today's tires. The increase in duration from 34 hours to 40 hours combined with the proposed test speed of 120 km/h represents an increase in the total test distance from

[32] In Spring 2001, the National Center for Statistics and Analysis (NCSA) conducted the 2001 National Automotive Sampling System (NASS) Tire Pressure Special Study (NASS Study) in response to the TREAD Act. The Preliminary Analysis of Findings, 2001 NASS Tire Pressure Special Study, dated May 4, 2001, has been placed in Docket No. NHTSA–00–8572. Data obtained as part of this study indicate that about 36 percent of passenger cars and 40 percent of light trucks had at least one tire that was at least 20 percent below the vehicle manufacturer's recommended cold inflation pressure. About 26 percent of passenger cars and 29 percent of light trucks had at least one tire that was least 25 percent below the vehicle manufacturer's recommended cold inflation pressure.

[33] These results, based on NHTSA's endurance testing at STL, are discussed in more detail below.

2720 km (1700 miles) to 4800 km (3000 miles).

The following chart illustrates an ''at-a-glance comparison'' of the proposed standard to the other standards and suggestions discussed in this document.[34]

TABLE 3.—ENDURANCE TEST

Test parameters	FMVSS 109	FMVSS 119	GTS-2000*	RMA 2000	ECE R30	New FMVSS 139
Ambient (°C)	38	38	38	38	N/A	40
Load (%):						
P-metric	85/90/100		100/110/115	80/90/100	N/A	90/100/110
LT-load C/D		75/97/114		75/97/114	N/A	90/100/110
LT-load E		66/84/101		70/88/106	N/A	90/100/110
Inflation Pressure (kPa):						
Standard load P-metric	180		180	180	N/A	180
Extra load P-metric	220		220	220	N/A	220
LT-Load C/D		(**)		(**)	N/A	260/340
LT-load E		(**)		(**)	N/A	410
Speed (km/h)	80	80	80	120	N/A	120
Duration (hrs)	34	34	34	24	N/A	40

* Endurance test recommended for GTS–2000 is only for radial tires rated ''Q'' and below.
** Sidewall max.

The endurance testing conducted in Phase 1 of the agency's testing was performed at 120 km/h and 140 km/h, with loads of 100 percent, 115 percent, and 125 percent for a total of 50 hours, and at inflation pressures of 160 kPa and 200 kPa. Many failures occurred at the combination of low inflation pressure (160 kPa) and high speed (140 km/h). At a test speed of 120 km/h with an inflation pressure of 200 kPa, 2 of the 9 P-metric tires failed to complete the 50 hour test.

In Phase 2 of the testing, the agency tested with loading conditions of 100/110/115 percent, (identical to the load recommended by the tire industry for the endurance test in GTS–2000), 180 kPa inflation pressure, 120 km/h for 50 hours. For P-metric tires, 2 of the 8 tire brands completed the test without any failures in their 5 samples; the remaining tire brands experienced at least one failure in the five samples used during the test.

Although neither phase of the endurance testing tested tires at exactly the same conditions as those proposed above, analysis conducted by the agency indicates that 19 of the 24 tires tested would pass the proposed endurance test. This analysis is contained in the PEA. NHTSA seeks comment on this analysis and whether the two alternatives mentioned above would be appropriate for the Endurance Test in the final rule.

A more detailed explanation of the proposed parameters is discussed below.

a. Ambient Temperature

The proposed ambient temperature is 40°C. This temperature is a slight increase over the temperature, 38°C, currently specified in FMVSS No.109, and reflects typical daytime temperatures in the South and Southwestern regions of the U.S. during the Summer months. As discussed earlier, the highest rates of tire problems occurred in the southern states in the summertime.

b. Load

The proposed loads for the endurance test are 90, 100, and 110 percent. These load percentages represent an approximate 10 percent increase over the load percentages specified for the endurance test in FMVSS No. 109 (85, 90, and 100 percent) and an increase over those recommended by RMA 2000.

The load levels originally proposed by the tire industry in GTS–2000 for P-metric tires rated Q or below were 100/110/115 percent at a test speed of 80 km/h. Given the increased use of light trucks and vans by the general public and the larger cargo volumes available in these vehicles, the agency believes that they are more likely to be operated in an overloaded condition than passenger cars. Our proposal for loads in the endurance test, 90/100/110 percent, reflects the need to increase the loads beyond the loads currently required in FMVSS No. 109 but not to the levels proposed by industry in the original GTS–2000 proposal. The RMA now supports a load combination of 85/90/100 percent for P-metric tires, which is identical to the test loads currently required for the endurance test in FMVSS No. 109, but at the higher speeds of 120 km/h, as proposed by the agency. The load combination proposed by RMA for LT tires with load C or D is 75/97/114 percent, and for load range E tires is 70/88/106 percent. The industry's endurance test proposal for P-metric and LT tires is based on a 24-hour test, which represents a 10-hour reduction in the endurance test time from FMVSS No. 109.

c. Inflation Pressure

The inflation pressure of 180 kPa represents a 25 percent under-inflation for 240 kPa maximum inflation pressure tires and is the same inflation pressure currently required for the endurance test in FMVSS No. 109. Tires tested to more severe levels of underinflation, e.g., 160 kPa, failed much sooner into the 50-hour endurance test than those tested at 180 kPa.

d. Speed

The proposed test is conducted at 120 km/h (75 mph). The current endurance test in FMVSS 109 is conducted at 80 km/h (50 mph). A 80 km/h test speed

[34] For global harmonization, the tire industry recommended an endurance test for radial tires rated Q and below. The test parameters included a load of 100/110/115 percent at a speed of 80 km/h. The agency's testing indicates that all the P-metric tires tested completed the industry's recommended test without any failures.

may have been an appropriate test speed in 1968 when initially proposed for bias ply tires. However, today, it is too low a speed for evaluating the endurance of today's tires given current vehicle performance capabilities and speed limits.[35] In addition, speed limits on interstate highways across the U.S. have reached as high as 75 mph, with actual vehicle traffic speeds typically at least several miles per hour above the posted speed limit.

e. Duration

NHTSA is proposing a 40-hour test at 120 km/h. The total test distance is 4800 km (3000 miles), which is almost double the distance for the current endurance test in FMVSS No. 109 (1700 miles at 80 km/h). The proposed test duration represents a slight increase from the current 34-hour test in FMVSS No. 109.

3. Low Inflation Pressure Tests

The TREAD Act requires that light vehicles be equipped with a tire pressure monitoring system, effective November 1, 2003, to indicate to the driver when any of the tires on his vehicle is significantly underinflated. NHTSA has proposed to establish 20 psi as a low pressure threshold at or above which the low pressure lamp must be activated.[36]

NHTSA proposes to include in the new light vehicle tire standard a low inflation pressure test to ensure a minimum level of endurance and/or high speed performance/safety when operated at a significant level of under-inflation. To aid the agency in choosing an appropriate test, NHTSA seeks comments on the following alternative tests: (1) The Low Pressure—TPMS test, (2) or the Low Pressure High Speed test. Both proposed tests are described and detail below.

a. Low Pressure—TPMS

The Low Pressure—TPMS test includes a linkage between the proposed requirements of the tire pressure monitoring system standard and the proposed endurance test for the tire standard upgrade proposed requirements. The former test is predicated upon the notion that a low pressure test would be most appropriate on tires that have completed the endurance test because a significantly underinflated condition for a tire is more likely to occur in a tire after several weeks of natural air pressure loss or due to a slow leak. The parameters for this test, which the tire must complete without failure, are as follows:

(1) Load: 100 percent.
(2) Inflation pressure: 140 kPa (20 psi).
(3) Test speed: 120 km/h (75 mph).
(4) Duration: 90 minutes at the end of the 40-hour endurance test.
(5) Ambient temperature: 40°C.

A tire complies with the proposed requirements if, at the end of the test, there is no visual evidence of tread, sidewall, ply, cord, inner liner, or bead separation, chunking, broken cords, cracking, or open splices, and the tire pressure is not less than the initial test pressure.

As discussed, *supra*, the agency also conducted a test at 140 kPa (20 psi) inflation pressure, at a speed of 120 km/h (75 mph) for a duration of 90 minutes, on the same tires (2 samples of each of the 12 brands) that successfully completed the endurance test to evaluate tire performance at the low inflation threshold level being proposed for tire pressure monitoring systems for light vehicles. Similar tests were performed using the LT tires, but at low inflation values commensurate with about 58 percent of their maximum inflation pressure. The test results indicated that all 24 tires tested completed the 90-minute low inflation test without failure.

The agency believes that this test provides an extra safeguard to ensure that tires which were able to successfully complete the endurance testing can also complete an additional 90-minute test at low inflation pressures.

b. Low Pressure—High Speed Test

This proposed test provides a linkage between the proposed TPMS requirements and the proposed high speed test. While it would evaluate tires at a lower load than that specified in the Low Pressure—TPMS test, the Low Pressure—High Speed test would ensure that a manufacturer designs a tire so that its high speed performance would comply with the test requirements not only at recommended inflation pressure, but also at a low inflation pressure. The parameters for this test are as follows:

(1) *Test speed:* 140, 150, and 160 km/h (88, 94, 100 mph).
(2) *Inflation pressure:* 140 kPa (20 psi).
(3) *Load:* 67 percent.
(4) *Duration:* 30 minutes at each speed.
(5) *Ambient Temperature:* 40°C.

A tire complies with the proposed requirements if, at the end of the test, there is no visual evidence of tread, sidewall, ply, cord, inner liner, or bead separation, chunking, broken cords, cracking, or open splices, and the tire pressure is not less than the initial test pressure.

The above conditions place the test point slightly below the T&RA load curves. The T&RA load curves establish the load capacity a tire is designed to carry at a specific inflation pressure. A tire is considered to have passed the test if it completes the 30 minute step at 160 km/h (100 mph).

NHTSA recently conducted testing of the above parameters on 8 tire brands. The results of this testing are contained in a report which has been added to the docket for this rulemaking. The results indicate that 30 percent of tires with an ''S'' speed rating, 63 percent of tires with an ''R'' speed rating, and 75 percent of tires with a ''Q'' speed rating would not pass this test. However, 70 percent of tires with an ''S'' speed rating, and all ''T'' and ''H'' rated tires would have completed the test. The following bullets summarize key conclusions derived from the results:

• Effect of test pressure on tire performance—Inflation pressure has a significant effect on speed-at-failure. An inflation pressure of 180 kPa (26 psi) produces a substantial number (32 out of 168, or 19 percent) of failures at speeds less than the rated speed of the tire.

• Combined effect of load and pressure on tire performance—The combination of NHTSA and RMA data supports the hypothesis that the performance of a tire is the same for a test condition anywhere on the T&RA load curve except for inflation pressure below 180 kPa (26 psi). At these lower pressures, specifically at 140 kPa (20 psi), failure rates are higher for tires with lower speed ratings than would be predicted from the results of tests run at higher pressures and loads that correspond to points on the T&RA load curve, i.e., the proposed high-speed test condition.

[35] According to Automotive News (5/14/01), ''since 1981, average horsepower has risen 79 percent and vehicle weight has grown 21 percent.'' The power to weight ratio has increased over the past 10 years based on data on selected mid-priced Ford, Chevrolet, Pontiac, Toyota, and Honda vehicles ranged from about 70 to 90 horsepower (HP) per ton. (Ward's Automotive Yearbooks, 1990 and 2000). In 1995, the federally-mandated 55 mph speed limit was repealed. Since that time, numerous States have increased speed limits up to 75 mph.

[36] The proposed requirements of the tire pressure monitoring system standard would allow each vehicle manufacturer to establish the level of under-inflation at which the low inflation pressure warning lamp will be illuminated, subject to a low inflation pressure threshold requirement for the warning lamp activation. In its recent TPMS NPRM, Docket No. NHTSA–00–8572, the agency proposed two options for activation: (1) 20 percent below the recommended cold inflation pressure or 140 kPa (20 psi) whichever is higher; and (2) 25 percent below the recommended cold inflation pressure or 140 kPa (20psi), whichever is higher.

• Effect of length of time at a speed on tire performance—For high-speed tests of tires at the maximum sidewall pressure (240 kPa (35 psi) for the tires tested), it may be necessary to test with durations greater than 10 minutes to fully judge failure rates. For tests at lower pressures, the results do not provide a consistent picture. For example, the RMA data at 180 kPa (26 psi) suggests that it probably is not necessary to test for more than 10 durations. However, the NHTSA data at 140 kPa (20 psi) suggests that 10 minutes may not be a sufficiently long duration.

4. Road Hazard Impact Test

The agency proposes that a road hazard impact test replace the strength (plunger) test in the new standard. A tire complies with the proposed requirements if, at the end of the test, there is no visual evidence of tread, sidewall, ply, cord, inner liner, or bead separation, chunking, broken cords, cracking, or open splices, and the tire pressure is not less than the initial test pressure.

A road hazard impact test simulates a tire impacting a road hazard, such as a pothole or curb, and is a more realistic test for radial tires than the current strength test in FMVSS No. 109. For this test, NHTSA is utilizing the existing SAE Recommended Practice J1981, Road Hazard Impact Test for Wheel and Tire Assemblies (Passenger Car, Light Truck, and Multipurpose Vehicles) (''J1981'').

