DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

49 CFR Parts 571 and 585

[Docket No. NHTSA 2004–19054]

RIN 2127–AJ23

Federal Motor Vehicle Safety Standards; Tire Pressure Monitoring Systems; Controls and Displays

AGENCY: National Highway Traffic Safety Administration (NHTSA), DOT.

ACTION: Notice of proposed rulemaking.

SUMMARY: This notice of proposed rulemaking (NPRM) proposes to establish a new Federal motor vehicle safety standard mandating tire pressure monitoring systems capable of detecting when a tire is significantly under-inflated. A prior version of the standard, adopted by the agency in June 2002 in response to a mandate in the Transportation Recall Enhancement, Accountability and Documentation Act, was vacated by a decision issued by the U.S. Court of Appeals for the Second Circuit in August 2003. This NPRM, which is consistent with the Court's decision, proposes to require installation in new light vehicles of a tire pressure monitoring system capable of four-tire, 25-percent under-inflation detection. This proposed rule differs from the final rule also in that it tentatively responds to issues raised in petitions for reconsideration of the June 2002 final rule and proposes to require a TPMS malfunction indicator.

DATES: Comments must be received on or before November 15, 2004.

ADDRESSES: You may submit comments identified by DOT DMS Docket Number NHTSA 2004–19054 by any of the following methods:

- Web site: *http://dms.dot.gov.* Follow the instructions for submitting comments on the DOT electronic docket site.
- Fax: 1–202–493–2251.
- Mail: Docket Management Facility; U.S. Department of Transportation, 400 Seventh Street, SW., Nassif Building, Room PL–401, Washington, DC 20590–001.
- Hand Delivery: Room PL–401 on the plaza level of the Nassif Building, 400 Seventh Street, SW., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal Holidays.
- Federal eRulemaking Portal: Go to *http://www.regulations.gov.* Follow the online instructions for submitting comments.

Instructions: All submissions must include the agency name and docket number or Regulatory Identification Number (RIN) for this rulemaking. For detailed instructions on submitting comments and additional information on the rulemaking process, see the Public Participation heading of the **SUPPLEMENTARY INFORMATION** section of this document. Note that all comments received will be posted without change to *http://dms.dot.gov,* including any personal information provided. Please see the Privacy Act heading under Rulemaking Analyses and Notice regarding documents submitted to the agency's dockets.

Docket: For access to the docket to read background documents or comments received, go to *http://dms.dot.gov* at any time or to Room PL–401 on the plaza level of the Nassif Building, 400 Seventh Street, SW., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal Holidays.

FOR FURTHER INFORMATION CONTACT: For non-legal issues, you may call Mr. George Soodoo or Mr. Samuel Daniel, Office of Crash Avoidance Standards (Telephone: 202–366–2720) (Fax: 202–366–4329).

For legal issues, you may call Mr. Eric Stas, Office of Chief Counsel (Telephone: 202–366–2992) (Fax: 202–366–3820).

You may send mail to these officials at National Highway Traffic Safety Administration, 400 Seventh Street, SW., Washington, DC 20590.

SUPPLEMENTARY INFORMATION:

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I. Executive Summary

Court Decision and Agency Response

In August 2003, the U.S. Court of Appeals for the Second Circuit (Second Circuit) vacated Federal Motor Vehicle Safety Standard (FMVSS) No. 138, *Tire Pressure Monitoring Systems,* which NHTSA had established by a final rule published in the **Federal Register** on June 5, 2002 (67 FR 38704). The rule required the installation of tire pressure monitoring systems (TPMSs) in light vehicles, thereby implementing a mandate in the Transportation Recall Enhancement, Accountability, and Documentation (TREAD) Act of 2000 for a rulemaking to require systems that warn consumers when a tire is significantly under-inflated.

The vacated standard covered an initial period from November 1, 2003 to October 31, 2006. Two compliance options were established for this time period. Under the first option, a vehicle's TPMS would have been required to warn the driver when the pressure in any single tire or in each tire in any combination of tires, up to a total of four tires, had fallen to 25 percent or more below the vehicle manufacturer's recommended cold inflation pressure for the tires, or a minimum level of pressure specified in the standard, whichever pressure was higher. Under the second option, a vehicle's TPMS would have been required to warn the driver when the pressure in any single tire had fallen to 30 percent or more below the vehicle manufacturer's recommended cold inflation pressure for the tires, or a minimum level of pressure specified in the standard, whichever pressure was higher.

The agency stated in the document published in June 2002 that it planned to issue the second part of the final rule by March 1, 2005. The second phase was to establish performance requirements for the period beginning on November 1, 2006. In the meantime, NHTSA planned to leave the rulemaking docket open for the submission of new data and analyses concerning the performance of TPMSs. NHTSA also decided to conduct a study of real world performance of vehicles

equipped with TPMSs, which was nearly completed by the summer of 2003.

After issuance of the June 2002 final rule, three organizations filed suit to challenge the TPMS regulation (FMVSS No. 138), in a case before the U.S. Court of Appeals for the Second Circuit. The Second Circuit issued its opinion in *Public Citizen, Inc.* v. *Mineta)*[1] on August 6, 2003.

The Court held that the agency's inclusion in the standard of a one-tire, 30-percent compliance option was contrary to the intent of Congress expressed in the TREAD Act. The Court found that that Act unambiguously mandates TPMSs capable of monitoring each tire up to a total of four tires, effectively precluding that option or any similar option with less than a four-tire detection capability. While noting that the agency must, as a general matter, consider the reasonableness of cost in rulemaking regarding Federal motor vehicle safety standards, the court also held that including the one-tire, 30-percent requirement as an option was arbitrary and capricious under the Administrative Procedure Act, given that the one-tire, 30-percent requirement was less cost effective and that the agency did not sufficiently ''explain why the costs saved were worth the benefits sacrificed.'' However, the Court upheld the agency's use of a phase-in to implement the standard's requirements and found that the agency had justification for adopting a four-tire, 25-percent option instead of the four-tire, 20-percent option proposed at an earlier stage of the rulemaking.

Consistent with the Second Circuit's opinion, NHTSA is proposing a new FMVSS No. 138 that would include a requirement for four-tire, 25-percent under-inflation detection. Most of the proposed standard's key provisions and underlying reasoning remain the same as in the June 2002 final rule, with the obvious exception of the one-tire, 30-percent option, which has been eliminated. In proposing this standard with its performance requirement, NHTSA reiterates its intention to adopt a standard that is technology-neutral and accommodates future technological innovation.

We note that, if adopted, the approach outlined in this NPRM would result in a consolidation of the rulemaking process, because, in light of the Court's decision, it is no longer necessary to conduct Part II of the rulemaking to determine longer-term compliance requirements after October 31, 2006. Similarly, NHTSA also decided to terminate its tire pressure survey designed to compare vehicles with direct and indirect TPMSs to other vehicles without a TPMS. Under the circumstances, the study's findings are no longer needed to help determine an appropriate detection level.

Originally, the phase-in period for the TPMS standard was scheduled to begin as of November 1, 2003. However, because the Court vacated the standard in its entirety, the agency must promulgate an updated final rule before a phase-in can commence. To determine the extent to which vehicle manufacturers must alter pre-vacation product plans to comply with the new final rule, the agency required all major automobile manufacturers and TPMS suppliers to respond to Special Orders it issued on September 9, 2003 (issued pursuant to 49 U.S.C. 30166(g)(1) and 49 CFR 510).[2] This NPRM proposes to establish a new phase-in schedule, accounting for these changed circumstances.

NHTSA is proposing the following phase-in schedule: 50 percent of a vehicle manufacturer's light vehicles would be required to comply with the standard during the first year (September 1, 2005 to August 31, 2006); 90 percent during the second year (September 1, 2006 to August 31, 2007); all light vehicles thereafter. This proposal would permit carry-forward credits for vehicles certified as complying with the standard that are produced after the effective date of the final rule.

As part of this NPRM, we also are addressing various issues raised in petitions for reconsideration of the June 2002 final rule. At the time of the Court's decision, the agency was nearing publication of its responses to the petitions, and the majority of those issues remain relevant to this updated TPMS rulemaking. Thus, we have decided to address them here. Accordingly, we have proposed some modifications, as compared to the vacated rule. These matters are discussed in further detail below.

Response to Issues Raised in Petitions for Reconsideration

Petitions for reconsideration of the June 2002 final rule raised a variety of issues, the more significant of them involving the standard's requirement that a vehicle's TPMS must work with all replacement tires of the tire size(s) authorized or recommended by the vehicle's manufacturer. Concerns were expressed that the requirement was overly broad and that some tire designs will prevent the proper functioning of the TPMS. The petitions also provided information indicating that there are as many as 600 tire models that could be used as replacements on some vehicle models.

After considering the arguments raised in the petitions and the supplemental information on TPMS compatibility with replacement tires, we have tentatively decided to alter our approach to this topic. Specifically, we are proposing only to require vehicle manufacturers to assure compliance with FMVSS No. 138 with the tires installed on the vehicle at the time of initial sale. We have tentatively decided upon this approach for the following reasons.

First, information presented to NHTSA in the petitions shows that there are currently over four million TPMS-equipped vehicles,[3] and neither the agency nor vehicle manufacturers have received reports indicating any significant performance problems with those TPMSs when replacement tires are installed on the vehicle. Further, there are a variety of aftermarket TPMSs, and again, there has not been any significant number of reports of incompatibility problems between those systems and replacement tires. Thus, this significant real world population suggests that TPMSs are expected to

[1] 340 F.3d 39 (2d Cir. 2003).

[2] In comments submitted to the Office of Management and Budget related to the agency's Special Order, the Alliance of Automobile Manufacturers (Alliance) suggested that its members' product plans were predicated on the agency's amending the final rule in a manner acceptable to its members (see Docket No. NHTSA–2000–8572–277). Specifically, the Alliance in its September 5, 2003 letter stated, *''It is important to note that those plans were predicated on the assumption that the major issues raised by the Alliance in its July 22, 2002 petition for reconsideration (with supplement on October 30, 2002) and its April 29, 2003 petition for rulemaking (with supplement on June 30, 2003) of FMVSS 138 would be satisfactorily resolved''* (emphasis in original). This expectation was repeated in several vehicle manufacturer responses to the Special Order.

We believe that a clarification of the regulatory process is in order. NHTSA carefully considers petitions for reconsideration of final rules that raise new issues arising from resolution of matters addressed in response to rulemaking proposals. After careful review, the agency decides whether to grant the petitions and whether to modify the rule. In any event, NHTSA's response to such petitions is prospective. In the interim, the final rule remains effective as originally promulgated. Because manufacturers cannot assume that requested changes will be made in response to such petitions, they must plan to comply with the final rule as issued, without reservation. At the same time, the agency recognizes its responsibility to grant or deny petitions for reconsideration of its rules in a timely fashion.

[3] Letter from Robert Strassburger, Vice President, Alliance of Automobile Manufacturers, to NHTSA (October 20, 2003) (Docket No. NHTSA–2000–8572–277).

continue to work with replacement tires in the vast majority of cases.

However, NHTSA has been presented with data demonstrating that a very small number of replacement tires may cause a vehicle's TPMS to exhibit functional problems for which there is currently no clear solution. The identified problems are primarily related to the tires' construction (*e.g.*, run-flat tires) and material content (*e.g.*, high carbon content in low aspect-ratio tires, thicker sidewall, or steel body ply sidewall).

In many instances, TPMSs may function properly even when equipped with replacement tires with the above-mentioned characteristics, but to date, it has not been possible to develop an appropriate performance measure that would reliably identify those anomalous tires that would prevent proper TPMS functioning. However, available data show that, in 2002, light vehicle tires having either steel body ply cords (steel casing tires) or run-flat capability accounted for less than 0.5 percent of tires distributed in the United States.[4]

Based upon the above new information, we now believe that there is not a sufficient basis to require vehicle manufacturers to assure compliance with all replacement tires. While the number of tires expected to be incompatible with a given TPMS is expected to be small, such a requirement would nonetheless raise significant practicability concerns. For example, vehicle manufacturers will not be able to anticipate future tire construction changes; therefore, a replacement tire requirement similar to the one contained in the June 2002 final rule could force vehicle manufacturers to halt vehicle sales over a problem they could not correct. We continue to believe, however, that the TPMS should continue to function properly beyond the point at which the vehicle's original tires are replaced, a clearly foreseeable event. At a minimum, consumers need to know if the TPMS is not functioning with the replacement tires. Otherwise, an unilluminated low tire pressure telltale would give consumers a false sense of security in those cases.

The Alliance has recommended a framework for resolution of the problem of incompatible replacement tires, predicated upon a requirement for a TPMS malfunction indicator coupled with a related statement in the vehicle's owner's manual.[5] We believe that this approach could provide not only a relatively low-cost solution to the replacement tire incompatibility problem, but also additional warnings regarding other types of TPMS malfunctions (*e.g.*, sensor damage, signal attenuation, and dead batteries).

Therefore, in this NPRM, we are proposing to require the TPMS to be equipped with a telltale that would alert the driver of a TPMS malfunction, tire-related or otherwise. We are proposing that the malfunction warning be provided either through a separate, dedicated telltale or through a distinctive warning delivered by the low tire pressure telltale.

In addition, we are proposing to require that the owner's manual include a statement that would make consumers aware of this potential problem. Specifically, we are proposing to require vehicle manufacturers to alert consumers regarding: (1) Potential problems related to compatibility between the vehicle's TPMS and various types of replacement tires, and (2) the presence and operation of the TPMS malfunction indicator.

Manufacturers also asked the agency to provide greater specificity in the TPMS test procedures in order to increase objectivity. After consideration of these recommendations, we are proposing to make the standard's test procedures more specific. However, we also seek to ensure that the test procedures continue to be broad enough to replicate a range of real world driving conditions, rather than encourage development of systems that are designed and tested for effectiveness only in a narrow set of driving circumstances. Specifically, we are proposing to designate a course for compliance testing (*i.e.*, the Southern Loop of the Treadwear Test Course), which is both objective and representative of a range of driving conditions. In addition, we are proposing to refine the calibration and system detection provisions to specify that driving times in the designated speed range will be cumulative (not continuous) and that system calibration or low tire detection time will not accumulate during periods when the brake is applied. Further, we also are proposing to specify that the vehicle's tires will be shaded from direct sun when parked. We believe that the proposed modifications would sufficiently address calls for greater specificity in the standard's test procedures, while ensuring that the TPMS will function on a variety of roadways and road conditions.

In response to other issues raised in the petitions, we are proposing to incorporate additional changes in this NPRM, including revision of the definition of ''small volume manufacturer'' and clarification of specific issues that may arise under FMVSS No. 138.

II. Background

A. The TREAD Act

Congress enacted the TREAD Act;[6] on November 1, 2000. Section 13 of that Act[7] required the Secretary of Transportation, within one year of the statute's enactment, to complete a rulemaking ''to require a warning system in new motor vehicles to indicate to the operator when a tire is significantly under inflated.'' Section 13 also required the regulation to take effect within two years of the completion of the rulemaking. Responsibility for this rulemaking was delegated to NHTSA.

B. The June 2002 Final Rule Requiring TPMSs

1. The Notice of Proposed Rulemaking

NHTSA initiated the TPMS rulemaking with the publication of a Notice of Proposed Rulemaking (NPRM) on July 26, 2001 (*see* 66 FR 38982, Docket No. NHTSA–2000–8572–30). That NPRM proposed to require passenger cars, light trucks, multipurpose passenger vehicles, and buses with a gross vehicle weight rating of 10,000 pounds or less, except those with dual wheels on an axle, to be equipped with a TPMS.

The agency sought comment on two alternative sets of performance requirements for TPMSs and indicated that it contemplated adopting only one of them in the final rule. The first alternative would have required that the driver be warned when the pressure in any single tire or in each tire in any combination of tires, up to a total of four tires, had fallen to 20 percent or more below the vehicle manufacturer's recommended cold inflation pressure for the vehicle's tires (the placard pressure), or a minimum level of pressure specified in the standard, whichever was higher. (This alternative is referred to below as the four-tire, 20-percent alternative.) The second alternative would have required that the driver be warned when the pressure in any single tire or in each tire in any combination of tires, up to a total of

[4] Letter from Steven Butcher, Vice President, Rubber Manufacturers Association, to NHTSA (October 31, 2003) (Docket No. NHTSA–2000–8572–282).

[5] Letter from Vann Wilber, Vehicle Safety and Harmonization Director, Alliance of Automobile Manufacturers, to NHTSA (December 9, 2003) (Docket No. NHTSA–2000–8572–285).

[6] Public Law 106–414, 114 Stat. 1800 (2000).

[7] *See* 49 U.S.C. § 30123 note (2003).

three tires, had fallen to 25 percent or more below the placard pressure, or a minimum level of pressure specified in the standard, whichever was higher. (This alternative is referred to below as the three-tire, 25-percent alternative.)

There are two types of TPMSs currently available, direct TPMSs and indirect TPMSs.[8] Direct TPMSs have a pressure sensor in each wheel that transmit pressure information to a receiver. In contrast, indirect TPMSs do not have tire pressure sensors, but instead rely on the wheel speed sensors, typically a component of an anti-lock braking system (ABS), to detect and compare differences in the rotational speed of a vehicle's wheels, which correlate to differences in tire pressure.

To meet the four-tire, 20-percent alternative within the timeframe envisioned in the NPRM, vehicle manufacturers likely would have had to install direct TPMSs because it is unlikely that even improved indirect systems would be able to detect loss of pressure until pressure has fallen 25 percent and to detect all combinations of significantly under-inflated tires. To meet the three-tire, 25-percent alternative, vehicle manufacturers would have been able to install either direct TPMSs or improved indirect TPMSs.

2. The Preliminary Determination About the Final Rule

After consideration of the comments submitted in response to the NPRM, NHTSA preliminarily determined to issue a final rule that would have specified a four-year phase-in schedule and that would have allowed compliance with either of two options during the phase-in period (*i.e.*, between November 1, 2003 and October 31, 2006). Under the first option, a vehicle's TPMS would have had to warn the driver when the pressure in one or more of the vehicle's tires, up to a total of four tires, was 25 percent or more below the placard pressure, or a minimum level of pressure specified in the standard, whichever pressure was higher. (This option is referred to below as the four-tire, 25-percent option.) Under the second option, a vehicle's TPMS would have had to warn the driver when the pressure in any one of the vehicle's tires was 30 percent or more below the placard pressure, or a minimum level of pressure specified in the standard, whichever pressure was higher. (This option is referred to below as the one-tire, 30-percent option.) The minimum levels of pressure specified in the standard were the same for both compliance options.

After the phase-in (*i.e.*, after October 31, 2006), the second option would have been terminated, and the provisions of the first option would have become mandatory for all new vehicles. Thus, all vehicles would have been required to meet a four-tire, 25-percent requirement.

3. OMB Return Letter

After reviewing the draft final rule, OMB returned it to NHTSA for reconsideration, with a letter explaining its reasons for doing so, on February 12, 2002. For a discussion of that letter and NHTSA's analysis of the issues it raised, see NHTSA's June 5, 2002 final rule at 67 FR 38704, 38712, 38718–22.

4. Highlights of the June 2002 Final Rule

Consistent with the OMB return letter, the agency divided the TPMS final rule into two parts because it decided to defer its decision as to which long-term performance requirements for TPMS would best satisfy the mandate of the TREAD Act. This deferral was intended to allow the agency to consider additional data on the effect and performance of TPMSs currently in use.

The first part of the final rule was published in the **Federal Register** on June 5, 2002 (67 FR 38704) (Docket No. NHTSA 2000–8572). It established requirements for vehicles manufactured during the first three years (*i.e.*, between November 1, 2003 and October 31, 2006) and phased TPMSs in by increasing percentages of production. The agency stated that the second part of the final rule would establish requirements for vehicles manufactured on or after November 1, 2006.

a. Part One—November 2003 Through October 31, 2006

The June 2002 final rule provided two compliance options during the interim period. Under the first compliance option, vehicle manufacturers would have been required to equip their light vehicles (*i.e.*, those with a GVWR of 4,536 kg (10,000 pounds) or less) with TPMSs to warn the driver when the pressure in any single tire or in each tire in any combination of tires, up to a total of four tires, is 25 percent or more below the vehicle manufacturer's recommended cold inflation pressure for the tires, or a minimum level of pressure specified in the standard, whichever pressure is higher. Under the second compliance option, the vehicle's TPMS would have been required to warn the driver when the pressure in any single tire is 30 percent or more below the vehicle manufacturer's recommended cold inflation pressure for the tires, or a minimum level of pressure specified in the standard, whichever pressure is higher.[9]

The two compliance options were outgrowths of the alternative sets of requirements proposed in the NPRM. In response to comments indicating that current indirect TPMSs could not meet the proposed three-tire, 25-percent under-inflation requirements, the agency adopted the one-tire, 30-percent option. That option would have allowed those systems to be used during the phase-in. The four-tire, 25-percent under-inflation option could have been met by installing either direct TPMSs or hybrid TPMSs (*i.e.*, TPMSs that combine direct and indirect TPMS technologies). One TPMS supplier indicated the potential for developing and producing hybrid systems, although it also indicated that it did not currently have plans for doing so.

The owner's manual for vehicles certified to either compliance option would have been required to include an explanation of the purpose of the yellow low tire pressure warning telltale, the potential consequences of driving on significantly under-inflated tires, the meaning of the telltale when it is illuminated, and the actions that drivers should take in response.

To facilitate compliance with the options, the rule included a phase-in of the standard's requirements by increasing percentages of production. Ten percent of a vehicle manufacturer's light vehicles were to be required to comply with either compliance option during the first year (November 1, 2003 to October 31, 2004), 35 percent during the second year (November 1, 2004 to October 31, 2005), and 65 percent during the third year (November 1, 2005 to October 31, 2006). The agency permitted carry-forward credits for vehicles that were manufactured during the phase-in and equipped with TPMSs that comply with the four-tire, 25-percent option.