J1981 was developed to provide a uniform test procedure for evaluating the effect, on wheel and tire assemblies, of impacting a road hazard such as a pothole or curb. J1981 does not attempt to simulate the exact conditions encountered when the wheel and tire assembly strikes such a hazard. The equipment developed for this test does, however, attempt to reproduce under controlled conditions the wheel and tire deformations that may be experienced with a road hazard impact. The test equipment can also be used to determine, with a high degree of accuracy, the threshold condition at which tire damage first occurs.

In the preparation of J1981, laboratory and road tests carried out by a number of manufacturers were studied. The pendulum test specified in J1981 was designed to provide equivalent damage with low cost equipment that would give accurate and reproducible results. The test is designed for testing of wheel and tire assemblies used with passenger cars, light trucks, and multipurpose vehicles. The test is limited to a front (radial) impact with both wheel rim flanges being impacted simultaneously.

The following bullets summarize the key components of a Road Hazard Impact Test Machine (used by STL) and the test procedure for the Road Hazard Impact Test as specified by SAE J1981:

• The basic machine consists of a framework designed to guide the Pendulum Weight System so that, when released, it will free fall and impact the wheel tire assembly. The wheel/tire assembly is adjustable so that it can be aligned with the Pendulum Weight Assembly.

• The equipment must be calibrated to ensure that the impact force is correct since the impact force on the wheel and tire assembly depends on the length of the pendulum, the shape of the striker, and the friction at the fulcrum.

• The tire and wheel assembly, inflated to the required test pressure, is installed on the test fixture. The inflation pressure proposed for P-metric tires is 180 kPa, and for LT tires load ranges C, D, and E, it is 260 kPa, 340 kPa, and 410 kPa, respectively.

• The 54 kg striker is raised to the predetermined drop height based on the pendulum centerline angle of 80 degrees to the vertical. The striker is allowed to fall freely from this predetermined height to impact the test tire and wheel assembly.

• The test is repeated for a total of five equally spaced points around the circumference of the tire.

• The tire pressure at the end of the test shall not be less than the initial test pressure, and there must be no visual evidence of tire failure.

5. Bead Unseating

The current resistance-to-bead unseating test is designed to evaluate how well the tire bead remains on the rim during turning maneuvers. The test forces currently used in FMVSS No. 109 are based on bias ply tires and are typically not stringent enough for radial tires. For this reason, the industry, in GTS–2000, recommended that the test be deleted from the standard because radial tires are able to satisfy the test easily. Results from the agency's 1997–1998 dynamic rollover testing, however, provide a strong rationale for seeking to upgrade, rather than delete, the bead unseating requirement in FMVSS No. 109. In this NHTSA test program, vehicles experienced bead unseating on three of twelve test vehicles. This bead unseating occurred during severe maneuvers, but on level surfaces without any external impact to the tire. Such bead unseating in the real world would pose serious safety concerns. Therefore, NHTSA proposes to replace the current bead unseating test in FMVSS No. 109 with the Toyota Air Loss Test.

The Toyota Air Loss Test was developed by Toyota to evaluate tubeless tire performance. While the current FMVSS No. 109 bead unseating test applies force in the middle of the sidewall, the Toyota Air Loss Test applies force at the tire tread surface edge. The tire tread surface edge is the actual location at which force occurs due to tire/road interface during severe vehicle maneuvers. There are two general methods for conducting the Toyota test:

1. *Air Loss Bench Test Method:* A tire that receives a lateral force from the ground is deformed and may be deflated as its tire bead is separated from the rim bead. The air loss test is intended to measure the tire inflation pressure at which a tire is deflated under the above condition. The test may be conducted with an actual vehicle or with a tire assembly on a test bench.

2. *On-Vehicle Air Loss Test Method:* When an actual vehicle is used for the air loss test, the vehicle is driven at 60 km/h along a straight course, then makes a curve with a radius of 25 meters, so that a lateral force is applied to the tire. This so-called J-turn test method is recommended because the fluctuation in input load is relatively small.

NHTSA proposes to adopt the Air Loss Bench Test Method because the test is independent of vehicle type, although the agency seeks comments on both methods. This test method uses a force of 2.1 times the maximum load labeled on the tire sidewall, which is applied at the tread surface. The wedge-shaped device applies a force on the tire, laterally, at the tread surface. This force simulates the lateral force at the tread surface, which a tire experiences during severe maneuvers that could produce bead unseating of the tire.

Toyota has provided a brief description of the test apparatus and the test method used for the bench test. The apparatus includes a tire mounting hub that positions the tire vertically at an angle 5 degrees to the vertical axis, a hydraulic-powered sliding wedge-shaped block that applies force to the tire tread surface, and a control panel that includes controls for monitoring and regulating the tire's inflation pressure and a load indicator. The test procedure recommends inflating the tire to an initial inflation pressure of maximum (design) inflation pressure plus 50 kPa. Therefore, the initial inflation pressure for a P205/65R15 standard load tire (rated at a load limit of 635 kg (1400 lbs.) at an inflation pressure of 240 kPa) is 290 kPa. Force, using the wedge-shaped block, is applied at a rate of 200 millimeters per second (mm/s) to a properly mounted tire and is maintained for a duration of 20 seconds. A tire successfully completes the test if the test pressure is not less than the initial test pressure.

The agency has recently conducted research using the Toyota test apparatus and test to verify that the recommended force levels are appropriate for a minimum safety requirement. Based on the agency's evaluation of this bead unseating method, it proposes 180 kPa for an inflation pressure in P-metric tires and 2.0 times the maximum tire load labeled on the tire sidewall for an application load appropriate for a minimum safety standard. The test inflation pressure for other tires are identical to the inflation pressures used in the proposed endurance test, which specifies 260 kPa, 340 kPa, and 410 kPa for LT tires load range C, D, and E, respectively.

The preliminary test results for the bead unseating testing have been placed in the docket. The agency requests comment on the data.

6. Aging Effects

During the Firestone hearings and the passage of the TREAD Act, some members of Congress expressed the view that there is a need for an aging test to be conducted on light vehicle tires. The agency tentatively concludes that we agree there is a need for an aging test in the proposed light vehicle tire standard because most tire failures occur at mileages well beyond 2,720 kilometers (1,700 miles) to which tires are exposed in the current FMVSS No. 109 Endurance Test.[37] The proposed endurance test, while accumulating 4,800 kilometers (3,000 miles) on a tire, still will not expose the tire to the type of environmental factors experienced on vehicles at 40,000 kilometers or beyond.

Currently, no industry-wide recommended practice for accelerating the aging of tires exists.[38] The agency, therefore, proposes the following three tests for consideration and comment: (1) Adhesion Test, (2) Michelin's Long-term Durability Endurance Test, and (3) Oven Aging. NHTSA plans to adopt one of these tests. These tests are discussed in detail below.

a. Adhesion (Peel) Test

The Adhesion (peel) test is based on the American Society for Testing and Materials (ASTM) 413–98, Standard Test Methods for Rubber Property—Adhesion to Flexible Substrate. The Adhesion (peel) test evaluates a tire's resistance to belt separation by determining the adhesion strength, measure by force per unit width, required to separate a rubber layer from a flexible substrate such as fabric, fibre, wire, or sheet metal. The adhesion levels of a tire will vary based on rubber formulations, the different materials used to construct a tire, and the curing process.

The test methods in ASTM D 413–98 cover the determination of adhesion strength between plies of fabric bonded with rubber or adhesion of the rubber layer in article made from rubber attached to other material. They are applicable only when the adhered surfaces (adjacent tire belts) are approximately plane or uniformly circular in belting, hose, tire carcasses, or rubber covered sheet metal.

The test methods described in this ASTM standard determine the force per unit (pounds per inch) width required to separate a rubber layer from a flexible substrate such as fabric. There are two general methods for this test:

(1) *Static-Mass Method:* The force required to cause separation between adhered surfaces is applied by means of gravity acting on a mass.

(2) *Machine Method:* The force required to cause separation between adhered surfaces is applied by means of a tension machine.

Due to the greater accuracy of the tension testing machine, the agency proposes to utilize the Machine Method to apply a peel strength requirement for new tires after they complete a 24-hour test with parameters similar to the proposed 40-hour endurance test. The parameters for this 24-hour test are as follows:

(1) Ambient temperature—40°C.
(2) Load—90/100/110 percent.
(3) Inflation pressure—180 kPa.
(4) Test speed—120km/h.
(5) Duration—24 hours with three 8-hour periods at each load.

For a tire to satisfy the proposed test, it must exhibit a minimum peel strength of 30 pounds per inch at the end of the 24-hour test period. This value was tentatively chosen based on data made available to NHTSA from Ford and Firestone.[39]

b. Michelin's Long-Term Durability Endurance Test

The second accelerated aging method being considered by the agency is based on a method utilized by Michelin. This method uses a road wheel endurance test with the following controlled parameters to simulate testing the tire to tread wear-out: load, inflation pressure, speed, and duration. The test tire is inflated with a 50/50 blend of O_2/N_2 and run for between 250–350 hours. Michelin has estimated that 100 hours of this testing correlates with approximately one year of real-world tire usage. For example, a 250-hour test correlates with approximately 2½ years of real world field operation.

The Michelin long-term durability endurance test research findings were initially published at a 1985 International Rubber Conference.[40] The research pointed toward four factors as comprising the best balance to achieve good/accurate correlation with field data—(1) filling gas; (2) test speed; (3) test temperature; and (4) tire load. Michelin discovered that if any one or several of these factors was disproportionately altered in an attempt to make the test more stringent or to complete the test faster, the result was a test failure condition that displayed an abnormal failure mode and did not reflect actual field conditions. Therefore, temperature and mechanical stress must be controlled to avoid failures that are not representative of real-world conditions.

The following test parameter values have been developed, through a multi-year research program at Michelin, to minimize variance from field test end conditions and minimize test hours:

(1) *Filling gas blend:* 50 percent O_2 (oxygen) and 50 percent N_2 (nitrogen).

(2) *Test speed:* 97 km/h (60 mph).

(3) *Test temperature:* 38°C (100°F).

(4) *Load:* 111 percent for standard load P-metric tires; 112 percent, 98 percent and 92 percent for LT tires load range C, D, and E, respectively.

(5) *Inflation pressure:* 40 psi (275 kPa) for standard load P-metric tires; 57, 65, and 80 psi (390, 450, 550 kPa) for LT tires load range C, D, and E, respectively.

(6) *Test duration:* 250 hours.

These values were chosen to make each test parameter proportionally

---

[37] Based on a review of a sample of complaints received by the agency's Office of Defects Investigation, complaint dates for tires are typically two to three years later than the model year of the vehicle on which they are equipped. This indicates, based on available data, that tire mileage may have been in the 20,000 to 30,000-mileage range when the complaint was submitted.

[38] The American Society for Testing and Materials (ASTM) has recently established a working group to develop a long-term durability endurance test standard.

[39] In light of the Firestone recall, NHTSA has obtained sufficient information in this area to assist in specifying the appropriate peel strength parameters. This information, however, has not been made public and, therefore, will not be discussed in this document.

[40] In the late 1980s and early 1990s, the test was used by Uniroyal and BF Goodrich for test validation and implementation in new tire development. The test was also used by General Motors as an internal indicator for GM's accelerated tire endurance test.

severe without exceeding a critical temperature which, in turn, would lead to failure conditions unrepresentative of real-world conditions/actual field conditions.

A tire complies with the proposed requirements if, at the end of the test, there is no visual evidence of tread, sidewall, ply, cord, inner liner, or bead separation, chunking, broken cords, cracking, or open splices, and the tire pressure is not less than the initial test pressure.

c. Oven Aging

The agency also proposes a two-step test combining oven aging and a 24-hour test that is similar in method to the proposed 40-hour endurance test. The parameters for this test are as follows:

(1) Oven aging
(a) Oven temperature: 75°C (167°F).
(b) Duration: 14 days.
(2) 24-hour endurance test
(a) Ambient temperature: 40°C.
(b) Load: 90/100/110 percent.
(c) Inflation pressure: 180 kPa.
(d) Test speed: 120 km/h.
(e) Duration: 24 hours with three 8-hour periods at each load.

A tire complies with the proposed requirements if, at the end of the test, there is no visual evidence of tread, sidewall, ply, cord, inner liner, or bead separation, chunking, broken cords, cracking, or open splices, and the tire pressure is not less than the initial test pressure.

One tire manufacturer, Michelin, commented during discussions with NHTSA that oven aging a tire does not create a representative heat differential (*e.g.,* a higher belt edge temperature than sidewall temperature) that a tire experiences in various areas of the tire in real world/field testing conditions. Also, Michelin asserted that the oxidative reaction that takes place in tires at increased strain levels does not occur in oven aging because no load is applied to the tire. According to Michelin, the presence of excess oxygen in a tire under simulated road conditions, with proportional increased in load and inflation pressure, accelerates the oxidation process while not exceeding the critical temperature. Oxidation at the belt edges is critical to testing as it leads to belt separation.