NHTSA also provided in the June 2002 final rule that small volume manufacturers would be given to the end of the phase-in period to comply with the TPMS requirements. Later, similar treatment was accorded to final stage manufacturers and alterers through a correcting amendment to the

[8] We anticipate that new types of TPMS technology may be developed in the future that will be capable of meeting the NPRM's proposed requirements. For example, such systems might incorporate aspects of both direct and indirect TPMS (*i.e.*, hybrid systems). In concert with TPMS suppliers, tire manufacturers might be able to incorporate TPMS sensors directly into the tires themselves. In proposing a performance standard, NHTSA is cognizant of and seeks to encourage technological innovation.

[9] The minimum levels of pressure were the same for both compliance options.

final rule published in the **Federal Register**.[10] As with previous phase-ins, NHTSA adopted reporting requirements to aid it in monitoring the implementation of the phase-in. The agency included these reporting requirements in 49 CFR Part 590.

b. Part Two—November 2006 and Thereafter

The June 2002 final rule provided that beginning November 1, 2006, all covered vehicles would be required to comply with the requirements in the second part of the final rule. The agency stated its intention to publish the second part of the final rule by March 1, 2005, in order to provide sufficient lead time to manufacturers.

In anticipation of making its decision about long-term requirements, the agency left the rulemaking docket open for the submission of new data and analyses. The agency also committed to conduct and place in the docket a tire pressure survey comparing the tire pressures of vehicles without any TPMS to the pressure of vehicles with TPMSs not complying with the four-tire, 25-percent performance option. After consideration of the rulemaking record, as supplemented by the tire pressure study and any other new information submitted to the agency, NHTSA would issue the second part of the rule.

Based upon the record before the agency at the time of publication of the first part of the final rule, NHTSA stated its tentative belief that the four-tire, 25-percent option would best meet the mandate in the TREAD Act. However, NHTSA remained open to the possibility of obtaining or receiving new information sufficient to justify a continuation of the compliance options established by the first part of the final rule, or the adoption of some other alternative.

C. Petitions for Reconsideration of the June 2002 Final Rule

NHTSA received thirteen petitions for reconsideration of the June 5, 2002 final rule from: (1) Ferrari S.p.A.; (2) Delphi Auto, Inc. (Delphi); (3) Japan Automobile Tyre Manufacturers Association, Inc. (JATMA); (4) Johnson Controls, Inc.; (5) Volkswagen of America, Inc. (Volkswagen); (6) Bureau de Normalisation de l'Automobile (BNA) ISO/TC22; (7) Porsche Cars North America, Inc. (Porsche); (8) Alliance of Automobile Manufacturers (Alliance); (9) Rubber Manufacturers Association (RMA); (10) Aviation Upgrade Technologies; (11) Vehicle Services Consulting, Inc. (VSC); (12) DENSO International America, Inc. (DENSO); and (13) Maserati S.p.A.

The petitioners raised a variety of issues, including ones related to the rule's requirements for functioning of the TPMS with replacement tires, system calibration, tire reserve load, the compliance testing procedures, system disablement and reset, the TPMS telltale (*e.g.*, issues related to color, extinguishment time, reconfigurable displays, and bulb check), definitions, alternative systems, and policy and procedures for the second part of the rulemaking.

NHTSA was in the process of finalizing its responses to the various petitions for reconsideration at the time of the Second Circuit's decision. However, because the majority of the issues raised in the petitions for reconsideration remain relevant, we have decided to address them substantively in this proposed rule.

D. The Court of Appeals' Opinion

After issuance of the June 2002 final rule, Public Citizen, Inc., New York Public Interest Research Group, and the Center for Auto Safety filed a suit challenging certain aspects of the TPMS regulation.

The Second Circuit issued its opinion in *Public Citizen, Inc.* v. *Mineta* on August 6, 2003, which held that the agency's adoption in the standard of a one-tire, 30-percent compliance option is ''contrary to the intent of the TREAD Act and, in light of the relative shortcomings of indirect systems, arbitrary and capricious.'' [11] The Court found that the TREAD Act unambiguously mandates TPMSs capable of monitoring each tire, up to a total of four tires, effectively precluding the one-tire, 30-percent option, or any similar option that cannot detect under-inflation in any combination of tires up to four tires.

The Court concluded that, against a backdrop of more efficacious performance of direct systems, current indirect systems (*i.e.*, those unable to meet a four-tire, 25-percent standard) are not sufficiently effective as would permit NHTSA to allow automakers to install those indirect systems in new motor vehicles.[12] The court opinion went on to note that the record, as reflected in NHTSA's final rule, suggested that the four-tire, 25-percent option would not only prevent more injuries and save more lives, but also that it would be more cost-effective on a per-life, per-injury basis than adopting both options together.

However, the Court stated that the agency was correct to consider the relative costs of adopting or rejecting different compliance options. Further, the Court did not preclude the use of indirect systems, to the extent that they are able to meet the performance requirements proposed in this NPRM. This point is noteworthy because it is NHTSA's practice to issue performance standards that seek to give manufacturers as broad a choice as possible in selecting the technology to be used in meeting those standards. Thus, as TPMS technology develops, it may become possible for new types of systems to meet the proposed performance requirements.

In all of the other areas of challenge, the Court supported the agency's actions. Specifically, the Court upheld NHTSA's use of a phase-in as part of the TPMS final rule. The Court also held that NHTSA's decision not to adopt the four-tire, 20-percent compliance option proposed in the NPRM was not arbitrary and capricious. The Court found that the agency had explained adequately that the four-tire, 25-percent option may permit improved indirect TPMSs and hybrid TPMSs to be used to comply with the standard and that this option was substantially more cost-effective than the proposed four-tire, 20-percent option.

Ultimately, the Court vacated the rule (FMVSS No. 138) in its entirety and directed the agency to issue a new rule consistent with its August 6, 2003 opinion. NHTSA published a final rule in the **Federal Register** on November 20, 2003, vacating FMVSS No. 138. The agency stated that, at present, vehicle manufacturer have no certification or reporting responsibilities. 68 FR 65404.

III. The Proposed Rule

A. Requirement for Four-Tire, 25-Percent Under-Inflation Detection

This NPRM proposes to re-establish FMVSS No. 138, *Tire Pressure Monitoring System,* in a manner consistent with the Second Circuit's opinion. Specifically, it proposes to require passenger cars, multipurpose passenger vehicles, trucks, and buses with a GVWR of 4,536 kg (10,000 pounds) or less, except those with dual wheels on an axle, to be equipped with a TPMS to alert the driver when one or more of the vehicle's tires, up to all four

[10] 68 FR 4107 (January 28, 2003).

[11] 340 F.3d 39, 54 (2d Cir. 2003).

[12] The Court found that given current technological limitations, indirect systems cannot meet the requirements of the four-tire, 25-percent under-inflation option under the June 2002 final rule, and even under the one-tire, 30-percent compliance option, indirect systems cannot detect low tire pressure in all cases (*e.g.*, when two tires on the same side of the vehicle or on the same axle are under-inflated, or when all four tires are equally under-inflated).

of its tires, are significantly under-inflated. The rule proposes requirements for covered vehicles manufactured on or after September 1, 2005 (*i.e.*, Model Year (MY) 2006), subject to the proposed phase-in schedule discussed below. The proposed standard is intended to be technology-neutral so as to permit compliance with any available TPMS technology that meets the performance requirements.

Because the Second Circuit vacated the entire TPMS standard in striking down the one-tire, 30-percent option, it is necessary for NHTSA again to propose the complete regulatory text for FMVSS No. 138. The following points highlight the key provisions of the proposed requirements.

• The TPMS would be required to warn the driver when the pressure in one or more of the vehicle's tires, up to a total of four tires, is 25 percent or more below the vehicle manufacturer's recommended cold inflation pressure for the tires, or a minimum level of pressure specified in the standard, whichever pressure is higher.[13]

• Vehicle manufacturers would be required to certify vehicle compliance under the standard with the tires installed on the vehicle at the time of initial vehicle sale.[14]

• The TPMS would be required to include a low tire pressure-warning telltale[15] (yellow) that must remain illuminated as long as any of the vehicle's tires remains significantly under-inflated and the vehicle's ignition locking system is in the ''On'' (''Run'') position. The telltale must be extinguished when all of the vehicle's tires cease to be significantly under-inflated.[16] The TPMS's low tire pressure-warning telltale would be required to perform a bulb-check at vehicle start-up.

• The TPMS also would be required to include a malfunction indicator to alert the driver when the system is non-operational, and thus unable to provide the required low tire pressure warning. We are proposing that TPMS malfunction could be indicated by either:

(1) Installing a separate, dedicated telltale (yellow) that illuminates upon detection of the malfunction and remains continuously illuminated as long as the ignition locking system is in the ''On'' (''Run'') position and the situation causing the malfunction remains uncorrected, or

(2) Designing the low tire pressure telltale so that it flashes for one minute when a malfunction is detected, after which the telltale would remain illuminated as long as the ignition locking system is in the ''On'' (''Run'') position. This flashing and illumination sequence would be repeated upon each subsequent vehicle start-up until the situation causing the malfunction has been corrected.

If the option for a separate telltale is selected, the TPMS malfunction telltale would be required to perform a bulb-check at vehicle start-up.

• The TPMS would not be required to monitor the spare tire (if provided), either when it is stowed or when it is installed on the vehicle.

• For vehicles certified under the standard, vehicle manufacturers would be required to provide in the owner's manual an explanation of the purpose of the low tire pressure warning telltale, the potential consequences of significantly under-inflated tires, the meaning of the telltale when it is illuminated, and what actions drivers should take when the telltale is illuminated. Vehicle manufacturers also would be required to provide a specified statement in the owner's manual regarding: (1) Potential problems related to compatibility between the vehicle's TPMS and various replacement tires, and (2) the presence and operation of the TPMS malfunction indicator.

B. Lead Time and Phase-In

The Second Circuit decision vacating FMVSS No. 138, while affirming the use of a phase-in as part of the TPMS rulemaking, necessitates a change in the phase-in schedule in order to ensure the practicability of the standard's implementation. First, for those vehicle manufacturers that had intended to certify to the June 5, 2002 final rule's one-tire, 30-percent option, redesign and a change in production plans may be necessary in order to meet the proposed four-tire, 25-percent detection requirements of this NPRM. Second, there must be an adequate supply of TPMSs available that meet the proposed requirements of the standard so that vehicle manufacturers would be capable of meeting the phase-in requirements.

To help determine appropriate lead time and phase-in percentages, NHTSA issued a number of Special Orders on September 9, 2003. NHTSA issued Special Orders to 14 vehicle manufacturers to ascertain what their production plans had been for compliance with the June 2002 final rule, including the option(s) under which they intended to certify and the technologies they intended to use in doing so. NHTSA also issued Special Orders to 13 TPMS suppliers in order to determine their current and planned production, as well as their current capacity and their ability to produce beyond their current capacity. The majority of the information submitted pursuant to these Special Orders is confidential business information (CBI) under the relevant NHTSA regulation.[17] We believe that the information obtained in response to these Special Orders provides the agency with the necessary data to propose and ultimately set a fair and reasonable phase-in schedule.