D. Deletion of FMVSS No. 109

The requirements of the proposed new standard, FMVSS No. 139, would supercede the current requirements of FMVSS No. 109. Therefore, the agency proposes the deletion of FMVSS No. 109 from its standards. FMVSS No. 109 is applicable to tires for vehicles manufactured after 1948. The proposed standard is would be applicable to tires for vehicles manufactured after 1975. While deletion of FMVSS No. 109 would theoretically preclude application of any requirements to tires produced for vehicles manufactured 1975 and before, the agency has no data showing that these vehicles are overrepresented in crashes involving tire failures. Additionally, the number of these vehicles operated today is very limited and this limited number makes them less likely to be involved in a crash caused by tire failure. Finally, the GRRF committee has tentatively agreed on 1975 as the date of applicability for a globally harmonized tire standard. The agency solicits comments on the deletion of FMVSS No. 109 and the issues discussed above.

E. FMVSS Nos. 110 and 120

The purpose of FMVSS Nos. 110 and 120 is to provide safe operational performance by ensuring that vehicles to which they apply are equipped with tires of adequate load rating and rims of appropriate size and type designation. FMVSS No. 110 currently applies to passenger cars and FMVSS No. 120 currently applies to vehicles other than passenger cars including motorcycles and trailers.

The agency proposed in the Tire Safety Information NPRM (Docket No. NHTSA–01–11157) that FMVSS Nos. 110 and 120 be revised to correspond with the applicability of the new light vehicle tire standard. FMVSS No. 110 would include passenger cars and other light vehicles with a GVWR of 10,000 pounds or less. Therefore, most SUVs, vans, trailers, and pickup trucks would be required to comply with the same tire selection and rim requirements as passenger cars. FMVSS No. 120 will continue to apply to vehicles over 10,000 pounds GVWR and motorcycles.

All requirements of FMVSS No. 110 would be retained including S4.2.2 which establishes a linkage between the vehicle normal load [41] and the load specified for the high speed test in FMVSS No. 109.[42] This requirement will be extended to SUVs, vans, trailers, and pickup trucks, which means that P-metric and LT tires used on these vehicles will have a load reserve similar to P-metric tires used on passenger cars. Since the load proposed for the high speed test is 85 percent of the maximum load rating of the tire, these tires will be required to have at least a 15 percent load reserve for a vehicle normal loading condition. The agency believes that, combined with the de-rating of P-metric tires when used on SUVs, vans, trailers, and pickup trucks, the reserve load requirements of FMVSS No. 110 should provide a sufficient safety margin for P-metric tires used on these vehicles.

The proposal also retains S4.4.1(b) of FMVSS No. 110 which requires that each rim shall retain a deflated tire in the event of a rapid loss of inflation pressure from a vehicle speed of 97 km/h until the vehicle is stopped with a controlled braking operation.

F. FMVSS Nos. 117 and 129

FMVSS No. 117, which specifies performance requirements for retreaded pneumatic passenger car tires and FMVSS No. 129, which specifies performance requirements for new non-pneumatic tires for passenger cars, contain test requirements and test procedures which either reference or are modeled after those in the current FMVSS No. 109. More specifically, FMVSS No. 117 specifies that each retreaded tire shall comply with FMVSS No. 109 strength and resistance-to-bead unseating tests and the FMVSS No. 129 tire strength and high speed tests specifications mirror those in FMVSS No. 109. In order to maintain consistent testing procedures and requirements for all tires for use on light vehicles, the strength and resistance-to-bead unseating test procedures and requirements in FMVSS No. 117 would be replaced with the proposed road hazard impact test and bead unseating tests. Similarly, the strength and high speed test procedures and requirements in FMVSS No. 129 would be revised to include the proposed road hazard impact test and high speed test. Additionally, the applicability of FMVSS Nos. 117 and 129 would be revised to include retreaded and non-pneumatic tires, respectively, for use on motor vehicles with a GVWR of 10,000 pounds or less, manufactured after 1975, except for motorcycles.

G. De-Rating of P-Metric Tires

FMVSS No. 120 requires that the load rating of a tire subject to FMVSS No. 109 must be reduced by a factor of 1.10 when installed on a MPV, truck, bus or trailer. This factor equals a 10 percent ''de-rating'' and provides a greater load reserve when passenger car tires are installed on SUVs, vans, trailers, and pickup trucks. The rationale for the de-rating requirement is that SUVs, vans,

[41] Vehicle normal load on the tire means that load on an individual tire that is determined by distributing to each axle its share of the curb weight, accessory weight, and normal occupant weight and dividing by 2.

[42] This, under the proposed high speed test, would ensure at least a 15 percent load reserve (high speed test load proposed is 85 percent) when the vehicle is operated at normal load.

trailers, and pickup trucks are generally easier to overload than passenger cars because SUVs, vans, trailers, and pickup trucks have greater cargo-carrying volumes than passenger cars. The reduction in the load rating is intended to provide a safety margin for generally harsher treatment, such as heavier loading and possible off-road use, which passenger car tires receive when installed on a MPV, truck, bus, or trailer.

Tire manufacturers have recommended that the agency retain the de-rating provision in the revised standard for tire selection and rims for light vehicles. The agency, for the reasons cited above, agrees with the tire manufacturers' suggestion and has inserted this provision in the proposed regulatory text for the revised FMVSS No. 110.

H. Other NHTSA Research Plans

As discussed above, NHTSA is currently conducting Bead Unseating and Road Hazard Impact Test (SAE J1981) research. The purpose of this research is to establish and to determine force levels for the Bead Unseating Test and to establish a minimum force requirement and test values for the Road Hazard Impact Test. The specific aspects of testing in these two areas are discussed below.

1. Bead Unseating Research

This research will be conducted in two testing phases. In Phase 1, potential bead unseat tests will be evaluated using a limited sample of tire types and sizes. In the first segment of Phase 1 testing (Phase 1a), an initial series of tests will be performed to evaluate basic aspects of the test procedures, such as the effect of test parameter variation and repeatability. These tests will consist of the following:

(1) FMVSS No. 109/110 Bead Unseat Test—tests completed when bead unseating or rim contact occurs.

(2) Toyota Air Loss Bench Test—tests using wedge-shaped loading fixture, two variations for each of vertical load and load rate application (four combinations total).

The Phase 1a testing will be conducted using five different brands of a single tire size. Four samples of each tire will be tested using each of the five tests and testing variations described above. A total of 100 bead unseat tests will be performed in Phase 1a.

Based on the findings from Phase 1a, a second segment of Phase 1 testing (Phase 1b) will be initiated within which promising test procedures will be further explored in an expanded matrix of tests. This testing will include utilizing a larger variety of tire types and sizes and/or additional variations in the selected test procedure(s).

Based on the findings of Phase 1, a final test procedure will be selected for use in Phase 2. In Phase 2, a series of tests will be performed to evaluate the performance of the current tire fleet when subjected to the bead unseat test identified in Phase 1. The agency anticipates that approximately 50 different tire brands and sizes will be tested. A subset of 10 of these tires will be further selected for repeatability testing. Preliminary test results have been placed in the docket. NHTSA requests comments on the data.

2. Road Hazard Impact Test (SAE J1981) Research

This testing will also be conducted in two phases. In Phase 1, potential tire strength tests will be evaluated, as well as potential methods for evaluating tire damage (i.e., pass/fail criteria). In the first segment of Phase 1 testing (Phase 1a), an initial series of tests will be performed to evaluate basic aspects of the test and evaluation procedures, such as the effect of test parameter variations, repeatability, and objectivity. This series of tests consist of the following:

(1) FMVSS No. 109/119 plunger test—test completion when current pass/fail energy level is obtained.

(2) Modified FMVSS No. 109 plunger tests—test completion when an increased energy level is reached. (The contractor will assist in the selection of the higher energy limit.)

(3) SAE J1981 Road Hazard Impact Test—tests conducted with wedge-shaped striker.

(4) SAE J1981 Road Hazard Impact Test—tests conducted with plunger-shaped striker. The Phase 1a tests will be conducted using 10 different types of tires, including different aspect ratios, brands, and models. One sample of each tire will be tested using the two FMVSS No. 109-type tests, and two samples of each will be tested using the SAE J1981-type tests. A total of 60 tire strength tests will be performed in Phase 1a. Prior to testing, all tires will be visually inspected for damage. After the strength tests are performed, all 60 tires will be inspected for damage visually, using x-ray, and shearography.

After the initial series of tests, 20 of the tested tires will be selected for high speed dynamometer testing. These tires are inspected using visual inspection, x-ray, and shearography.

Based on the findings from Phase 1a, a second segment of Phase 1 testing (Phase 1b) will be initiated where promising test procedures and evaluation methods will be further explored in an expanded matrix of tests. This testing will include utilizing a larger variety of tire types and sizes and/or additional variations in the selected test procedure(s) and evaluation method(s) than in the Phase 1a testing.

Based on the findings of Phase 1, a final test procedure and damage evaluation method(s) will be selected for use in Phase 2. In Phase 2, a series of tests will be performed to evaluate the performance of the current tire fleet when subjected to the strength tests and evaluation method(s) identified in Phase 1. The agency anticipates that approximately 50 different tire models and sizes will be tested. A subset of these tires will be selected for further repeatability testing. Preliminary test results have been placed in the docket. NHTSA requests comments on the data.

I. Additional Considerations

1. Lead Time for Implementation of New Tire Standard

Congress did not set a lead time by which all applicable tires would be required to meet the upgraded standard. The agency proposes two alternative implementation schedules: a two-year phase-in whereby all applicable tires must comply with the final rule by September 1, 2004, and a three-year phase-in whereby all applicable tires must comply with the final rule by September 1, 2005.

As mentioned above, the proposed new tire standard would apply to radial and non-radial tires for use on passenger cars, SUVs, vans, trailers, and pickup trucks, but not tires for motorcycles or heavy trucks. The applicability of this standard would consolidate the current FMVSS No. 109 and part of FMVSS No. 119. The agency anticipates that many P-metric tires rated C for UTQG Temperature Resistance will either have to be taken off the market or redesigned to pass the proposed tests. Similarly, the agency anticipates that a larger percentage of LT tires, than P-metric tires, will need to be redesigned to pass the proposed standard.

Given the number of additional test requirements and possible design changes that may be required for some tires, particularly LT tires, the agency proposes a phase-in period that allows for up to three years for manufacturers to comply with the requirements of the new standard. The agency believes that a three-year phase-in period would give tire manufacturers sufficient time to make necessary design changes to their tires so that they will comply with the new requirements. A three-year phase-in period would also quickly provide the American public with tires that are certified to a higher standard than presently exists. As an alternative, NHTSA also proposes a 2-year phase-in period. The details of both plans are discussed below.

For the three-year phase-in, the agency proposes that beginning on September 1, 2003, approximately one year after issuance of the final rule, 50 percent of P-metric tires would be required to comply with the new standard. As of September 1, 2004, two years after the final rule is published, 100 percent of P-metric tires would be required to comply with the new standard. As for LT tires, 100 percent must comply with the new standard beginning on September 1, 2005, three years after issuance of the final rule. Under this implementation scheme, tire manufacturers would be required to provide the agency with tire production data for the year September 1, 2003 to August 31, 2004. This requirement would enable the agency to verify that tires certified to the new standard constitute 50 percent of a manufacturer's production of P-metric tires for that period of time. No production data would be required for subsequent years because all P-metric tires would be required to be certified to the new standard beginning on September 1, 2004. Similarly, no production data would be required for LT tires because all LT tires would be required to be certified to the new standard beginning on September 1, 2005.

As an alternative to the three-year implementation scheme, the agency proposes a two-year phase-in period. Beginning September 1, 2003, 100 percent of P-metric tires would be required to be certified to the requirements of the new standard. Beginning September 1, 2004, 100 percent of LT tires would be required to be certified to the requirements of the new standard. This implementation plan does not require manufacturers to provide production data because it does not contain provisions for partial compliance. Optional early compliance would be permitted by the agency for both alternatives.

2. Shearography Analysis

Shearography analysis evaluates the condition of a tire using laser technology. This technology provides information on impending tread or belt separations that cannot be detected through visual inspection. While currently used in the tire industry, shearography analysis requires a technician to exercise his judgement in determining whether an indication of the size and prospective rate of growth of a belt or tread failure could lead to failure. This analysis has proven to be a valuable tool in analyzing tire failures during the agency's high speed and endurance testing program.[43]

For the aforementioned reasons, the agency solicits comments on the appropriateness of specifying shearography analysis for inspection purposes, in addition to the visual inspection now required, to determine tire failure at the end of the high speed test, the endurance test, the low pressure performance test, and the road hazard impact test. In particular, the agency seeks comments on whether the physical indications of possible future tire failure can be described with sufficient specificity to fulfill the statutory requirement that FMVSSs be stated in objective terms.

3. Revised Testing Speeds in UTQG Temperature Grading Requirement

The agency, in a future rulemaking, may propose to revise the testing speeds specified in the Uniform Tire Quality Grading (''UTQG'') temperature grading requirement in Part 575.104, Uniform Tire Quality Grading Standards, by allowing manufacturers to substitute the High Speed Test speed steps for those currently specified in UTQG, up to 100 mph.

The current temperature resistance test assigns a grade of A, B, C to a tire based on whether it completes or fails to complete a road wheel test for 30 minutes at a given speed. A tire is rated C if it fails to complete the test at 100 mph for 30 minutes, B if it completes the test at 100 mph for 30 minutes, and A if it completes the test at 115 mph for 30 minutes. Under the UTQG test procedure, the test is initiated at 75 mph for 30 minutes and then successively increased in 5 mph increments for 30 minutes each until the tire has run to 115 mph for 30 minutes. Therefore, tires with a temperature rating of C would be able to complete 30 minutes at speeds of 75, 80, 85, 90, and 95 mph (120, 128, 136, 144, and 152 km/h), but not complete the 100-mph (160 km/h) step.

Utilizing the proposed High Speed Test test speeds, a tire could simultaneously complete the High Speed Test speed steps of 140, 150, and 160 km/h (88, 94, 100 mph) and the first 6 speed steps of the UTQG testing procedure. NHTSA requests comments on whether manufacturers should be permitted to substitute, up to 100 mph, the High Speed Test speed steps for those currently specified in UTQG for the Temperature Grading requirement. The agency also requests comment on whether other revisions to the UTQG Temperature Grading requirements are warranted. Please be specific in your response and provide a basis for your answer.

4. Request for Comments on Particular Issues

(1) The agency is participating in the development of a global tire standard as part of a cooperative worldwide effort, through the United Nations Economic Commission for Europe, to establish best safety and environmental practices for motor vehicle regulations. The test methodology contained in the proposed global tire standard was used by the agency in its evaluation of the high speed and endurance tests. However, the agency decided to use the methodology of FMVSS No. 109, with more stringent test parameters. Are there any voluntary consensus standards or requirements of other countries or regions (*e.g.,* ECE R30) which address the issues raised in this NPRM? Do they provide effective ways of accomplishing the purposes of this rulemaking? What opportunities are there to accomplish the purposes of this rulemaking in ways that minimize any unnecessary differences between NHTSA's requirements and those of other countries and regions?

(2) As noted previously in this NPRM, GM stated in its submission to the docket that while it supports both laboratory and real-world testing, it believes that real-world testing is more valuable. GM, however, did not present any specific proposals or data regarding the test procedures, conditions, specifications, or requirements that should comprise their proposed ''real-world'' testing. At this juncture, NHTSA believes that real-world testing is not practicable due to issues such as the selection of an appropriate control vehicle and vehicle and testing variability. The agency seeks comments on whether practicable and repeatable ''real-world'' testing procedures, conditions, and specifications exist and whether they could be utilized as part of a minimum performance standard.

(3) Whereas FMVSS No. 109 specifies requirements for all tires for use on passenger cars manufactured after 1948, the proposal specifies an applicability containing a temporal limitation for vehicles manufactured after 1975. Since the mid–1970s, radial tires have held an increasingly predominate market share (over bias ply tires) in both the original equipment and replacement tire market. The proposed standard will apply to both bias ply and radial tires, however,

[43] In the STL testing, shearography analysis detected initial stages of belt separation in tires that completed the tests.

its testing procedures and requirements result from the testing and analysis of solely radial tires. The agency seeks comments on the appropriateness of specifying the vehicle model year 1975 as a limitation on the applicability of the proposed standard. Please be specific in your response and provide a basis for your answer.

(4) For the purpose of testing tires and vehicles to determine their compliance, the agency specifies a limited number of permissible inflation pressures in both English and metric units. In FMVSS No. 109, the agency lists four inflation pressures, 32, 36, 40, or 60 psi, which were originally selected based on bias ply tires. In its proposed standard, the agency retains these tire inflation pressures in English units. The agency seeks comments on whether these four inflation pressures should be retained in the proposed standard and/or whether these inflation values should be translated into metric units. Please be specific in your response and provide a basis for your answer.

VII. Benefits

For a fuller discussion of the benefits, see the agency's Preliminary Economic Assessment (PEA). A copy of the PEA has been placed in the docket.

The proposed rule would increase the strength, endurance, and heat resistance of tires by raising the stringency of the existing standard on road hazard, bead unseating, endurance, and high speed tests and by requiring a low pressure performance test. Tires that meet the improved tests would, presumably, experience fewer blowouts, tire failures and de-beading problems.

Based on the tires tested by the agency, and on a comparison of their levels of performance in those tests to the level that they would need to achieve to pass the proposed tests, the agency estimates that tires would perform about 7 percent better in the high speed test and about 15 percent better in the endurance test. The agency considers these results additive, such that the total benefit from these two tests would be 22 percent for those tires that currently would not pass the proposed tests. We then assume that these percent improvements of the high speed and endurance tests directly relate to an improvement in safety. The agency cannot currently quantify the benefits of the other proposed tests.

As discussed in the PEA, a target population, 414 fatalities and 10,275 non-fatal injuries annually, can be estimated for tire problems (flat tire/ blowout). However, the agency does not know how many of these crashes are influenced by tire design or under-inflation. The agency assumes that under-inflation is involved in 20 percent of flat tire/blowout cases that resulted in a crash. The agency assumes that the influence that under-inflation has on the chances of a blowout is affected by both tire pressure and the properties of the tire. Therefore, the agency assumes that proper inflation would represent 50 percent of these cases and improved tires would represent the other 50 percent of these cases. Consequently, 41 fatalities ($414 \times .2 \times .5$) and 1,028 injuries are being assigned to the TPMS Final Rule. This leaves the target population for this proposal at 373 fatalities and 9,247 injuries.

Assuming that the improvement in performance needed to pass the proposed High Speed and Endurance tests (estimated to be 22 percent) related to a reduction in flat tires/blowouts, the total potential improvement would be 82 lives saved ($373 \times .22$) and 2,034 injuries avoided if only those tires in the target population were those that needed improvements. If the tires having flats and blowouts were a random selection of all tires and only benefits accrued to those tires currently not passing the proposed tests (weighted to be 32.8 percent), then the benefits would be 27 lives saved ($373 \times .22 \times .328$) and 667 injuries reduced when all tires on the road meet the proposed High Speed and Endurance test requirements. Additionally, there could be benefits from the proposed Low Inflation Pressure Performance tests and from the proposed Road Hazard and Bead Unseating tests.

Furthermore, agency tire testing indicated that there is a significant variability in tires. If this variability could be reduced, many of the failed tires could pass the proposed tests. If variability in tires were reduced in the real world, this would alter the benefits that may occur from the proposed tests. The agency requests comments on this issue.

VIII. Costs

The following is a summary of the costs associated with the proposed light vehicle tire standard. It is based on the increased stringency of the proposed high speed and endurance tests. For a more detailed analysis, see the agency's PEA.

A. Original Equipment Tire and Vehicle Costs

The proposed tests will result in tires being designed that are less susceptible to heat build-up. The agency believes that many, if not all, of the P-metric tires rated C for Temperature resistance, some P-metric tires rated B for Temperature resistance and some LT tires will not be able to pass the proposed new tests. The agency has attempted to determine the difference in price between two tires that appear be similar in all characteristics except for temperature resistance where one is a B-rated tire and the other is a C-rated tire. There appears to be very few cases where every notable attribute (comparing tire size, warranty, tread wear, and traction) of two different tires are identical except for temperature resistance.

The agency estimates that the difference in price between a B- or C-rated tire that may fail the proposed standard and a B-rated tire that would pass the proposed standard is $3 per tire (in 2001 dollars). Comments are requested on this estimate. Therefore, the cost differential for a vehicle model equipped with C-rated tires, depending on whether it has a full-size spare, is $12 to $15 per vehicle.

Since only a portion of new vehicles are equipped with tires that would not meet the proposed standard, the agency estimates the average price increase for new vehicles by weighting the vehicles that would receive improvements at $3 per tire with the vehicles whose tires and prices would not change. In the Benefits section of the document, the agency estimated that 33 percent of P-metric and 29 percent of LT tires might not pass the proposed standard. Based on the data presented in this document for all crashes by light truck type, we estimate that 10 percent of light trucks have LT tires. Since future sales are estimated to be evenly split between passenger cars and light trucks, 5 percent of all light vehicles ($10\% \times 0.5$) would be equipped with LT tires. Therefore, the agency estimates that 32.8 percent of all light vehicle tires would not meet the proposed standard ($0.33 \times 95\%$ of sales + $0.29 \times 5\%$ of sales). Thus, the cost of the proposed standard per average new vehicle is $3.94 to $4.92 per vehicle.[44] The agency estimates that approximately 85 percent of the light vehicle fleet (passenger cars, pickups, SUVs, and vans) are sold with a temporary spare tire. Thus, the average cost per vehicle for the new vehicle fleet would be $4.09 ($3.94 × 0.85 = $4.92 × .15).

If this proposal resulted in the lowest priced new tires being taken off the market (tires rated C for Temperature resistance appear to be lowest priced tires), there could be market effects on

[44] This range reflects whether the vehicle comes equipped with a temporary spare or full-sized spare tire.

new vehicle and aftermarket tire sales. One effect could be an increased popularity in alternatives to conventional new tires, such as temporary spare tires for new vehicles, and retreads and used tires in the aftermarket. These impacts are difficult to estimate and the agency seeks comments on this issue. Another effect may result from a tire manufacturer making tradeoffs in tire construction, *e.g.,* in traction, treadwear and rolling resistance, to improve the heat resistance of his tires. To effect such a tradeoff, a tire manufacturer could alter the design construction of the core of the tire or could reduce the amount of tread on the tire. When one lessens the amount of tread on a tire, one lowers the heat build-up that occurs in the tire. This strategy has deleterious implications for treadwear and also serves to reduce the wet traction ability of the tire. The agency seeks comments on the relationship between tread depth and heat build-up.

B. Total Annual Costs

The agency estimates that the lowest price aftermarket tire will increase by the same margin as the lowest priced OE tire, $3, to improve up to the performance levels required in the High Speed and Endurance Tests. If the cost for these improved tires was spread across the entire new light vehicle fleet, the average new vehicle price increase would, we estimate, be $4.09 per vehicle.

The agency anticipates that 32.8 percent of the combined sales of P-metric and LT tires would not pass the High Speed and Endurance Tests. There are an estimated 287 million light vehicle tires sold of which 32.8 percent might increase in price by $3 per tire. The overall annual cost of these two tests for new original equipment and replacement tires is estimated at $282 million (287 million tires × .328 × $3) and the net costs per equivalent life saved would be about $7.2 million.

We do not anticipate an increase in costs for the proposed Road Hazard Impact and Bead Unseatings tests because our testing indicates that most of all of current production tires would pass these tests. The agency has not conducted sufficient testing of the proposed Aging tests to anticipate their potential costs. The agency believes, however, that most manufacturers already perform an aging test. Therefore, it is likely that the incremental cost of adding an aging test would be minimal. With regard to the Low Inflation Pressure Performance tests, one alternative would provide no added costs because agency testing indicates that current production tires pass the test. Tires tested to the other alternative have a higher failure margin. Costs for this test cannot be characterized by the agency at this point.

C. Testing Costs

The proposed light vehicle tire standard contains six tests with which every applicable tire must comply. Based on a time-based comparison between the time required to run the tests in FMVSS No. 109 and the proposed FMVSS No. 139, the agency anticipates that the proposal will increase test time by 6.5 hours (an additional 5 hours for the endurance test and 90 minutes for the high-speed low inflation test). Labor costs associated with this additional time is estimated to be $53 per hour for a test engineer for the 90 minute low inflation pressure performance test and $31 per hour for a technician for the 90 minute low inflation pressure performance test and for the additional final 5 hours of the proposed endurance test. Therefore, incremental tests costs are estimated to be $281 per tire run (1.5 hours × [$53 + $31] + 5 hours × $31).

D. Request for Comments on Costs and Benefits of Individual Tests

As discussed above, the agency has only been able to provide preliminary estimates of the costs and benefits of the proposed high speed and endurance tests. Further, the agency has not been able to quantify the costs and benefits of the other four proposed tests. While our analysis would be made simpler if each proposed test yielded similar costs and benefits, the agency anticipates that each proposed test would produce differing levels of costs and benefits. To the extent that the data will allow, the agency requests that commenters evaluate each proposed test separately and quantify the costs and benefits of each of the six tests individually. The agency wishes to acquire information on which tests would be more costly and which tests would create the most benefits for passenger safety. This information will assist the agency in revising its estimates to provide a more precise and accurate evaluation of the costs and safety benefits of the six proposed tests and will aid the agency in determining which tests would become part of the new standard.

IX. Effective Date

Section 10 of the TREAD Act requires the agency to issue a final rule on this tire upgrade proposal by June 1, 2002. Based on this issuance date, the agency proposes two alternative implementation schedules in section VI.H.1. of this document.

X. Rulemaking Analyses and Notices

A. Executive Order 12866 and DOT Regulatory Policies and Procedures

Executive Order 12866, ''Regulatory Planning and Review'' (58 FR 51735, October 4, 1993), provides for making determinations whether a regulatory action is ''significant'' and therefore subject to Office of Management and Budget (OMB) review and to the requirements of the Executive Order. The Order defines a ''significant regulatory action'' as one that is likely to result in a rule that may:

(1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or Tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

NHTSA has considered the impact of this rulemaking action under Executive Order 12866 and the Department of Transportation's regulatory policies and procedures. This rulemaking document was reviewed by the Office of Management and Budget under Executive Order 12866, ''Regulatory Planning and Review.'' The rulemaking action has been determined to be economically significant. The proposal is likely to result in an expenditure by automobile manufacturers and/or tire manufacturers of $282 million in annual costs. NHTSA is placing in the public docket a Preliminary Economic Assessment (PEA) describing the costs and benefits of this rulemaking action. The costs and benefits are summarized earlier in this document.