From the responses to these Special Orders, NHTSA learned that, in anticipation of the start of the phase-in under the June 2002 final rule, most vehicle manufacturers were moving aggressively toward installation of TPMSs capable of meeting the four-tire, 25-percent detection requirement, but some were not. The information provided by TPMS suppliers indicated sufficient capacity to supply TPMSs with a four-tire, 25-percent detection capability in quantities that would

[13] As proposed, these minimum activations pressures (MAPs) are included in Table 1 of the standard, which is identical to the Table 1 that appeared in the June 5, 2002 final rule. However, we note that the Alliance submitted a Petition for Rulemaking on April 29, 2003 that asks NHTSA to make certain changes to the minimum activation pressures in Table 1 (Docket No. NHTSA–2000–8572–265). NHTSA is in the process of evaluating the issues raised in the Alliance petition.

[14] We note that some vehicle manufacturers authorize their dealers to replace the vehicle's factory-installed tires with other tires, including ones with a different size and/or recommended cold tire inflation pressure. The TPMS would have to perform properly with any such tires, because the vehicle could be equipped with those tires at the time of initial sale. Of course, the manufacturer would not have that responsibility if the dealer installed other tires without manufacturer authorization. However, the dealer would violate the Motor Vehicle Safety Act if it installed tires on a new vehicle that prevented the TPMS from functioning properly. *See* 49 U.S.C. 30112(a).

[15] As part of this notice proposing to re-establish FMVSS No. 138, we are proposing to add two versions of the TPMS low tire pressure telltale and a TPMS malfunction telltale to Table 2 of FMVSS No. 101, *Controls and Displays*. The proposed regulatory text in this NPRM incorporates the TPMS telltales in Table 2, as that table currently exists in the Code of Federal Regulations. However, we note that NHTSA published an NPRM in the **Federal Register** on September 23, 2003 that proposes to update and expand FMVSS No. 101 (68 FR 55217). Publication of the present version of Table 2 here is not intended to suggest a change in approach to the ongoing FMVSS No. 101 rulemaking. We anticipate that the TPMS telltales would be incorporated in a revised Table 2, once a final decision is reached on updating Standard No. 101.

[16] For some systems, extinguishment may occur automatically upon re-inflation of the tires to the proper pressure. Other systems may require manual reset in accordance with the vehicle manufacturer's instructions. However, manual reset of the system may not result in extinguishment of the low tire pressure telltale prior to correction of the under-inflation situation.

[17] 49 CFR Part 512 (as amended, 68 FR 44209 (July 28, 2003)).

easily meet the newly proposed phase-in requirements.

Based upon the information obtained from the data submitted in response to the Special Orders, NHTSA is proposing to adopt the following phase-in schedule: 50 percent of a vehicle manufacturer's light vehicles would be required to comply with the standard during the first year (September 1, 2005 to August 31, 2006); 90 percent during the second year (September 1, 2006 to August 31, 2007); and all vehicles thereafter.[18]

To encourage early compliance, NHTSA is proposing to permit carry-forward credits for vehicles that are certified as complying with the standard [19] and that are manufactured on or after the effective date of the final rule.[20] However, beginning September 1, 2007, all covered vehicles would be required to comply with the standard, without regard to any earlier carry-forward credits.

As before, NHTSA is proposing to exclude from the phase-in requirements final stage manufacturers, alterers, and small volume manufacturers (SVMs) (although the criteria for designation as an SVM has been revised). We also are proposing to maintain the phase-in reporting requirements, as modified to reflect the newly proposed phase-in schedule.[21] We request public comment on the schedule that NHTSA has proposed.

C. Responses to Issues Raised in Petitions for Reconsideration

As noted previously, NHTSA was nearing the point of issuing its response to petitions for reconsideration of the June 5, 2002 final rule for TPMS, when the Second Circuit issued its opinion in *Public Citizen, Inc.* v. *Mineta.* Most issues raised in the petitions for reconsideration were not directly related to the one-tire, 30-percent option nullified by the Court and thus remain relevant. Accordingly, NHTSA decided to address those issues in this notice, as discussed below.

1. Replacement Tires

As expressed in paragraph S4.4 of the standard, the June 5, 2002 final rule required that each TPMS-equipped vehicle meet the requirements of FMVSS No. 138 when the vehicle's original tires are replaced with optional or replacement tires (for simplicity of discussion, we refer below to these tires as replacement tires) of the size(s) authorized or recommended for use on the vehicle by the vehicle manufacturer. Paragraph S6(l) set out test procedure provisions applicable to replacement tires.

TPMS operation with replacement tires was the issue most frequently raised and extensively discussed in the petitions for reconsideration. Five petitioners (Delphi, DENSO, the Alliance, Johnson Controls, and JATMA) raised this issue. The petitioners generally argued that the standard's replacement tire requirements are not practicable because there are a large number of replacement tires available in the tire sizes authorized or recommended for each vehicle model and the construction characteristics of some of those tires may prevent proper functioning of the TPMS, even within a given size.

The Delphi petition asked us to amend FMVSS No. 138 S4.4 and S6(l) so that manufacturers need only certify TPMS operation with replacement tires that are of the same size and ''type'' recommended by the vehicle manufacturer. According to Delphi, tire ''type'' is a critical factor that will affect TPMS operation, and takes into account properties such as construction, speed rating, and manufacturer's brand. Tire ''construction'' involves the number of plies and the material of the plies in both the tread and the sidewall.

The Delphi petition argued that adding a tire type limitation to the requirement for TPMS compliance with replacement tires is necessary, not only from a practical standpoint, but in order to render the standard objective, as required under the National Traffic and Motor Vehicle Safety Act (49 U.S.C. Chapter 301) (Safety Act). The Johnson Controls petition argued that the current, above-mentioned provisions of the standard related to replacement tires are not ''reasonable, practicable, and appropriate,'' as required by section 30111(b)(3) of the Safety Act. It argued that the requirement for TPMS compliance with the standard for all replacement tires would go beyond the limitations of current TPMS capabilities.

Delphi argued that lack of specificity regarding the type of tire would force manufacturers to anticipate future tire designs in order to certify a vehicle under the TPMS rule, rendering the rule insufficient to meet the objectivity requirements of the Safety Act. Further, Delphi argued that in practical terms, without a tire type limitation, manufacturers would have to certify certain TPMS-equipped vehicle models for compliance with over 100 replacement tire options, if size is the only limiting factor.

DENSO's petition expressed similar concerns and added that, for indirect TPMSs, tire pressure sensitivity (*i.e.*, the relationship between tire radius and tire inflation pressure) is a design parameter of significant operational importance. However, according to DENSO, tire pressure sensitivity varies by tire manufacturer or brand even if such tires are of an identical size, thereby making it difficult to ensure that a TPMS would be able to comply with the standard for all replacement tires of the specified size. According to the petitioner, similar concerns apply to direct TPMSs because some aftermarket tires are constructed with materials (*e.g.*, steel) that, to varying degrees, may shield the radio signal transmitted from the TPMS tire sensor to the receiver. The DENSO petition asked NHTSA to limit the universe of replacement tires for which manufacturers must certify TPMS functionality under FMVSS No. 138 by revising paragraph S4.4 of the standard to require vehicle manufacturers to certify TPMS compliance only for tires released as original equipment.

The Alliance petition also objected to the final rule's requirement that the TPMS operate properly with all replacement tires. The Alliance argued that just because different brands and styles of the same size tire meet the same tire industry standards, it does not mean that such tires are equivalent in form and function. For example, it argued that different tires of the same size are often designed to perform under a variety of road and weather conditions, and at varying levels of durability, performance, and cost. Thus, according to the petitioner, there may be fundamental differences in tire construction, even though such tires may meet the same basic performance standards. The Alliance also stated in its petition that the current availability of aftermarket direct TPMSs does not guarantee that these systems will be sensitive to all tire constructions, and

[18] The responses to the Special Orders also contained information indicating that a 20% phase-in would be appropriate for MY 2005. The agency, however, does not believe the rulemaking process will be completed in time to allow for the adoption of a MY 2005 requirement, so we are not proposing one in this NPRM.

[19] Any such certification of compliance with the standard is irrevocable.

[20] The effective date of the amendments made to the Code of Federal Regulations by the final rule would likely be specified as 30 days after the issuance of the final rule.

[21] Since the issuance of the June 5, 2002 final rule, NHTSA has published an unrelated NPRM in the **Federal Register** that, in part, proposes to consolidate the placement of phase-in reporting requirements for various standards (including the TPMS standard) in a renamed Part 585, *Phase-in Reporting Requirements. See* 68 FR 46546 (August 6, 2003). Consequently, in this notice, we are proposing ultimately to incorporate the TPMS phase-in reporting requirements as Subpart D to Part 585.

such problems may be even more pronounced for indirect TPMSs.

In its petition, the Alliance argued also that the replacement tire requirement is not practicable. According to the Alliance, there may be hundreds of aftermarket tires of the same size as a vehicle's original equipment tires, but in some cases, differences in tire properties may pose insurmountable problems for proper functioning of the TPMS. It argued that the mere existence of a non-compatible tire would render compliance with S4.4 impossible. In addition, because tire manufacturing is largely beyond the control of vehicle manufacturers, the Alliance argued that it is unfair to ask vehicle manufacturers to certify TPMS compliance with all replacement tires of a given size. Finally, the Alliance contended that existing TPMSs work in an acceptable fashion with replacement tires in the field and that the agency has not provided any evidence to support an assumption to the contrary.

The Alliance supplemented its petition with a letter providing data intended to support its position that a vehicle's TPMS should not be required to comply with FMVSS No. 138 with replacement tires. Among other things, the letter provided data on the number of tires of the same size for various vehicles and on characteristic differences between original equipment and replacement tires of the same size. More specifically, the Alliance presented data on the specifications for 33 replacement tires (P195/75R14), showing differences in overall diameter and revolutions per mile, among other specifications. However, the Alliance did not explain in its petition how these differences in overall diameter and revolutions per mile, for each of the 33 tires, affected compliance for vehicles with indirect TPMSs.

The supplementary letter also included data from a study of the number of replacement tires that are available for a given vehicle model. For 61 vehicle models, an average of 5 tire sizes are recommended by the manufacturer, and an average of 162 different tire models are available per vehicle. Data were provided to show also the negative effect that steel reinforcement in the sidewall of a tire can have on the signal transmission by direct TPMSs.

The Alliance also asserted that NHTSA has not established a safety need that would justify requiring manufacturers to certify that TPMSs will function with replacement tires. Alternatively, the Alliance argued that if the agency does identify such a safety need, NHTSA should undertake rulemaking to standardize and tighten the performance requirements for replacement tires to ensure that their revolutions per kilometer (RPK) profiles are within the range that can work with TPMSs designed to meet the requirements of FMVSS No. 138.

The Alliance also argued that there is no precedent for such a broad requirement, noting that manufacturers are not required to certify vehicle compliance with FMVSS Nos. 105 and 135 for all available replacement brake linings, or to certify vehicle compliance with crashworthiness performance requirements for all aftermarket body, restraint, or interior components. The Alliance and Johnson Controls petitions also objected to high testing costs associated with the TPMS requirements for replacement tires, which the Alliance estimates to be between $3.2 million and $106.5 million.

Consequently, the Alliance requested that the agency revise FMVSS No. 138 to delete paragraph S4.4, so that vehicle manufacturers are only required to certify compliance with the TPMS standard with any tire released as original equipment on the vehicle.

The JATMA petition took a view contrary to the other petitions regarding TPMS compliance with replacement tires, urging NHTSA to strengthen that portion of the standard so as to require the TPMS to function properly even with tires of a type different than the standard and optional tires recommended by the manufacturer. JATMA reasoned that failure of the TPMS to function properly with such tires could lead to significant confusion among consumers.

In a letter dated September 11, 2003, General Motors (GM) submitted information to NHTSA intended to illustrate additional difficulties associated with the TPMS standard's replacement tire requirement, specifically problems associated with certifying run-flat tires with direct TPMSs.[22] According to GM, on the basis of validation testing, it certified a MY 2004 vehicle equipped with run-flat tires to the requirements of the June 5, 2002 final rule. However, the company later decided to test the vehicle with a set of replacement run-flat tires. During testing with those replacement tires, the TPMS produced a series of erroneous warnings. GM stated that the root cause was an attenuated signal from the TPMS sensors as a result of the replacement tires' thicker sidewall construction. GM stated that its test further demonstrates that it is not practicable to require vehicle certification under FMVSS No. 138 for all replacement tires.

Since the Second Circuit's decision, NHTSA has continued to gather information regarding the benefits and limitations of a requirement that a TPMS continue functioning when any replacement tires of a size recommended or authorized by the vehicle manufacturer are installed on the vehicle. On October 20, 2003, the Alliance and several of its members presented additional data regarding their research into direct TPMS operation with replacement tires.[23] Although by no means a comprehensive analysis of all replacement tires, the Alliance data identified 20 replacement tires with which the TPMS would reportedly not function properly.

The Alliance stated that there are a small number of replacement tires that are problematic for direct TPMSs due to signal attenuation. Problems may arise from aspects of tire design and construction, such as high carbon content in low aspect-ratio tires, thicker sidewall, or steel body ply sidewall. Some tires with these characteristics may weaken the radio frequency signal from a direct TPMS's sensors to its receiver, potentially resulting in inaccurate tire inflation pressure information or overt failure of the system to operate. These data suggest that the scope of the signal attenuation problem is broader than just the issue of steel sidewall tires documented in earlier Alliance submissions.

RMA also submitted information on the prevalence of tires with characteristics identified as being incompatible with proper TPMS functioning, at least in some cases. As noted above, these problems are primarily related to the tires' construction (*e.g.*, run-flat tires) and material content (*e.g.*, high carbon content in low aspect-ratio tires, thicker sidewall, or steel body ply sidewall). According to the RMA, in 2002, light vehicle tires having either steel body ply cords (steel casing tires) or run-flat capability accounted for less than 0.5 percent of tires distributed in the United States.[24]

In an effort to develop a test protocol to evaluate a tire's radio frequency signal attenuation (the most significant problem for direct TPMSs), the Alliance conducted an analysis of nearly 100 tires, including 28 of the most popular replacement tires with 14, 15, and 16-

[22] Docket No. NHTSA–2000–8572–275.

[23] Docket No. NHTSA–2000–8572–277

[24] Letter from Steven Butcher, Vice President, Rubber Manufacturers Association, to NHTSA (October 31, 2003) (Docket No. NHTSA–2000–8572–282).

inch rim sizes.[25] The Alliance stated that its testing included both original equipment (OE) tires and high-volume, non-OE replacement tires. According to the Alliance, the proper functioning of a TPMS is dependent upon the interaction of the system's various components. It said that factors such as wheel material, wheel shape, and the mounting of the sensor in the wheel all can affect transmission of the TPMS signal.

The Alliance presented its findings and a proposed solution to the replacement tire issue in a December 9, 2003 letter to NHTSA.[26] Based upon the results of its testing, the Alliance reached two basic conclusions. First, the Alliance stated that most replacement tires were found to be compatible with the TPMS tested. Second, the Alliance asserted that ''to date we have not been able to identify appropriate performance measures that would reliably identify those few replacement tires that are likely to undermine the proper functioning of tire pressure monitoring systems.''[27] The Alliance stated that other than steel sidewall construction, there was no obvious construction or size characteristics that distinguished run-flat, low profile, and non-steel sidewall tires that permit proper TPMS functioning from those that preclude proper TPMS functioning.

In its December 9, 2003 letter, the Alliance recommended that NHTSA consider a two-step approach that would provide information to consumers regarding replacement tire compatibility with TPMSs, as a substitute for the replacement tire certification requirement. First, the Alliance recommended that the vehicle owner's manual should contain specified language alerting consumers to select appropriate replacement tires that are compatible with the vehicle's TPMS. Second, the Alliance recommended that NHTSA should require vehicle manufacturers to provide an in-vehicle indication when there is inadequate signal reception from one or more of the TPMS sensors (either through a dedicated telltale, a separate function of the low tire pressure telltale, a message on a reconfigurable display, or some other means). In an attachment to its letter, the Alliance also provided draft regulatory language that would implement its recommended approach.

After considering the arguments in the petitions and the supplemental information on TPMS compatibility with replacement tires, we have tentatively decided to alter our approach to this topic. However, we emphasize that it would not be permissible for dealers to install tires on a new vehicle that would take the vehicle out of compliance with the TPMS standard. In addition, we are proposing to only require vehicle manufacturers to assure TPMS compliance with the tires installed on the vehicle at the time of initial vehicle sale. However, we are proposing certain new requirements designed to address the issue of continuing TPMS functionality, including incorporation of a TPMS malfunction indicator and additional language in the owner's manual discussing replacement tire compatibility with the tire pressure monitoring system. The portions of our proposal related to replacement tires build upon the approach recommended by the Alliance.

Several factors contributed to our decision to alter how we would address the need to have the TPMS continue functioning properly after the vehicle's original tires are replaced. First, information presented to NHTSA shows that there are currently over four million TPMS-equipped vehicles.[28] Neither the agency nor vehicle manufacturers have received reports indicating any significant performance problems with those TPMSs when replacement tires are installed on the vehicle. In addition, the agency has noted previously that aftermarket direct TPMSs are available and that such systems may be capable of functioning regardless of the construction of the tires.[29] NHTSA does not have any information to suggest a significant problem with the operation of aftermarket TPMSs, although the performance capabilities of these systems are not known. This significant real world population of TPMSs suggests that TPMSs will continue to work with replacement tires in the vast majority of cases.

However, NHTSA has been presented with data demonstrating that a very small number of replacement tires (estimated at less than 0.5 percent of production) may have construction characteristics and material content that cause the vehicle's TPMS to exhibit functional problems. There is no clear design solution for this problem. In many instances, TPMSs may function properly even when equipped with replacement tires with the previously discussed characteristics. However, to date, it has not been possible to develop an appropriate performance measure that would reliably identify those anomalous tires that would prevent proper TPMS functioning.

Further, it is NHTSA's understanding that some of the reported compatibility problems between direct TPMSs and certain replacement tires may have been related to vehicle manufacturer use of TPMS transmitters and receivers produced by different suppliers.[30] Incompatibility between different parts of the TPMS may have contributed to the overall problem in those cases. Thus, cognizance of this problem may limit further the number of incidents of incompatibility between TPMSs and replacement tires.

Based upon the above new information, we now believe that there is not a sufficient basis to require vehicles to comply with FMVSS No. 138 with all replacement tires. While the number of tires expected to be incompatible with the TPMS is small, such a requirement would nonetheless raise significant practicability concerns.

We continue to believe, however, that the TPMS should continue to function properly beyond the point at which the vehicle's original tires are replaced, a clearly foreseeable event. Continued TPMS functionality with replacement tires is consistent with Congress's intention to improve tire and vehicle safety, as expressed in the TREAD Act. Moreover, there are other TPMS failure modes (*e.g.,* pressure sensor battery life, pressure sensor failure, antenna failure, TPMS power loss), and unless drivers are made aware of such failures, they could have a false sense of security. Therefore, in this NPRM, we are proposing to require the TPMS to be equipped with a telltale indicator that would alert the driver of a TPMS malfunction, tire-related or otherwise. In addition, we are proposing owner's manual requirements to make consumers aware of this potential problem. The details of these proposed requirements immediately follow.

[25] Letter from Vann Wilber, Vehicle Safety and Harmonization Director, Alliance of Automobile Manufacturers, to NHTSA (December 17, 2003) (Docket No. NHTSA–2000–8572–287).

[26] Letter from Vann Wilber, Vehicle Safety and Harmonization Director, Alliance of Automobile Manufacturers, to NHTSA (December 9, 2003) (Docket No. NHTSA–2000–8572–285).

[27] *Id.*

[28] Letter from Robert Strassburger, Vice President, Alliance of Automobile Manufacturers, to NHTSA (October 20, 2003) (Docket No. NHTSA–2000–8572–277).

[29] 67 FR 38704, 38731 (June 5, 2002).

[30] GM submitted a letter to NHTSA on September 11, 2003, outlining the problems that their direct TPMS was experiencing when different run-flat tires were installed on the vehicle. (Docket No. NHTSA–2000–8572–275) Subsequent discussions revealed that TPMS components from different TPMS manufacturers were used and that the same tires permitted proper TPMS functioning when TPMS components from a single TPMS manufacturer were used.

We believe that this approach offers a reasonable alternative that would not only facilitate continued proper TPMS operation with replacement tires, but also would provide the driver with valuable information regarding malfunction of the TPMS.

a. TPMS Malfunction Indicator

In proposing to require a malfunction indicator, NHTSA sees an opportunity not only to provide a means of warning when incompatible replacement tires have been installed on the vehicle, but at the same time also to provide the driver with notice when some other problem has rendered the TPMS inoperative. We are proposing to require a TPMS malfunction indicator that ''illuminates whenever there is a malfunction that affects the generation or transmission of control or response signals in the vehicle's tire pressure monitoring system.'' Examples of malfunctions that would trigger the TPMS malfunction indicator include, but are not limited to, the following: (1) Loss of power or insufficient power to the TPMS control unit; (2) loss of power or insufficient power from one or more wheel sensors due to a low or dead battery; (3) inadequate signal transmission from one or more TPMS sensors, or (4) inadequate signal reception by the system's antenna/receiver, attributable to a defective wheel sensor, a defective antenna, or incompatible replacement tire.[31] We believe that operational details of when the malfunction indicator would be triggered will depend upon the strengths and limitations of a given TPMS. We request comment on whether our proposed requirement for malfunction detection is sufficiently broad to detect and report TPMS malfunctions, regardless of the type of system installed. We also request comment on whether our proposed requirement is sufficiently specific to enable manufacturers to know the types of malfunctions the system must be capable of detecting and reporting. If not, we request comments on how it should be made more specific.