B. Regulatory Flexibility Act

The Regulatory Flexibility Act of 1980 (5 U.S.C. 601 *et seq.*) requires agencies to evaluate the potential effects of their proposed and final rules on small business, small organizations and small governmental jurisdictions. I hereby certify that the proposed amendment would not have a significant impact on a substantial number of small entities.

The proposed rule would affect motor vehicle manufacturers and tire manufacturers and/or suppliers. The agency does not believe that any of the tire manufacturers are small businesses. However, there are thousands of small tire retail outlets that will in some small way be impacted by this rule. As mentioned earlier, increasing the price of the less expensive tire could potentially allow used tires and retread tires to make more inroads into the tire retail business. This could impact small businesses. At this time, it is unknown whether the impacts will be insignificant and just an increase in price to consumers, or whether there will be some competitive effects brought about by the price increase.

NHTSA estimates that there are only about four small passenger car and light truck vehicle manufacturers in the United States. These manufacturers serve a niche market. The agency believes that small manufacturers manufacture less than 0.1 percent of total U.S. passenger car and light truck production per year.

NHTSA notes that final stage manufacturers and alterers could also be affected by this proposal. Many final stage manufacturers and alterers install supplier manufactured tires in vehicles they produce. The proposal would not have any significant effect on final stage manufacturers or alterers, however, since the tires they purchase should be tested and certified by the tire manufacturer and the potential cost impacts associated with this proposed action should only slightly affect the price of new motor vehicles and replacement tires.

The agency requests comments concerning the economic impact of the proposed rule on small vehicle manufacturers, tire manufacturers, tire retail outlets, final stage manufacturers and vehicle alterers.

Additional information concerning the potential impacts of the proposed requirements on small entities is presented in the PEA.

C. National Environmental Policy Act

NHTSA has analyzed this proposal for the purposes of the National Environmental Policy Act. The agency has determined that implementation of this action would not have any significant impact on the quality of the human environment.

D. Executive Order 13132 (Federalism)

The agency has analyzed this rulemaking in accordance with the principles and criteria contained in Executive Order 13132 and has determined that it does not have sufficient federal implications to warrant consultation with State and local officials or the preparation of a federalism summary impact statement. The proposal would not have any substantial impact on the States, or on the current Federal-State relationship, or on the current distribution of power and responsibilities among the various local officials.

E. Unfunded Mandates Act

The Unfunded Mandates Reform Act of 1995 requires agencies to prepare a written assessment of the costs, benefits and other effects of proposed or final rules that include a Federal mandate likely to result in the expenditure by State, local or tribal governments, in the aggregate, or by the private sector, of more than $100 million annually (adjusted annually for inflation with base year of 1995). Adjusting this amount by the implicit gross domestic product price deflator for the year 2000 results in $109 million (106.99/98.11 = 1.09). The assessment may be included in conjunction with other assessments, as it is here.

This proposal is not estimated to result in expenditures by State, local or tribal governments of more than $109 million annually. However, it is likely to result in the expenditure by automobile manufacturers and/or their tire manufacturers of more than $109 million annually. The average costs estimate in this analysis is $3 per tire. Estimating that 32.8 percent of 287 million light vehicle tires sold annually (including new vehicle tire sales and aftermarket tires sales but excluding temporary spare tires) results in $282 million in annual costs. These effects have been discussed in the PEA.

F. Civil Justice Reform

This proposal would not have any retroactive effect. Under 49 U.S.C. 21403, whenever a Federal motor vehicle safety standard is in effect, a State may not adopt or maintain a safety standard applicable to the same aspect of performance which is not identical to the Federal standard, except to the extent that the state requirement imposes a higher level of performance and applies only to vehicles procured for the State's use. 49 U.S.C. 21461 sets forth a procedure for judicial review of final rules establishing, amending or revoking Federal motor vehicle safety standards. That section does not require submission of a petition for reconsideration or other administrative proceedings before parties may file suit in court.

G. National Technology Transfer and Advancement Act

Under the National Technology and Transfer and Advancement Act of 1995 (NTTAA) (Public Law 104–113), ''all Federal agencies and departments shall use technical standards that are developed or adopted by voluntary consensus standards bodies, using such technical standards as a means to carry out policy objectives or activities determined by the agencies and departments.'' Certain technical standards developed by the Society of Automotive Engineers (SAE) and other bodies have been incorporated into this proposal but the overall need for safety precludes, in NHTSA's view, the adoption of such voluntary standards as a substitute for this proposal for several reasons. First, no one voluntary standard contains all six of the proposed test procedures and requirements in this proposal. Second, voluntary consensus standards do not exist for several of the test procedures and requirements in the agency's proposal. Third, while the testing conditions and procedures of some voluntary standard have been incorporated by reference into the agency's proposal, the specified performance requirements of the voluntary standards are either different than those specified in our proposal or are non-existent.

H. Paperwork Reduction Act

The Department of Transportation is submitting the following information collection request to OMB for review and clearance under the Paperwork Reduction Act of 1995 (Pub.L. 104–13, 44 U.S.C. Chapter 35).

Agency: National Highway Traffic Safety Administration (NHTSA).

Title: Phase-In Production Reporting Requirements for new pneumatic tires for use on vehicles with a gross vehicle weight rating of 10,000 pounds or less.

Type of Request: Routine.

OMB Clearance Number: 2127–[XXXX].

Affected Public: The respondents are manufacturers of tires. The agency estimates that there are about 75 such manufacturers.

Estimate of the Total Annual Reporting and Recordkeeping Burden Resulting from the Collection of Information: NHTSA estimates that the total annual hour burden is 75 hours.

Estimated Costs: NHTSA estimates the total cost annual burden, in dollars to be $0. No additional resources would be expended by manufacturers to gather annual production information because they already compile this data for their own uses.

Summary of the Collection of Information: This collection would require manufacturers of new pneumatic tires to provide tire production data for the year September 1, 2003 to August 31, 2004.

Description of the Need for the Information and Proposed Use of the Information: The purpose of the reporting requirements would be to aid the National Highway Traffic Safety Administration in determining whether a manufacturer of tires has complied with the requirements of Standard No. 139 during the phase-in of those requirements. NHTSA requests comments on the agency's estimates of the total annual hour and cost burdens resulting from this collection of information. These comments must be received on or before May 6, 2002.

I. Plain Language

Executive Order 12866 and the President's memorandum of June 1, 1998, require each agency to write all rules in plain language. Application of the principles of plain language includes consideration of the following questions:

- Have we organized the material to suit the public's needs?
- Are the requirements in the rule clearly stated?
- Does the rule contain technical language or jargon that isn't clear?
- Would a different format (grouping and order of sections, use of headings, paragraphing) make the rule easier to understand?
- Would more (but shorter) sections be better?
- Could we improve clarity by adding tables, lists, or diagrams?
- What else could we do to make the rule easier to understand?

If you have any responses to these questions, please include them in your comments on this proposal.

XI. Submission of Comments

How Can I Influence NHTSA's Thinking on This Proposed Rule?

In developing this proposal, we tried to address the concerns of all our stakeholders. Your comments will help us improve this rule. We invite you to provide different views on options we propose, new approaches we haven't considered, new data, how this proposed rule may affect you, or other relevant information. We welcome your views on all aspects of this proposed rule, but request comments on specific issues throughout this document. We grouped these specific requests near the end of the sections in which we discuss the relevant issues. Your comments will be most effective if you follow the suggestions below:

- Explain your views and reasoning as clearly as possible.
- Provide solid technical and cost data to support your views.
- If you estimate potential costs, explain how you arrived at the estimate.
- Tell us which parts of the proposal you support, as well as those with which you disagree.
- Provide specific examples to illustrate your concerns.
- Offer specific alternatives.
- Refer your comments to specific sections of the proposal, such as the units or page numbers of the preamble, or the regulatory sections.
- Be sure to include the name, date, and docket number with your comments.

How Do I Prepare and Submit Comments?

Your comments must be written and in English. To ensure that your comments are correctly filed in the Docket, please include the docket number of this document in your comments.

Your comments must not be more than 15 pages long. (49 CFR 553.21). We established this limit to encourage you to write your primary comments in a concise fashion. However, you may attach necessary additional documents to your comments. There is no limit on the length of the attachments.

Please submit two copies of your comments, including the attachments, to Docket Management at the address given above under **ADDRESSES**.

Comments may also be submitted to the docket electronically by logging onto the Dockets Management System website at *http://dms.dot.gov.* Click on ''Help & Information'' or ''Help/Info'' to obtain instructions for filing the document electronically.

How Can I Be Sure That My Comments Were Received?

If you wish Docket Management to notify you upon its receipt of your comments, enclose a self-addressed, stamped postcard in the envelope containing your comments. Upon receiving your comments, Docket Management will return the postcard by mail.

How Do I Submit Confidential Business Information?

If you wish to submit any information under a claim of confidentiality, you should submit three copies of your complete submission, including the information you claim to be confidential business information, to the Chief Counsel, NHTSA, at the address given above under **FOR FURTHER INFORMATION CONTACT**. In addition, you should submit two copies, from which you have deleted the claimed confidential business information, to Docket Management at the address given above under **ADDRESSES**. When you send a comment containing information claimed to be confidential business information, you should include a cover letter setting forth the information specified in our confidential business information regulation. (49 CFR part 512.)

Will the Agency Consider Late Comments?

We will consider all comments that Docket Management receives before the close of business on the comment closing date indicated above under **DATES**. To the extent possible, we will also consider comments that Docket Management receives after that date. If Docket Management receives a comment too late for us to consider it in developing a final rule (assuming that one is issued), we will consider that comment as an informal suggestion for future rulemaking action.

How Can I Read the Comments Submitted by Other People?

You may read the comments received by Docket Management at the address given above under **ADDRESSES**. The hours of the Docket are indicated above in the same location.

You may also see the comments on the Internet. To read the comments on the Internet, take the following steps:

(1) Go to the Docket Management System (DMS) Web page of the Department of Transportation (*http://dms.dot.gov/*).

(2) On that page, click on ''search.''

(3) On the next page (*http://dms.dot.gov/search/*), type in the four-digit docket number shown at the beginning of this document. Example: If the docket number were ''NHTSA–1998–1234,'' you would type ''1234.'' After typing the docket number, click on ''search.''

(4) On the next page, which contains docket summary information for the docket you selected, click on the desired comments. You may download the comments. However, since the comments are imaged documents, instead of word processing documents, the downloaded comments are not word searchable.

Please note that even after the comment closing date, we will continue to file relevant information in the Docket as it becomes available. Further, some people may submit late comments.

Accordingly, we recommend that you periodically check the Docket for new material.

XII. Proposed Regulatory Text

List of Subjects in 49 CFR Part 571

Imports, Motor vehicle safety, Motor vehicles, Rubber and rubber products, and Tires.

In consideration of the foregoing, we propose to amend 49 CFR part 571 as follows:

PART 571—FEDERAL MOTOR VEHICLE SAFETY STANDARDS

1. The authority citation for part 571 would continue to read as follows:

Authority: 49 U.S.C. 322, 20111, 30115, 30166 and 30177; delegation of authority at 49 CFR 1.50.

2. Section 571.109 would be removed.

3. Section 571.110, as proposed to be amended in the Notice of Proposed Rulemaking published on December 19, 2001 (66 FR 65536), would be further amended by revising S4.2.1, S4.2.2, and S4.4.1(a), by adding S4.2.1.1, S4.2.1.2, S4.2.2.1, S4.2.2.2, S4.2.2.3, and S4.4.2 and by adding to S3 in alphabetical order, definitions for ''Rim size designation,'' ''Rim diameter,'' ''Rim width,'' ''Rim type designation,'' ''Weather side,'' to read as follows:

§ 571.110 Standard No. 110; Tire selection and rims for motor vehicles with a GVWR of 10,000 pounds or less.

* * * * *

S3. Definitions

* * * * *

Rim diameter means nominal diameter of the bead seat.

Rim size designation means rim diameter and width.

Rim type designation means the industry of manufacturer's designation for a rim by style or code.

Rim width means nominal distance between rim flanges.

* * * * *

Weather side means the surface area of the rim not covered by the inflated tire.

* * * * *

S4.2.1 Tire Load Limits for Passenger Cars

S4.2.1.1 The vehicle maximum load on the tire shall not be greater than the applicable maximum load rating as marked on the sidewall of the tire.

S4.2.1.2. The vehicle normal load on the tire shall not be greater than 85 percent (as specified in the high speed performance test in S6.1 of § 571.139) of the load rating at the vehicle manufacturer's recommended cold inflation pressure for that tire.

S4.2.2 Tire Load Limits for Multipurpose Passenger Vehicles, Trucks, Buses, and Trailers

S4.2.2.1 Except as provided in S4.2.2.2, the sum of the maximum load ratings of the tires fitted to an axle shall not be less than the GAWR of the axle system as specified on the vehicle's certification label required by 49 CFR part 567. If the certification label shows more than one GAWR for the axle system, the sum shall be not less than the GAWR corresponding to the size designation of the tires fitted to the axle. If the size designation of the tires fitted to the axle does not appear on the certification label, the sum shall not be less than the lowest GAWR appearing on the label.

S4.2.2.2 When passenger car (P-metric) tires are installed on an MPV, truck, bus, or trailer, each tire's load rating is reduced by dividing it by 1.10 before determining, under S4.2.2.1, the sum of the maximum load ratings of the tires fitted to an axle.