Under the proposal, the malfunction indicator would not be required to specify the cause of the malfunction. We have tentatively decided not to establish such a requirement for several reasons. First, a multiplicity of TPMS malfunction messages could confuse the consumer. Second, there are obvious space limitations on the instrument panel or reconfigurable display, space that might more prudently be reserved for some other safety warning in the future. In addition, we believe that for most consumers, correction of a TPMS malfunction will necessitate vehicle servicing by a trained professional.

We believe that it is important that the message for TPMS malfunction be distinct from the message for low tire pressure. We are proposing to allow manufacturers to choose from two options[32] for the TPMS malfunction indicator to ensure that distinctness.

(1) Separate TPMS Malfunction Telltale

Under the first proposed option, a vehicle manufacturer would be required to install a dedicated yellow telltale (pictured below) that is separate from the low tire pressure warning indicator and that would illuminate upon detection of a malfunction and remain continuously illuminated as long as the malfunction exists, whenever the ignition locking system is in the ''On'' (''Run'') position. It also would be required to perform a bulb-check at vehicle start-up. This TPMS malfunction telltale would be required to be labeled with the symbol below, or that symbol and the word ''TPMS.''

TPMS

[31] We are not proposing to require the TPMS malfunction indicator to illuminate when a spare tire without a TPMS transmitter is used, because we believe that a consumer would not be lulled into a false sense of security under that scenario.

[32] We note that, under either proposed option, it would be permissible to incorporate the TPMS malfunction indicator as part of a reconfigurable display, provided all proposed requirements are met.

We are proposing yellow (as opposed to red) as the appropriate color for the dedicated malfunction telltale because, in most cases, malfunction of the TPMS would not constitute an imminent safety problem necessitating immediate driver action. A vehicle's tires may be properly inflated, even if the malfunction indicator is triggered. Therefore, we believe that a yellow cautionary telltale would be appropriate to indicate that while a problem with the TPMS exists, the vehicle may be driven safely until the opportunity arises to have the situation corrected.

We are proposing that, once triggered, this separate TPMS malfunction indicator would be continuously illuminated as long as the malfunction exists, whenever the ignition locking system is in the ''On'' (''Run'') position. We are making this proposal because the TPMS is an important piece of safety equipment, and we believe that the driver should be constantly reminded when such equipment is not operating properly. The requirement for constant illumination is consistent with the operation of other warning telltales.

After conducting an evaluation of possible icons, NHTSA selected the proposed symbol for TPMS malfunction, which is based upon an international ISO design used to signal low tire pressure. In selecting the proposed symbol, we sought to choose an icon that could be recognized by consumers, that would help achieve the desired response, and that at the same time would be consistent with the ISO standard. If the consumer were not already familiar with the telltale, the preferred response would be to lead people to consult the owner's manual for further information, rather than an extreme response (*e.g.*, stopping the vehicle immediately).

As in the case of the requirement for bulb checks for other telltales, we believe that the proposed requirement for a bulb check for the malfunction telltale would provide an important safety benefit (*i.e.*, ensuring that the telltale is capable of illuminating in order to deliver its message) at minimal cost.

(2) *Combination Low Tire Pressure/TPMS Malfunction Telltale*

Under the second proposed option, a vehicle manufacturer could incorporate the TPMS malfunction indicator function as part of the required low tire pressure telltale. Proposed requirements for color, wording, bulb check, and illumination format for the low tire pressure function (all discussed elsewhere in this proposal), would be unaffected by the incorporation of the TPMS malfunction indicator within the same telltale.

In order to indicate a malfunction, the low tire pressure telltale would be required to flash for a period of one minute, after which time the telltale would remain continuously illuminated as long as the malfunction exists and the ignition locking system is in the ''On'' (''Run'') position. We limited the period to one minute to avoid distracting or bothering the driver. This flashing and illumination sequence would be repeated upon subsequent vehicle start-ups until the situation causing the malfunction has been corrected. We believe that flashing the low tire pressure telltale to indicate TPMS malfunction is a sufficiently distinct message to enable the driver to differentiate between the two warnings; any confusion between the messages would be resolved easily by consulting the owner's manual.

The agency is especially interested in comments related to the specific details of the mode of operation of the proposed TPMS malfunction indicators, as well as possible alternatives. We invite views on the telltales' malfunction symbol(s) and how the signal is presented to the driver, in order to assess its effectiveness in delivering a clear message.

b. Owner's Manual Requirements Related to Replacement Tires and the TPMS Malfunction Indicator

The second part of our proposed approach for addressing continued operation of the TPMS with replacement tires involves requiring vehicle manufacturers to provide relevant information to consumers in the vehicle owner's manual. Generally, we are proposing to require language to alert consumers regarding: (1) Potential problems related to compatibility between the vehicle's TPMS and various types of replacement tires, and (2) the presence and operation of the TPMS malfunction indicator. For those vehicles without an owner's manual, we are proposing to require that this information be supplied to the purchaser in writing at the time of initial vehicle sale. We request comments on our proposed owner's manual language, including any suggestions for modifications and accompanying rationale.

Specifically, under paragraph S4.5 of the standard, we are proposing to require the following language to be printed in the vehicle's owner's manual:

> Your vehicle has also been equipped with a TPMS malfunction telltale to indicate when the system is not operating properly. When the malfunction telltale is illuminated, the system may not be able to detect or signal low tire pressure as intended. TPMS malfunctions may occur for a variety of reasons, including the installation of incompatible replacement tires on the vehicle. Always check the TPMS malfunction telltale after replacing one or more tires on your vehicle to ensure that the replacement tires are compatible with the TPMS.

2. Spare Tires

In the June 5, 2002 final rule, we decided not to require the TPMS to monitor the pressure in a spare tire (either compact or full-sized), either while stowed or when installed on the vehicle (67 FR 38704, 38731). We came to this decision for a number of reasons, including the knowledge on the part of drivers that temporary tires are not intended for extended use, the fact that compact spare tires pose operational problems for both direct and indirect TPMSs, the potential disincentive for manufacturers to supply a full-size spare if TPMS compliance were required, and the increased cost of the rule, with little if any safety benefit, if a spare tire must be monitored. NHTSA stated that it would not conduct compliance testing under Standard No. 138 with spare tires installed on the vehicle.

The Alliance petition asked NHTSA to further clarify the final rule to acknowledge that a properly calibrated TPMS will activate the TPMS telltale after a small spare tire or a full-sized spare tire without a pressure sensor is installed. According to the Alliance, in situations in which a spare tire is in use, information regarding the inflation pressure of the remaining three tires may or may not be indicated by the TPMS, depending upon the type of system and display used. The Alliance asked for an explicit statement that the standard does not require a TPMS to indicate low pressure in any of the remaining three tires when a spare tire is installed on a vehicle.

We acknowledge that in certain instances, use of a spare tire on a vehicle may prevent the proper operation of the TPMS. However, we believe that the Alliance's recommended regulatory language is unnecessary, because the proposed language in paragraph S4.5, *Written Instructions*, of the NPRM adequately addresses this issue. That provision proposes to permit a vehicle manufacturer to include in the vehicle owner's manual a statement of ''whether the tire pressure monitoring system functions with the vehicle's spare tire (if provided).'' This proposed language is sufficient to cover all aspects of a

TPMS's capability to function when a spare tire is in use.

In addition, during the course of this rulemaking, GM suggested a clarification in paragraph S4.5.1 of the standard, which deals with TPMS-related written instructions in the vehicle owner's manual (*see* Docket No. NHTSA–2000–8572–258 in the DOT Docket Management System Web site at *http://dms.dot.gov*). Specifically, GM noted that vehicle manufacturers are not required to provide a spare tire, and some vehicles do not come equipped with spare tires. Consequently, GM suggested that the standard be amended to reflect this possibility, thereby preventing consumer confusion.

We agree with GM that not all vehicles are equipped with spare tires and that consumers might be confused to see language in the owner's manual, as contained in the June 2002 final rule, for a vehicle that is not equipped with a spare tire. Accordingly, in the NPRM, we have drafted proposed paragraph S4.5 to reflect the potential absence of a spare tire.[33]

3. Low Tire Pressure Telltale

Paragraph S4.3 of FMVSS No. 138 required that each vehicle be equipped with a yellow telltale that is mounted in plain view of the driver and is identified by the symbols and phrases specified for low tire pressure in S5.2.3 and Table 2 of FMVSS No. 101, *Controls and Displays*.[34] It also stated the conditions under which the TPMS telltale must illuminate and the conditions under which the TPMS must extinguish or deactivate the telltale.

Specifically, the TPMS telltale was required to be illuminated continuously when low tire pressure is detected under the parameters set forth in S4.2 of FMVSS No. 138. In addition, it was required to be illuminated as a bulb check when the ignition locking system is in the ''on'' position and the engine is not operating, or when the ignition locking system is in a position between ''on'' and ''start'' that is designated by the manufacturer as a check position. Paragraph S6(j) of the standard provided a test procedure, in which the TPMS telltale is to be extinguished automatically, although it does not specify a time limit for the telltale to be turned off.

A number of the petitioners raised issues about the TPMS warning telltale requirements, including issues related to permissible color, use of reconfigurable displays, extinguishment time, bulb check, and indication of TPMS malfunction. A discrepancy also was identified between FMVSS No. 138 S4.3.1(b) and FMVSS No. 101 S5.2.3 and Table 2. Each of these issues will be discussed in turn. (Please note that all relevant telltale issues related to the newly proposed TPMS malfunction indicator are discussed above in Section III.C.1 (*Replacement Tires*).)

Color

Petitions submitted by Volkswagen, the Alliance, and BNA's ISO/TC22 all raised issues related to TPMS telltale color. The petition of BNA's ISO/TC22 recommended replacement of the yellow TPMS telltale required under the June 5, 2002 final rule with a red lamp, arguing that illumination of the TPMS telltale should be treated as an alert to the driver to check the tire pressure and to take corrective action immediately. The petitioner reasoned that the TPMS should have a red telltale, consistent with other failure telltales, rather than a yellow ''warning'' telltale, which does not connote a need for immediate corrective action. It was mentioned that ISO, an international standard-setting body, is currently preparing a new standard for ''Tyre Pressure Monitoring Systems,'' which can be expected to have a requirement for a red telltale.[35]

Volkswagen's petition also asked the agency to modify its requirement in FMVSS No. 101 for the color of the TPMS telltale. However, Volkswagen seeks to have the standard permit a dual-color TPMS telltale, which would switch from yellow to red when tire pressure falls below a specified level deemed to be dangerously low. The petitioner acknowledged the possibility that such TPMS telltales may display as red immediately if air loss is sufficiently rapid or is below a safe driving level upon start-up. However, Volkswagen believes that a TPMS telltale with dual yellow/red illumination capabilities would provide an enhanced level of warning to drivers in urgent situations and notes that such TPMS telltales are currently in use on some vehicles.

Volkswagen also asked that the final rule be modified to permit the use of a white lamp in the event the TPMS telltale is permitted to be part of a reconfigurable (multi-function) display. In line with its recommendations, Volkswagen's petition asked the agency to require vehicle owner's manuals to explain the functional meaning of the colors utilized for the TPMS telltale.

The Alliance believes that the final rule's specified requirements for telltale color are unnecessarily design-restrictive. Its petition also recommended amendment of the standard to permit both the yellow/red TPMS telltale color combination and the white TPMS telltale for reconfigurable displays.

We continue to believe that yellow is the most appropriate color for the low tire pressure telltale, consistent with the reasoning set forth in the final rule, so in this NPRM, we are again proposing a yellow telltale requirement as part of the standard. We will briefly restate our reasoning. The use of the color red usually is reserved for telltales warning of an imminent safety hazard. An example is the brake system warning telltale, which is red because a failure in a vehicle's brake system results in an imminent safety hazard that requires immediate attention. In contrast, NHTSA requires a yellow telltale for driver warnings when the safety consequences of the malfunctioning system do not constitute an emergency and the vehicle does not require immediate servicing.

Tire pressure monitoring systems are designed to detect a relatively slow loss of tire pressure so that the driver can seek the necessary tire maintenance and prevent a major tire failure that could result in catastrophic consequences (*i.e.*, the type of situation where a red telltale would be suitable). Based upon the agency's testing of tires at 20 pounds per square inch (psi) (the minimum activation pressure for the TPMS telltale), we do not believe that a significantly under-inflated tire represents an imminent safety hazard, particularly because we are proposing a requirement for under-inflation detection and warning at a point when the vehicle may still be operated safely.

If we were to require a red telltale, we would be conveying a very different message regarding the urgency of the low tire pressure situation and the action to be taken (*i.e.*, the need for an immediate stop). If we were to permit a telltale that changes color from yellow to red, we are concerned that this could confuse consumers, particularly if it is left to the discretion of individual vehicle manufacturers to decide the

[33] NHTSA has eliminated the owner's manual requirement contained in S4.5.2, due to the Second Circuit's invalidation of the underlying one-tire, 30-percent option. Accordingly, as part of this proposal, we have consolidated the remaining owner's manual requirements under S4.5 and included the change related to spare tires in that section.

[34] We note that if a vehicle manufacturer elects to install a low tire pressure telltale that indicates which tire is under-inflated, the telltale must correctly identify the under-inflated tire. *See* S4.3.2.

[35] NHTSA understands that ISO had made plans to convene a meeting in April 2004, in order to obtain agreement on performance specifications and test procedures for a ''Tyre Pressure Monitoring Systems'' standard, with the intention of presenting a draft document to its members for balloting in June 2004. A date for issuance of a final ISO standard has not been set.

level of under-inflation at which the red telltale is triggered. Conceivably, a manufacturer could program the TPMS to illuminate a yellow telltale for a fraction of a second, after which time it would immediately turn red; such a result would meet the letter of the requirement, but foil its intent. Accordingly, we stand by our conclusion that yellow is the appropriate color for the low tire pressure telltale because it conveys the message that the driver may continue driving, but should check and adjust the tire pressure at the earliest opportunity.

Although we are proposing to retain the yellow color requirement for the low tire pressure telltale in this NPRM, it has traditionally been our practice to permit manufacturers to take additional measures, consistent with Federal motor vehicle safety standards, that are designed to further enhance safety. Consequently, we are proposing to permit manufacturers to incorporate a second, red light to accompany the continuously-illuminated yellow TPMS telltale, which would be illuminated when pressure in one or more tires becomes dangerously under-inflated, as determined by the manufacturer. If a manufacturer chooses to add a second, red warning light, its meaning and function would have to be discussed in the vehicle's owner's manual.

NHTSA has not adopted the recommendation that the agency waive the yellow color requirement to also permit a white color for TPMS telltales that are part of a reconfigurable display. We believe that color imparts meaning in the context of warning telltales, and the petitioners have provided insufficient data to justify exempting TPMS telltales in reconfigurable displays from being subject to the standard's proposed yellow color requirement.

Reconfigurable Display

The petitions for reconsideration submitted by Johnson Controls, Volkswagen, and the Alliance all raised concerns related to the permissibility of incorporating the TPMS telltale in reconfigurable, multi-function displays. Reconfigurable displays utilize a common space to provide a variety of information to the driver; typically, these displays have a screen on which different messages may occupy the same position at different times.

While acknowledging the agency's concerns regarding the safety implications of permitting a vehicle operator to deactivate the TPMS telltale or reconfigure the display so that the TPMS telltale is not visible, the Johnson Controls petition stated that reconfigurable displays can be designed to meet the requirements of the June 5, 2002 final rule. Specifically, a reconfigurable telltale could be produced that automatically illuminates and remains continuously illuminated while one or more tires are significantly under-inflated and that is extinguished only when the tires cease to be significantly under-inflated. (We assume that other messages that normally share the same position on the reconfigurable display as the TPMS telltale either would be suppressed or migrate to a different position on the display.) Johnson Controls asked the agency to clarify the TPMS rule to acknowledge that the TPMS telltale may be part of a reconfigurable display, provided that the above two conditions are met. The petitioner noted that this clarification would not require any substantive change to the TPMS standard, but it would allow manufacturers to continue to have the option of utilizing multi-function display technology while fully complying with the requirements of the regulation.

Volkswagen's petition argued that the final rule's telltale requirements are too design restrictive and requested that the TPMS telltale be permitted as part of a reconfigurable display that illuminates the TPMS telltale when the vehicle is shifted into a forward driving gear and which displays the telltale on an interruptible but persistent basis until the tire pressure is corrected or until the system is reset manually in accordance with the vehicle manufacturer's instructions.

In the interest of safety, we incorporated a requirement in the June 5, 2002 final rule for continuous illumination of the TPMS telltale as long as one or more of a vehicle's tires is significantly under-inflated. While the TPMS rule did not explicitly prohibit the incorporation of the TPMS telltale into a reconfigurable display, we questioned the ability of a reconfigurable display to meet the requirements of S4.2 of the standard, due to the constant illumination requirement. In drafting the June 2002 final rule, we were concerned also that a vehicle operator may be able to reconfigure the display in such a way that the important safety message provided by the TPMS telltale is no longer visible, which is not acceptable.

In the current proposal, FMVSS No. 138 once again would not prohibit outright the inclusion of the TPMS telltale as part of a reconfigurable display, and we note Johnson Controls' statement that reconfigurable displays currently exist which can meet the proposed requirements of the standard, including the provision for continuous illumination. Thus, we want to make it clear that we are proposing that it would be permissible to incorporate the TPMS telltale as part of a reconfigurable display, provided that illumination of the yellow telltale is continuous while one or more tires is under-inflated. However, we want to emphasize that under this proposal, the TPMS telltale would not be permitted to flash or cycle when performing its under-inflation detection function. Further, the display could not be controlled by the driver so as to disable the TPMS safety message prior to remedying the low pressure condition, including by scrolling the message down such that it is no longer visible. Thus, reconfigurable displays that provide a persistent, but cycling, TPMS warning would not meet the standard's proposed requirement for continuous illumination.

Extinguishment Time

The Johnson Controls petition asked the agency to amend the June 2002 final rule to specify a timing requirement for TPMS telltale extinguishment, in cases in which the tire pressure deficiency has been corrected and there is no manual reset feature. In recommending a timeframe for extinguishment, the petitioner stated that because both illumination and extinguishment of the telltale involve the same detection considerations from a technological standpoint, extinguishment should occur within ten minutes. Accordingly, Johnson Controls petitioned NHTSA to amend the testing procedures in FMVSS No. 138 S6(j) of the June 5, 2002 final rule to provide that unless there is a manual reset feature, the manufacturer must record the time to extinguishment after the vehicle reaches 50 km/hr and that the TPMS telltale must extinguish within ten minutes. The petitioner also asked that the testing procedures in FMVSS No. 138 S6(i) be amended to require verification of telltale extinguishment if the TPMS system has a manual reset feature.

We are not adopting the suggestion of Johnson Controls to require a time limit for TPMS telltale extinguishment. Telltale extinguishment is addressed already under FMVSS No. 101. Specifically, paragraph S5.3.1 of FMVSS No. 101 provides, ''A telltale shall not emit light except when identifying the malfunction or vehicle condition for whose indication it is designed or during a bulb check upon vehicle starting.'' The TPMS telltale is not excluded from this requirement.

NHTSA has not imposed specific time limits for extinguishment of other telltales, and given the existing

requirements of FMVSS No. 101, we do not believe it is necessary to do so for the TPMS telltale at this time, although we acknowledge that TPMS technology may require a certain period of time to detect that the low-pressure situation has been corrected before extinguishing the telltale.

Bulb Check

Paragraph S4.3.3 of the June 5, 2002 final rule provided that the TPMS warning telltale must be activated as a check of lamp function either when the ignition locking system is turned to the ''On'' (''Run'') position when the engine is not running, or when the ignition locking system is in a position between ''On'' (''Run'') and ''Start'' that is designated by the manufacturer as a check position. However, the telltale need not be activated when a starter interlock is in operation.

The petitions of both Volkswagen and the Alliance recommended changes to the June 2002 final rule's requirements related to a bulb check for the TPMS telltale. Volkswagen expressed agreement with the Alliance's recommendation in its comments on the earlier NPRM that a bulb check function should not be required because manufacturers routinely include serviceability provisions as a normal design practice, thereby rendering that regulatory provision unnecessary. Volkswagen also stated that if the TPMS telltale were permitted as part of a multi-functional display, the telltale would not necessarily illuminate because internal vehicle diagnostics monitor the system, and illumination of the display itself constitutes the bulb check function. Consequently, Volkswagen asked NHTSA to eliminate the requirement for the bulb check function. Alternatively, Volkswagen asked the agency to amend S4.3.3(a) to clarify that the bulb check function does not apply if the TPMS telltale is part of a reconfigurable display.

We are proposing to retain a requirement for a bulb check for the TPMS low tire pressure telltale as part of this NPRM, because a bulb check helps ensure the functionality of the TPMS warning system in a consistent and uniform fashion. The safety benefits associated with the TPMS will only be realized if the TPMS telltale can illuminate so as to provide the requisite warning to the vehicle operator. Consequently, NHTSA continues to believe that a bulb check will provide vehicle operators with useful information (*i.e.*, that the warning telltale bulb is functional), and these benefits will come at little, if any, additional cost. (This same reasoning applies to the bulb check for the proposed dedicated TPMS malfunction telltale, if the vehicle is so equipped.)

For the safety-related reasons discussed above, we believe that the proposed bulb check requirement also should apply when the TPMS telltale is part of a reconfigurable display. However, we are proposing that illumination of the reconfigurable display itself would constitute a sufficient bulb check under the standard, as long as the low tire pressure telltale is one of the displays activated.