S4.2.2.3 (a) For vehicles equipped with P-metric tires, the vehicle normal load on the tire shall be no greater than the derated value of 85 percent (as specified in the high speed performance test in S6.1 of § 571.139) of the load rating at the vehicle manufacturer's recommended cold inflation pressure for that tire.

(b) For vehicles equipped with LT tires, the vehicle normal load on the tire shall be no greater than 85 percent (as specified in the high speed performance test in S6.1 of § 571.139) of the load rating at the vehicle manufacturer's recommended cold inflation pressure for that tire.

* * * * *

S4.4.1 * * *

(a) Be constructed to the dimensions of a rim that is listed by the manufacturer of the tires as suitable for use with those tires, in accordance with S4 of § 571.139.

(b) * * *

S4.4.2. *Rim markings for vehicles other than passenger cars.* Each rim or, at the option of the manufacturer in the case of a single-piece wheel, each wheel disc shall be marked with the information listed in paragraphs (a) through (e) of this S4.4.2, in lettering not less than 3 millimeters in height, impressed to a depth or, at the option of the manufacturer, embossed to a height of not less than 0.125 millimeters. The information listed in paragraphs (a) through (c) of this S4.2.2 shall appear on the outward side. In the case of rims of multi piece construction, the information listed in paragraphs (a) through (e) of this S4.2.2 shall appear on the rim base and the information listed in paragraphs (b) and (d) of this S4.2.2 shall also appear on each other part of the rim.

(a) A designation which indicates the source of the rim's published nominal dimensions, as follows:

(1) ''T'' indicates The Tire and Rim Association.

(2) ''E'' indicates The European Tyre and Rim Technical Organization.

(3) ''J'' indicates Japan Automobile Tire Manufacturers'' Association, Inc.

(4) ''D'' indicates Deutsche Industrie Norm.

(5) ''S'' indicates Scandinavian Tire and Rim Organization.

(6) ''A'' indicates The Tyre and Rim Association of Australia.

(7) ''N'' indicates an independent listing pursuant to S4.1 of § 571.139 or S5.1(a) of § 571.119.

(b) The rim size designation, and in case of multipiece rims, the rim type designation. For example: 20 x 5.50, or 20 x 5.5.

(c) The symbol DOT, constituting a certification by the manufacturer of the rim that the rim complies with all applicable Federal motor vehicle safety standards.

(d) A designation that identifies the manufacturer of the rim by name, trademark, or symbol.

(e) The month, day and year or the month and year of manufacture, expressed either numerically or by use of a symbol, at the option of the manufacturer. For example: ''September 4, 2001'' may be expressed numerically as: ''90401'', ''904, 01'' or ''01, 904''; ''September 2001'' may be expressed as: ''901'', ''9, 01'' or ''01, 9''.

(1) Any manufacturer that elects to express the date of manufacture by means of a symbol shall notify NHTSA in writing of the full names and addresses of all manufacturers and brand name owners utilizing that symbol and the name and address of the trademark owner of that symbol, if any. The notification shall describe in narrative form and in detail how the month, day, and year or the month and year are depicted by the symbol. Such description shall include an actual size graphic depiction of the symbol, showing and/or explaining the interrelationship of the component parts of the symbol as they will appear on the rim or single piece wheel disc, including dimensional specifications, and where the symbol will be located on the rim or single piece wheel disc. The notification shall be received by NHTSA not less than 60 calendar days before the first use of the symbol. The notification

shall be mailed to the Office of Vehicle Safety Compliance (NSA–30), National Highway Traffic Safety Administration, 400 Seventh Street SW., Washington, DC 20590. All information provided to NHTSA under this paragraph will be placed in the public docket.

(2) Each manufacturer of wheels shall provide an explanation of its date of manufacture symbol to any person upon request.

* * * * *

4. Section 571.117, as proposed to be amended in the Notice of Proposed Rulemaking published on December 19, 2001 (66 FR 65536), would be further amended by revising S1, S2, and S3, and by removing the phrase "§ 571.109" wherever it appears and adding in its place the phrase "§ 571.139" in S4.2, S5.1.1, S5.1.2, and S5.1.4, to read as follows:

§ 571.117 Standard No. 117; Retreaded pneumatic tires.

S1. *Scope.* This standard specifies performance, labeling, and certification requirements for retreaded pneumatic tires for motor vehicles, except for motorcycles, with a GVWR of 10,000 pounds or less.

S2. *Purpose.* The purpose of this standard is to require retreaded pneumatic tires for motor vehicles, except for motorcycles and trailers, with a GVWR of 10,000 pounds or less, to meet safety criteria similar to those for new pneumatic tires for those vehicles.

S3. *Application.* This standard applies to retreaded pneumatic tires for use on motor vehicles, except for motorcycles, with a GVWR of 10,000 pounds or less, manufactured after 1975.

* * * * *

5. Section 571.119 would be amended by revising its heading, S1, S2, and S3, to read as follows:

§ 571.119 Standard No. 119; New pneumatic tires for motor vehicles with a GVWR of more than 10,000 pounds.

S1. *Scope.* This standard establishes performance and marking requirements for tires for use on motor vehicles with a GVWR of more than 10,000 pounds and motorcycles.

S2. *Purpose.* The purpose of this standard is to provide safe operational performance levels for tires used on motor vehicles with a GVWR of more than 10,000 pounds, trailers, and motorcycles, and to place sufficient information on the tires to permit their proper selection and use.

S3. *Application.* This standard applies to new pneumatic tires designed for highway use on motor vehicles with a GVWR of more than 10,000 pounds, trailers, and motorcycles manufactured after 1948.

* * * * *

6. Tables I, II, and III, in the tables at the end of § 571.119, would be revised to read as follows:

BILLING CODE 4910–59–P

TABLE I—STRENGTH TEST PLUNGER DIAMETER

	Plunger diameter	
	(mm)	(inches)
Tire type:		
Light truck	19.05	3/4
Motorcycle	....	5/16
Tires for 12-inch or smaller rims, except motorcycle	19.05	3/4
Tires other than above types:		
Tubeless:		
17.5-inch or smaller rims	19.05	3/4
Larger than 17.5-inch rims:		
Load range F	31.75	1 1/4
Load range over F	38.10	1 1/2
Tube type:		
Load range F	31.75	1 1/4
Load range over F	38.10	1 1/2

TABLE II—MINIMUM STATIC BREAKING ENERGY (JOULES (J)) AND INCH-POUNDS (INCH-LBS))

Load Range			All 12 rim diameter code or smaller rim size		Light truck 17.5 rim diameter or smaller rime tubeless		Tube Type		Tubeless		Tube Type		Tubeless	
Tire Characteristic	Motorcycle		19.05 J	¾"	19.05 J	¾"	31.75 J	1 ¼"	J	Inch-lbs	38.10 J	1 ½"	J	Inch-lbs
Plunger diameter (mm and inches)	7.94 J	5/16"												
A	16	150	....	....	....	....	....	....	....	....	....	....	....	....
B	33	300	....	....	....	....	....	....	....	....	....	....	....	....
C	45	400	....	....	....	....	....	....	....	....	....	....	....	....
D	....	....	....	....	....	....	....	....	....	....	....	....	....	....
E	....	....	....	....	....	....	....	....	....	....	....	....	....	....
F	....	....	406	3,600	644	5,700	1,785	15,800	1,412	12,500	....	....	....	....
G	....		....	....	711	6,300	....	....	....	....	2,282	20,200	1,694	15,000
H	....	....	....	....	768	6,800	....	....	....	....	2,598	23,000	2,090	18,500
J	....	....	....	....	....	....	....	....	....	....	2,824	25,000	2,203	19,500
L	....	....	....	....	....	....	....	....	....	....	3,050	27,000	....	....
M	....	....	....	....	....	....	....	....	....	....	3,220	28,500	....	....
N	....	....	....	....	....	....	....	....	....	....	3,389	30,000	....	....

TABLE III—ENDURANCE TEST SCHEDULE

Description	Load Range	Test wheel speed (r/m)	Test load: Percent of maximum load rating			Total Best Revolutions (thousands)
			I-7 hours	II-16 hours	III-24 hours	
Speed restricted service:						
88 km/h (55 mph)	F,G,H,J, L, M, N	125	66	84	101	352.0
80 km/h (50 mph)	F,G,H,J, L	100	66	84	101	282.5
56 km/h (35 mph)	All	75	66	84	101	211.0
Motorcycle	All	250	[1] 100	[2] 108	117	510.0
All other	F	200	66	84	101	564.0
	G	175	66	84	101	493.5
	H,J,L,N	150	66	84	101	423.5

[1] 4 hr. for tire sizes subject to high speed requirements (S6.3).
[2] 6 hr. for tire sizes subject to high speed requirements (S6.3).

BILLING CODE 4910–59–C

7. Section 571.120, as proposed to be amended in the Notice of Proposed Rulemaking published on December 19, 2001 (66 FR 65536), would be further amended by revising S5.1.1, and S5.1.2 to read as follows:

§ 571.120 Standard No. 120; Tire selection and rims for motor vehicles with a GVWR of more than 10,000 pounds.

* * * * *

S5.1.1 Except as specified in S5.1.3, each vehicle equipped with pneumatic tires for highway service shall be equipped with tires that meet the requirements of § 571.119, New pneumatic tires for motor vehicles with a GVWR of more than 10,000 pounds, and rims that are listed by the manufacturer of the tires as suitable for use with those tires, in accordance with S5.1 of § 571.119, except that vehicles may be equipped with a non-pneumatic spare tire assembly that meets the requirements of § 571.129, New non-pneumatic tires for passenger cars, and S8 of this standard. Vehicles equipped with such an assembly shall meet the requirements of S5.3.3, S7, and S9 of this standard.

S5.1.2 Except in the case of a vehicle which has a speed attainable in 3.2 kilometers of 80 kilometers per hour or less, the sum of the maximum load ratings of the tires fitted to an axle shall be not less than the gross axle weight rating (GAWR) of the axle system as specified on the vehicle's certification label required by 49 CFR part 567. Except in the case of a vehicle which has a speed attainable in 2 miles of 50 mph or less, the sum of the maximum load ratings of the tires fitted to an axle shall be not less than the gross axle weight rating (GAWR) of the axle system as specified on the vehicle's certification label required by 49 CFR part 567. If the certification label shows more than one GAWR for the axle system, the sum shall be not less than the GAWR corresponding to the size designation of the tires fitted to the axle. If the size designation of the tires fitted to the axle does not appear on the certification label, the sum shall be not less than the lowest GAWR appearing on the label.

* * * * *

8. Section 571.129, as proposed to be amended in the Notice of Proposed Rulemaking published on December 19, 2001 (66 FR 65536), would be further amended by revising S2, S4.2.2.4, S4.2.2.5, S4.2.2.6, and by removing S5.3 through S6, to read as follows:

§ 571.129— New non-pneumatic tires for motor vehicles with a GVWR of 10,000 pounds or less.

* * * * *

S2. Application. This standard applies to temporary non-pneumatic tires for use on motor vehicles, except for motorcycles, with a GVWR of 10,000 pounds or less, manufactured after 1975.

* * * * *

S4.2.2.4 Road Hazard Impact. Each new non-pneumatic tire shall comply with the requirements of S6.5 of § 571.139.

S4.2.2.5 Tire Endurance. Each new non-pneumatic tire shall comply with the requirements of S6.3 of § 571.139.

S4.2.2.6 High Speed Performance. Each new non-pneumatic tire shall comply with the requirements of S6.2 of § 571.139.

* * * * *

9. Section 571.139, as proposed to be added in the Notice of Proposed Rulemaking published on December 19, 2001 (66 FR 65536), would be amended by adding S3, S5.1 through S5.4, S6 and S7 to read as follows:

§ 571.139 Standard No. 139; New pneumatic tires for motor vehicles with a GVWR of 10,000 pounds or less.

* * * * *

S3. Definitions.

Bead means the part of the tire that is made of steel wires, wrapped or reinforced by ply cords and that is shaped to fit the rim.

Bead separation means a breakdown of the bond between components in the bead.

Bias ply tire means a pneumatic tire in which the ply cords that extend to the beads are laid at alternate angles substantially less than 90 degrees to the centerline of the tread.

Carcass means the tire structure, except tread and sidewall rubber which, when inflated, bears the load.

Chunking means the breaking away of pieces of the tread or sidewall.

Cord means the strands forming the plies in the tire.

Cord separation means the parting of cords from adjacent rubber compounds.

Cracking means any parting within the tread, sidewall, or inner liner of the tire extending to cord material.

CT means a pneumatic tire with an inverted flange tire and rim system in which the rim is designed with rim flanges pointed radially inward and the tire is designed to fit on the underside of the rim in a manner that encloses the rim flanges inside the air cavity of the tire.

Extra load tire means a tire designed to operate at higher loads and at higher inflation pressures than the corresponding standard tire.

Groove means the space between two adjacent tread ribs.

Innerliner means the layer(s) forming the inside surface of a tubeless tire that contains the inflating medium within the tire.

Innerliner separation means the parting of the innerliner from cord material in the carcass.

Light truck (LT) tire means a tire designated by its manufacturer as primarily intended for use on lightweight trucks or multipurpose passenger vehicles.

Load rating means the maximum load that a tire is rated to carry for a given inflation pressure.

Maximum load rating means the load rating for a tire at the maximum permissible inflation pressure for that tire.

Maximum permissible inflation pressure means the maximum cold inflation pressure to which a tire may be inflated.

Measuring rim means the rim on which a tire is fitted for physical dimension requirements.

Open splice means any parting at any junction of tread, sidewall, or innerliner that extends to cord material.

Outer diameter means the overall diameter of an inflated new tire.

Overall width means the linear distance between the exteriors of the sidewalls of an inflated tire, including elevations due to labeling, decorations, or protective bands or ribs.

Ply means a layer of rubber-coated parallel cords.

Ply separation means a parting of rubber compound between adjacent plies.

Pneumatic tire means a mechanical device made of rubber, chemicals, fabric and steel or other materials, that, when mounted on an automotive wheel, provides the traction and contains the gas or fluid that sustains the load.

Radial ply tire means a pneumatic tire in which the ply cords that extend to the beads are laid at substantially 90 degrees to the centerline of the tread.

Reinforced tire means a tire designed to operate at higher loads and at higher inflation pressures than the corresponding standard tire.

Rim means a metal support for a tire or a tire and tube assembly upon which the tire beads are seated.

Section width means the linear distance between the exteriors of the sidewalls of an inflated tire, excluding elevations due to labeling, decoration, or protective bands.

Sidewall means that portion of a tire between the tread and bead.

Sidewall separation means the parting of the rubber compound from the cord material in the sidewall.

Test rim means the rim on which a tire is fitted for testing, and may be any rim listed as appropriate for use with that tire.

Tread means that portion of a tire that comes into contact with the road.

Tread rib means a tread section running circumferentially around a tire.

Tread separation means pulling away of the tread from the tire carcass.

Treadwear indicators (TWI) means the projections within the principle grooves designed to give a visual indication of the degrees of wear of the tread.

Wheel-holding fixture means the fixture used to hold the wheel and tire assembly securely during testing.

* * * * *

S5. General requirements

S5.1. *Size and construction.* Each tire shall fit each rim specified for its size designation in accordance with S4.1.

S5.2. *Performance requirements.* Each tire shall conform to each of the following:

(a) It shall meet the requirements specified in S6 for its tire size designation, type, and maximum permissible inflation pressure.

(b) It shall meet each of the applicable requirements set forth in paragraphs (c) and (d) of this S5.2, when mounted on a model rim assembly corresponding to any rim designated by the tire manufacturer for use with the tire in accordance with S4.

(c) Except in the case of a CT tire, its maximum permissible inflation pressure shall be either 32, 36, 40, or 60 psi, or 240, 280, 300, 340, or 350 kPa. For a CT tire, the maximum permissible inflation pressure shall be either 290, 330, 350, or 390 kPa.

(d) Its load rating shall be that specified either in a submission made by an individual manufacturer, pursuant to S4, or in one of the publications described in S4 for its size designation, type and each appropriate inflation pressure. If the maximum load rating for a particular tire size is shown in more than one of the publications described in S4, each tire of that size designation shall have a maximum load rating that is not less than the published maximum load rating, or if there are differing maximum load ratings for the same tire size designation, not less then the lowest published maximum load rating.

S5.3. *Test sample.* For the tests specified in S6, use:

(a) One tire for high speed;

(b) Another tire for endurance and high speed low inflation pressure performance;

(c) Another tire for road hazard impact test and bead unseating; and

(d) A fourth tire for aging effects.

S5.4. *Treadwear indicators.* Except in the case of tires with a 12-inch or smaller rim diameter, each tire shall have not less than six treadwear indicators spaced approximately equally around the circumference of the tire that enable a person inspecting the tire to determine visually whether the tire has worn to a tread depth of one sixteenth of an inch. Tires with 12-inch or smaller rim diameter shall have not less than three such treadwear indicators.

* * * * *

S6. *Test procedures, conditions and performance requirements.* Each tire shall meet all of the applicable requirements of this section when tested according to the conditions and procedures set forth in S5 and S6.1 through S6.7.

S6.1. Tire Dimensions

S6.1.1 *Test conditions and procedures.*

S6.1.1.1 *Tire Preparation.*

S6.1.1.1.1 Mount the tire on the measuring rim specified by the tire manufacturer or in one of the publications listed in S4.1.1

S6.1.1.1.2 In the case of a P-metric tire, inflate it to the pressure specified in the following table:

Radial and bias-belted inflation pressure (kPa)		Diagonal (bias-ply) inflation pressure (kPa)			T-type temporary use spare inflation pressure (kPa)	CT tires (kPa)	
Standard	Reinforced	Ply rating				Standard	Reinforced
		4	6	8			
180	220	170	190	220	420	230	270

S6.1.1.1.3 In the case of a LT tire, inflate it to the pressure index given by the manufacturer.

S6.1.1.1.4 Condition the assembly at 25 ±5°C for not less than 24 hours.

S6.1.1.1.5 Readjust the tire pressure to that specified in S6.1.1.2.

S6.1.1.2 Test Procedure

S6.1.1.2.1 Measure the section width and overall width by caliper at six points approximately equally spaced around the circumference of the tire, avoiding measurement of the additional thickness of the special protective ribs or bands. The average of the measurements so obtained are taken as the section width and overall width, respectively.

S6.1.1.2.2 Determine the outer diameter by measuring the maximum circumference of the tire and dividing the figure so obtained by Pi (3.14).

S6.1.2 *Performance Requirements.* The actual section width and overall width for each tire measured in accordance with S6.1.1.2, shall not exceed the section width specified in a submission made by an individual manufacturer, pursuant to S4.1.1(a) or in one of the publications described in S4.1.1(b) for its size designation and type by more than:

(a) (For tires with a maximum permissible inflation pressure of 32, 36, or 40 psi) 7 percent, or

(b) (For tires with a maximum permissible inflation pressure of 240, 280, 290, 300, 330, 350 or 390 kPa, or 60 psi) 7 percent or 10 mm (0.4 inches), whichever is larger.

S6.2 High Speed.

S6.2.1 *Test conditions and procedures.*

S6.2.1.1 *Preparation of tire.*

S6.2.1.1.1 Mount the tire on a test rim and inflate it to the pressure specified for the tire in the following table:

Tire application	Test pressure (kPa)
P-metric:	
Standard load	220
Extra load	260
Load Range C	320
Load Range D	410
Load Range E	500
CT:	
Standard load	270
Extra load	310

S6.2.1.1.2. Condition the assembly at 35 ± 5°C for not less than three hours.

S6.2.1.1.3 Before or after mounting the assembly on a test axle, readjust the tire pressure to that specified in S6.2.1.1.1.

S6.2.1.2. *Test procedure.*

S6.2.1.2.1 Press the assembly against the outer face of a test drum with a diameter of 1.70 m ± 1%.

S6.2.1.2.2 Apply to the test axle a load equal to 85% of the tire's maximum load carrying capacity.

S6.2.1.2.3 Break-in the tire by running it for 15 minutes at 80 km/h.

S6.2.1.2.4 Allow tire to cool to 40°C and readjust inflation pressure to applicable pressure in 6.2.1.1.1 immediately before the test.

S6.2.1.2.5 Throughout the test, the inflation pressure is not corrected and the test load is maintained at the value applied in S6.2.1.2.2.

S6.2.1.2.6 During the test, the ambient temperature, at a distance of not less than 150 mm and not more than 1 m from the tire, shall be maintained at not less than 40° C.

S6.2.1.2.7 The test is conducted, continuously and uninterrupted, for ninety minutes through three thirty minute consecutive test stages at the following speeds: 140, 150, and 160 km/h.

S6.2.1.2.8 Not more than 15 minutes after running the tire for the specified time, measure its inflation pressure. Allow the tire to cool for one hour. Then, deflate the tire and remove it from the test rim.

S6.2.2 *Performance requirements.* When the tire is tested in accordance with S6.2.1:

(a) There shall be no visible evidence of tread, sidewall, ply, cord, innerliner, belt or bead separation, chunking, open splices, cracking, or broken cords.

(b) The tire pressure, when measured not more than 15 minutes after the test, shall not be less than the initial pressure specified in S6.2.1.

S6.3 *Tire Endurance.*

S6.3.1 *Test conditions and procedures.*

S6.3.1.1 *Preparation of Tire.*

S6.3.1.1.1 Mount the tire on a test rim and inflate it to the pressure specified for the tire in the following table:

Tire application	Test pressure (kPa)
P-metric:	
Standard load	180
Extra load	220
LT:	
Load Range C	260
Load Range D	340
Load Range E	410
CT:	
Standard load	230
Extra load	270

S6.3.1.1.2 Condition the assembly at 35 ± 5° C for not less than three hours.

S6.3.1.1.3 Readjust the pressure to the value specified in S6.3.1.1.1 immediately before testing.

S6.3.1.2. *Test Procedure.*

S6.3.1.2.1 Mount the assembly on a test axle and press it against the outer face of a smooth wheel having a diameter of 1.70 m ± 1%.

S6.3.1.2.2 During the test, the ambient temperature, at a distance of not less than 150 mm and not more than 1 m from the tire, shall not be less than 40° C.

S6.3.1.2.3 Conduct the test, without interruptions, at not less than 120 km/h test speed with loads and test periods not less than those shown in the following table:

Test period	Duration (hours)	Load as a percentage of tire maximum load rating (percent)
1	8	90
2	10	100
3	22	110

S6.3.1.2.4 Throughout the test, the inflation pressure is not corrected and the test loads are maintained at the value corresponding to each test period, as shown in the table in S6.3.1.2.3.

S6.3.1.2.5 Not more than 15 minutes after running the tire for the time specified in the table in S6.3.1.2.3, measure its inflation pressure. Allow the tire to cool for one hour. Then, deflate the tire and remove it from the test rim.

S6.3.2 *Performance requirements.* When the tire is tested in accordance with S6.3.1:

(a) There shall be no visible evidence of tread, sidewall, ply, cord, innerliner, belt or bead separation, chunking, open splices, cracking or broken cords.

(b) The tire pressure, when measured not more than 15 minutes after the test, shall not be less than the initial pressure specified in S6.1.1.

S6.4 *Low Inflation Pressure Performance.*

S6.4.1 *Test conditions and procedures.*

S6.4.1.1 *Preparation of tire.*

S6.4.1.1.1 Mount the same tire tested in accordance with 6.3 on a test rim and inflate it to the following appropriate pressure:

Tire application	Test pressure (kPa)
P-metric:	
Standard load	140
Extra load	160
LT:	
Load Range C	200
Load Range D	260
Load Range E	320
CT:	
Standard load	170
Extra load	180

S6.4.1.1.2 Condition the assembly at 35 ± 5° C for not less than three hours.

S6.4.1.1.3 Before or after mounting the assembly on a test axle, readjust the tire pressure to that specified in S6.3.1.1.1.

[Proposed S6.4.1.2 through S6.4.1.2.6—Alternative 1]

S6.4.1.2 *Test procedure.*

S6.4.1.2.1 The test is conducted for ninety minutes at the end of the test specified in S6.3, continuous and uninterrupted, at a speed of 120 km/h.

S6.4.1.2.2 Press the assembly against the outer face of a test drum with a diameter of 1.70 m ± 1%.

S6.4.1.2.3 Apply to the test axle a load equal to 100% of the tire's maximum load carrying capacity.

S6.4.1.2.4 Throughout the test, the inflation pressure is not corrected and the test load is maintained at the initial level.

S6.4.1.2.5 During the test, the ambient temperature, at a distance of not less than 150 mm and not more than 1 m from the tire, is maintained at not less than 40° C.

S6.4.1.2.6 Not more than 15 minutes after running the tire for the specified time, measure its inflation pressure. Allow the tire to cool for one hour. Then, deflate the tire and remove it from the test rim.

[Proposed S6.4.1.2 through S6.4.1.2.6—Alternative 2]

S6.4.1.2 *Test procedure.*
S6.4.1.2.1 Press the assembly against the outer face of the test drum.
S6.4.1.2.2. Apply to the test axle a load equal to 67% of the tire's maximum load carrying capacity.
S6.4.1.2.3 Throughout the test, the inflation pressure is not corrected and the test load is maintained at the original level.
S6.4.1.2.4 During the test, the ambient temperature, at a distance of not less than 150 mm and not more than 1 m from the tire, is maintained at not less than 40° C.
S6.4.1.2.5 The test is conducted, continuously and uninterrupted, for ninety minutes through three consecutive test stages of 30 minutes each at the following speeds: 140, 150, and 160 km/h.
S6.4.1.2.6 Allow the tire to cool for one hour. Then deflate the tire and remove it from the test rim.
S6.4.2 *Performance requirements.* When the tire is tested in accordance with S6.4.1:
(a) There shall be no visible evidence of tread, sidewall, ply, cord, innerliner, belt or bead separation, chunking, open splices, cracking, or broken cords. For tires tested at a speed of 300 km/h or above, superficial blistering in the tire tread due to localized heat build-up in the test drum is acceptable.
(b) The tire pressure, when measured not more than 15 minutes after the test, shall not be less than the initial pressure specified in S6.4.1.1.1.

S6.5 Road Hazard Impact.

S6.5.1 *Test conditions and procedures.*
S6.5.1.1 *Test conditions.*
S6.5.1.1.1 The tire is prepared and mounted on the equipment in accordance with section 3.2 of SAE Recommended Practice J1981 (JUN94), Road Hazard Impact Test for Wheel and Tire Assemblies (Passenger Car, Light Truck, and Multipurpose Vehicles).
S6.5.1.1.2 The test pressure shall be inflated to the appropriate test pressure:

Tire application	Test pressure (kPa)
P-metric:	....
Standard load	180
Extra load	220
LT:	
Load Range C	260
Load Range D	340
Load Range E	410

S6.5.1.2 *Test procedures.* The test is conducted in accordance with the test procedures described in section 3.3 of SAE Recommended Practice J1981 (JUN94). Initiate the test by raising the pendulum to a drop height based on a pendulum centerline angle of 80 degrees to the vertical. Repeat the test so that the impact occurs at five test points equally spaced around the circumference of the tire.

S6.5.2 *Performance requirements.*

S6.5.2.1 When the tire has been tested in accordance with S6.5.1.2 using a test rim that undergoes no permanent deformation, the test pressure shall not be less than the initial test pressures specified in S6.5.1.1.

S6.5.2.2 There shall be no visible evidence of tread, sidewall, ply, cord, inner liner, belt or bead separation, chunking, open splices, cracking, or broken cords.

S6.6 Bead Unseating.

S6.6.1 *Test conditions and procedures.*

S6.6.1.1 *Test conditions.*

S6.6.1.1.1 *Tire inclination angle.* The tire inclination angle is 5° to the vertical axis.

S6.6.1.1.2 *Simulated road surface inclination angle.* The simulated road surface inclination angle is 10° to the horizontal. The road surface shall be free from rubber and other substances.

S6.6.1.1.3 *Tire mounting.* No lubricant, such as soapy water, is used when mounting tire. The tire inflation pressure, after mounting, is set at the appropriate test pressure:

Tire Application	Test pressure (kPa)
P-metric:	
Standard load	180
Extra load	220
LT:	
Load Range C	260
Load Range D	340
Load Range E	410

S6.6.1.2 *Test procedure.* Apply a lateral force of 2.0 times the maximum tire load labeled on the tire sidewall at a rate of 220 millimeters per second (mm/s) to the tire, and maintain the lateral force for 20 seconds. Repeat the test at no less than four points equally spaced around the tire circumference.

S6.6.2 *Performance requirements.* When a tire is tested in accordance with S6.6.1.2., no air loss shall occur.

S6.7 Aging Effects.

[Proposed S6.7.1 through S6.7.2—Alternative 1]

S6.7.1. *Test conditions and procedures.*

S6.7.1.1 Preparation of Tire.

S6.7.1.1.2 Mount the tire on a test rim and inflate it to the pressure specified in the following table:

Tire application	Test pressure (kPa)
P-metric:	
Standard load	180
Extra load	220
LT:	
Load Range C	260
Load Range D	340
Load Range E	410

S6.7.1.1.3 Condition the assembly at 35 ± 5° C for not less than three hours.
S6.7.1.1.4 Readjust the pressure to the value specified in S6.6.1.1.2 immediately before testing.
S6.7.1.2 *Test Procedure.*
S6.7.1.2.1 Mount the assembly on a test axle and press it against the outer face of a smooth wheel having a diameter of 1.70 m ± 1%.
S6.7.1.2.2 During the test, the ambient temperature, at a distance of not less than 150 mm and not more than 1 m from the tire, is not less than 40° C.
S6.7.1.2.3 Conduct the test, without interruptions, at not less than 120 km/h (75 mph) test speed for 24 hours with loads not less than those shown in the following table:

Test period	Duration (hours)	Load as a percentage of tire maximum load rating (percent)
1	8	90
2	8	100
3	8	100

S6.7.1.2.4 Throughout the test, the inflation pressure is not corrected and the test loads are kept constant at the value corresponding to each test period.
S6.7.1.2.5 Allow the tire to cool for one hour. Then, deflate the tire and remove it from the test rim.
S6.7.2 *Performance requirements.* The tire, after being tested in accordance with S6.7.1.2, exhibits a peel strength of not less than 30 pounds per inch in accordance with American Society for Testing and Materials Method D 413–98 (Machine Method).

[Proposed S6.7.1 through S6.7.2—Alternative 2]

S6.7.1 Test conditions and procedures.

S6.7.1.1 *Preparation of tire.*
S6.7.1.1.2 Mount the tire on a test rim and inflate it, with a gas blend of 50% O_2 (oxygen) and 50% N_2 (nitrogen), to

the pressure specified in the following table:

Tire application	Test pressure (kPa)
P-metric	275
LT:	
Load Range C	390
Load Range D	450
Load Range E	550

S6.7.1.1.3 Condition the assembly at 35 ± 5° C for not less than three hours.

S6.7.1.1.4 Readjust the pressure to the value specified in S6.6.1.1.2 immediately before testing.

S6.7.1.2. *Test Procedure.*

S6.7.1.2.1 Mount the assembly on a test axle and press it against the outer face of a smooth wheel having a diameter of 1.70 m ± 1%.

S6.7.1.2.2 During the test, the ambient temperature, at a distance of not less than 150 mm and not more than 1 m from the tire, is not less than 40° C.

S6.7.1.2.3 Conduct the test, without interruptions, at not less than 96 km/h (60 mph) for 250 hours with loads not less than those shown in the following table:

Tire application	Load as a percentage of tire maximum load rating (perecent)
P-metric	111
LT:	
Load Range C	112
Load Range D	98
Load Range E	92

S6.7.1.2.4 Throughout the test, the inflation pressure is not corrected and the test loads are maintained at the original level.

S6.7.1.2.5 Not more than 15 minutes after running the tire the specified time, measure its inflation pressure. Allow the tire to cool for one hour. Then, deflate the tire and remove it from the test rim.

S6.7.2 *Performance requirements.* When the tire is tested in accordance with S6.7.1:

(a) There shall be no visible evidence of tread, sidewall, ply, cord, inner liner, belt or bead separation, chunking, open splices, cracking or broken cords.

(b) The tire pressure, when measured not more than 15 minutes after the test, shall not be less than the initial pressure specified in S6.1.1.

[Proposed S6.7.1 through S6.7.2—Alternative 3]

S6.7.1. *Test conditions and procedures.*

S6.7.1.1. *Preparation of Tire.*

S6.7.1.1.2 Condition tire in an oven at 75°C (167°F), continuously and uninterrupted for 14 days.

S6.7.1.1.2. Mount the tire on a test rim and inflate it to the pressure specified in the following table:

Tire application	Test pressure (kPa)
P-metric:	
Standard	180
Reinforced	220
LT:	
Load Range C	260
Load Range D	340
Load Range E	410

S6.7.1.1.3. Condition the assembly at 35 ± 5° C for not less than three hours.

S6.7.1.1.4. Readjust the pressure to the value specified in S6.3.1.1.2 immediately before testing.

S6.7.1.2. *Test Procedure.*

S6.7.1.2.1. Mount the assembly on a test axle and press it against the outer face of a smooth wheel having a diameter of 1.70 m ± 1%.

S6.7.1.2.2. During the test, the ambient temperature, at a distance of not less than 150 mm and not more than 1 m from the tire, is not less than 40° C.

S6.7.1.2.3. Conduct the test, without interruptions, at not less than 120 km/h test speed with loads and test period not less than those shown in the following table:

Test period	Duration (hours)	Load as a percentage of tire maximum load rating (percent)
1	8	90
2	8	100
3	8	110

S6.7.1.2.4. Throughout the test the inflation pressure is not corrected and the test loads are maintained at the value corresponding to each test period.

S6.7.1.2.5. Not more than 15 minutes after running the tire the specified time, measure its inflation pressure. Allow the tire to cool for one hour. Then, deflate the tire and remove it from the test rim.

S6.7.2. *Performance requirements.* When the tire is tested in accordance with S6.7.1:

(a) There shall be no visible evidence of tread, sidewall, ply, cord, inner liner, belt or bead separation, chunking, open splices, cracking or broken cords.

(b) The tire pressure, when measured not more than 15 minutes after the test, shall not be less than the initial pressure specified in S6.1.1.

[Proposed S7 through S7.3—Alternative 1]

S7. Phase-In Schedule

S7.1 *P-metric tires manufactured on or after September 1, 2003 and before September 1, 2004.* For tires manufactured by a manufacturer on or after September 1, 2003 and before September 1, 2004, the amount of tires complying with S4 through S6 must be 50 percent of the manufacturers production of P-metric tires during that period.

S7.2 *P-metric tires manufactured on or after September 1, 2004.* Each P-metric tire manufactured on or after September 1, 2004 must comply with S4 through S6 of this standard.

S7.3 *LT tires manufactured on or after September 1, 2005.* Each LT tire manufactured on or after September 1, 2005 must comply with S4 through S6 of this standard.

[Proposed S7 through S7.3—Alternative 2]

S7. Phase-In Schedule

S7.1 *P-metric tire manufactured on or after September 1, 2003.* Each P-metric tire manufactured on or after September 1, 2003 must comply with S4 through S6 of this standard.

S7.2 *LT tires manufactured on or after September 1, 2004.* Each LT tire manufactured on or after September 1, 2004 must comply with S4 through S6 of this standard.

10. Part 597 would be added to read as follows:

PART 597—TIRES FOR MOTOR VEHICLES WITH A GVWR OF 10,000 POUNDS OR LESS PHASE-IN REPORTING REQUIREMENTS

Sec.

597.1 Scope.
597.2 Purpose.
597.3 Applicability.
597.4 Definitions.
597.5 Response to inquiries.
597.6 Reporting requirements.
597.7 Records.
597.8 Petition to extend period to file report.

Authority: 49 U.S.C. 322, 30111, 30115, 30117, and 30166; delegation of authority at 49 CFR 1.50.

§ 597.1 Scope.

This part establishes requirements for manufacturers of new pneumatic tires for motor vehicles with a gross vehicle weight rating of 10,000 pounds or less to submit a report, and maintain records related to the report, concerning the number of such tires the meet the requirements of Standard No. 139 (49 CFR 571.139).

§ 597.2 Purpose.

The purpose of these reporting requirements is to assist the National Highway Traffic Safety Administration in determining whether a manufacturer has complied with Standard No. 139 (49 CFR 571.139).

§ 597.3 Applicability.

This part applies to manufacturers of tires for motor vehicles with a gross vehicle weight rating of 10,000 pounds or less.

§ 597.4 Definitions.

(a) All terms defined in 49 U.S.C. 30102 are used in their statutory meaning.

(b) Motor vehicle and gross vehicle weight rating are used as defined in 49 CFR 571.3.

(c) Production year means the 12-month period between September 1 of one year and August 31 of the following year, inclusive.

§ 597.5 Response to inquiries.

At anytime beginning September 1, 2003, each manufacturer shall, upon request from the Office of Vehicle Safety Compliance, provide information identifying the tires (by make, model, brand and tire identification number) that have been certified as complying with Standard No. 139 (49 CFR 571.139). The manufacturer's designation of a tire as a certified tire is irrevocable.

§ 597.6 Reporting requirements.

(a) *General reporting requirements.* Within 60 days after the end of the production year ending August 31, 2004, each manufacturer shall submit a report to the National Highway Traffic Safety Administration concerning its compliance with Standard No. 139 (49 CFR 571.139) for its P-metric tires produced in that year for motor vehicles with a GVWR of 10,000 pounds or less. Each report shall—

(1) Identify the manufacturer;

(2) State the full name, title, and address of the official responsible for preparing the report;

(3) Identify the production year being reported on;

(4) Contain a statement regarding whether or not the manufacturer complied with Standard No. 139 (49 CFR 571.139) for the period covered by the report and the basis for that statement;

(5) Provide the information specified in paragraph (b) of this section;

(6) Be written in the English language; and

(7) Be submitted to: Administrator, National Highway Traffic Safety Administration, 400 Seventh Street, SW., Washington, DC 20590.

(b) *Report Content.* (1) *Basis for phase-in production goals.* Each manufacturer shall provide the number of new pneumatic tires for motor vehicles with a gross vehicle weight rating of 10,000 pounds or less manufactured for sale in the United States for each of the three previous production years, or, at the manufacturer's option, for the current production year. A new manufacturer that has not previously manufactured these vehicles for sale in the United States shall report the number of such vehicles manufactured during the current production year.

(2) *Production.* Each manufacturer shall report for the production year for which the report is filed: the number of new pneumatic tires for motor vehicles with a GVWR of 10,000 pounds or less that meet Standard No. 139 (49 CFR 571.139).

§ 597.7 Records.

Each manufacturer must maintain records of the tire identification number for each tire for which information is reported under § 590.6(b)(2) until December 31, 2006.

§ 597.8 Petition to extend period to file report.

A manufacturer may petition for extension of time to submit a report under this part. A petition will be granted only if the petitioner shows good cause for the extension and if the extension is consistent with the public interest. The petition must be received not later than 15 days before expiration of the time stated in § 597.6(a). The filing of a petition does not automatically extend the time for filing a report. The petition must be submitted to: Administrator, National Highway Traffic Safety Administration, 400 Seventh Street, SW., Washington, D.C. 20590.

Issued: February 27, 2002.

Stephen R. Kratzke,

Associate Administrator for Safety Performance Standards.

[FR Doc. 02–5151 Filed 2–28–02; 10:44 am]

BILLING CODE 4910–59–P