Harmonization of FMVSS 138 S4.3.1(b) and FMVSS 101 Table 2

The petitions of Johnson Controls and the Alliance asked NHTSA to resolve an apparent discrepancy under the June 5, 2002 final rule between S4.3.1(b) of FMVSS No. 138 and S5.2.3 and Table 2 of FMVSS No. 101. These provisions discussed the permissible use of words and symbols as part of the TPMS telltale. As the petitioners point out, FMVSS No. 101 S5.2.3 stated that for a TPMS telltale that does not identify which tire has low pressure, the TPMS telltale may include the symbol in Table 2 or the symbol *and* the words ''Low Tire.'' That same provision provided that for a TPMS telltale that does indicate which of the four tires is experiencing low pressure, the telltale may either use the symbol *or* the words indicated in Table 2. However, FMVSS No. 138 S4.3.1(b) stated that the TPMS telltale must be identified by one of the symbols shown for the low tire pressure telltale in Table 2 of Standard No. 101. Consequently, the petitioners contended that these two provisions are unclear as to the content requirements for the TPMS telltale for systems that identify which tire has low pressure.

The two petitions, however, recommended different remedies. Johnson Controls recommended resolving the discrepancy by modifying FMVSS No. 138 S4.3.1(b) so as to remove the language ''one of the symbols shown for the 'Low Tire Pressure Telltale' in Table 2'' and replace that phrase with ''a telltale permitted by Section 5.2.3.'' The Alliance recommended modifying FMVSS No. 101 S5.2.3 so as to eliminate the two parenthetical phrases stating ''(that does not identify which tire has low pressure).'' Elimination of that phrase would have the effect of requiring either a symbol from Table 2 or both a symbol and words from Table 2.

We agree with the petitioners that the identified provisions in FMVSS No. 101 and FMVSS No. 138 must be reconciled in order to denote clearly what constitutes a permissible TPMS telltale and thus have addressed this issue in the NPRM. The preamble to the June 2002 final rule made clear the agency's intent regarding the visual content of the TPMS telltale for those systems that identify which tire has low pressure. Specifically, the preamble stated, ''Thus, the final rule requires the use of this image, with lamps at the image's tires to indicate which tire is significantly under-inflated, if a vehicle manufacturer provides a display that identifies which tire is significantly under-inflated.'' 67 FR 38704, 38732. Without the symbol, the words ''Low Tire'' would not indicate which of the vehicle's four tires had low pressure.

In order to resolve the discrepancy, as part of this NPRM, we are proposing to adopt the recommended solution put forth by the Alliance and rejecting the solution suggested by Johnson Controls. The recommended solution in the Johnson Controls petition would permit a manufacturer to choose a telltale displaying the words ''Low Tire'' without a symbol. Not only would such an outcome be at odds with the agency's clear intent articulated in the June 2002 final rule's preamble, but it would also be an inappropriate result for a TPMS designed to ''identify which tire has low pressure.'' Accordingly, as part of this NPRM, we are proposing that FMVSS No. 101 S5.2.3 require a TPMS symbol in all cases, with optional supplementation by the words ''Low Tire.''

Indication of TPMS Malfunction

The Alliance petition requested that NHTSA modify the June 2002 final rule specifically to allow the TPMS telltale to alert the vehicle operator in the event of a TPMS system malfunction. The Alliance argued that the agency has permitted other required telltales to flash to indicate malfunctioning systems, but it also noted that the preamble and the regulatory text of FMVSS No. 138 S4.2.1 and S4.2.2 required constant illumination once the telltale is triggered until the low-pressure situation is resolved. To indicate TPMS system malfunction, the Alliance recommended permitting the telltale to flash, as distinct from a steady activation pattern indicating low tire pressure, and it asked the agency to amend paragraphs S4.2, S4.3, and S4.5 of FMVSS No. 138 accordingly.

Consistent with our proposed resolution of the replacement tire issue, NHTSA is proposing to require the TPMS to include a TPMS malfunction indicator. Details of the proposed requirements for the TPMS malfunction

indicator and related matters are fully discussed under Section III.C.1 (Replacement Tires) above.

4. Test Procedures

A number of petitions raised issues about testing procedures under the June 2002 final TPMS rule, including petitions submitted by Delphi, DENSO, Volkswagen, and the Alliance. Concerns were raised regarding what petitioners perceived to be inadequate specificity and objectivity of those test procedures. Specifically, petitioners raised issues related to rim position, calibration, test specificity, and reset, each of which will be addressed in further detail below. In addition, DENSO's petition asked the agency to issue a TPMS Compliance Test Procedure on an expedited basis, because DENSO stated that manufacturers will need sufficient lead time (*e.g.*, DENSO estimated one year) to implement the TPMS design specifications and to begin installation of TPMSs in new vehicles.

Petitioners argued that in light of the capabilities of TPMS systems, specific test procedures are necessary. While we do not agree with all of the petitioners' contentions, in order to ensure objectivity, we are proposing to identify a specific test course and to incorporate it in the standard as part of this NPRM. This proposed course is the Southern Loop of the Treadwear Course, as defined in Appendix A and Figure 2 of 49 CFR 575.104, which is located on various highways in and around San Angelo, Texas. We propose that testing would be conducted starting at any point on the course.

We see several benefits to this approach, foremost of which is that this test course could be incorporated into the standard in a timely fashion. It would not be necessary to design or build a new test track for compliance testing purposes or to conduct extensive research to describe such a test course.

Further, the proposed course is well known and has been used for decades by NHTSA and the tire industry for uniform tire quality grading (UTQG) testing. Testing on a section of public highway would help to ensure that any required TPMS calibration will be performed appropriately and that low tire pressure detection would be evaluated appropriately during testing. Also, vehicle manufacturers would be able to review the course and to use it to verify compliance of their TPMS prior to vehicle certification. Thus, by proposing to require vehicles to satisfy the TPMS requirement when tested at any portion of this course, TPMSs would be designed to operate properly on a variety of roadways and conditions, and the standard would satisfy the requirement of objectivity.

Designation of a specific test course in and around San Angelo could pose some potential problems if that section of highway were to experience closures related to major road repairs or damage due to extreme weather conditions or natural disasters. However, we believe that the probability of such occurrences is very small, particularly to the extent that the entire test course would be unavailable. Because the proposed test course is approximately 140 miles in length, if one portion were to become unavailable, testing could be conducted on a different segment of the course. Again, we note that this particular test course has been used successfully for UTQG testing purposes for a number of years, and we believe that it would be suitable for TPMS testing as well.

Additional details are provided below regarding proposed changes to the standard's test conditions and procedures that reflect differences between the June 5, 2002 final rule and this NPRM.

Rim Position

Under the June 5, 2002 final rule, paragraph S6(l) of the standard stated that the original rims are to be used with any replacement tires recommended by the manufacturer (that are of a suitable size to fit the OE rims; otherwise, appropriately sized OE rims will be used).

The petition for reconsideration filed by Johnson Controls asked the agency to revise the test procedures in paragraph S6(l) to specify that the original rim position (*i.e.*, left front, left rear, right front, right rear) will be preserved when replacement tires are placed on the vehicle. According to the petition, such positioning is important to preserve the integrity of the original training of the TPMS. Johnson Controls stated that most direct TPMSs require that the system initially be trained to recognize the transmitters on the rims and their relative positions on the vehicle, with such training routinely occurring during vehicle assembly. This change was recommended to prevent compliance testing in a manner that would foil the proper functioning of the TPMS.

We anticipate that there will be many instances in which consumers and vehicle repair/service technicians will not maintain original rim position, either intentionally or unintentionally. As a primary example, many vehicle manufacturers direct owners to rotate their tires on a regular basis, based on time, mileage, or both. Maintaining original rim position during tire rotation would necessitate the additional time and expense of removing each tire from its wheel rim prior to rotation, rather than simply shifting the entire wheel and tire assembly, which is the normal way tires are rotated. Moreover, contrary to the implication of the Johnson Controls petition, some manufacturers of vehicles with a direct TPMS provide instructions in the owner's manual regarding how to reprogram the TPMS sensors following wheel rotation (*see, e.g.*, the TPM sensor identification codes section of the MY 2004 GMC Yukon owner's manual, at page 5–74).

However, after considering the Johnson Controls petition, we have drafted a new paragraph S5.3.3, *Rim position,* in the NPRM to provide that we would maintain the original rim positions when conducting compliance testing in those cases in which the vehicle manufacturer directs owners to retain the original rim positions in the owner's manual. We would also follow any instructions contained in the vehicle owner's manual related to tire rotation and rim position, regardless of whether such instructions are included in a discussion of the TPMS or in some other portion of the owner's manual. If a vehicle manufacturer does not make such rim position recommendations, the agency would be free to mount the rims in any position on the vehicle when conducting compliance testing. (If the tires and rims on the front and rear axles were not the same size, the tires and rims would remain on the appropriate axle. We would ensure also that unidirectional tires are mounted appropriately.[36]) Before conducting such compliance tests, the agency would follow all manufacturer recommendations with respect to reprogramming the TPMS to account for changes in rim positions.

Calibration

As part of the June 2002 final rule's test procedures, paragraph S6(d) specified that the vehicle be driven at any speed between 50 km/hr and 100 km/hr for 20 minutes prior to conducting the TPMS low inflation pressure detection test. This procedure was designed to calibrate or to establish a baseline for the TPMS. As noted in the June 5, 2002 final rule, indirect TPMSs need time to calibrate the system under certain circumstances, such as when a vehicle is driven for the first time (*i.e.*, when it is new), when pressure in a tire is changed, and when the tires are replaced or rotated. 67 FR 38704, 38730.

[36] Unidirectional tires are tires that are designed to rotate in one specified direction during forward motion. This directional limitation is primariliy based upon tread pattern design.

Until the system is properly calibrated, the TPMS may not be available to monitor the vehicle's tire inflation pressure fully.

The petitions submitted by both Volkswagen and the Alliance raised issues involving TPMS calibration and related test procedures. The two petitioners argued that the test procedures in paragraph S6(d) do not include sufficient detail and are design restrictive.

Volkswagen's petition sought clarification that TPMS calibration is necessary when any one of the above-discussed three conditions occurs. We acknowledge that calibration (or recalibration) of an indirect TPMS may be necessary when any one of the above-stated conditions occurs. Beyond this statement of clarification, we have also drafted this NPRM so as to further accommodate the need for TPMS calibration, as discussed below. These proposed changes include designation of a specific test course and the inclusion of an expanded test procedure for the ''system calibration/learning phase'' (S6(d)). We believe that these measures would address the issues raised by the petitioner regarding calibration.

Volkswagen's petition also asked the agency to modify the test procedures in paragraph S6(d), which are designed to provide sufficient initial driving time for indirect TPMSs to properly calibrate. Again, that provision specified that the vehicle be driven for 20 minutes at any speed specified in paragraph S5.3.2 (*i.e.*, between 50 km/h (31.1 mph) and 100 km/h (62.2 mph)). However, Volkswagen argued that paragraph S6(d) is not sufficiently specific to simulate the reasonable and common driving conditions necessary for calibration of the TPMS. Volkswagen asserted that for proper calibration of the TPMS, the vehicle must be driven at least a minimal amount of time in various speed ranges and within limits of forward and lateral acceleration. According to Volkswagen, driving for calibration purposes should be on reasonably straight roads, at controlled and reasonable speeds in the turns, and with limited and moderated acceleration and braking.

Consequently, Volkswagen asked NHTSA to amend S6(d) to include a statement that the vehicle shall be driven in accordance with the manufacturer's specification. The Volkswagen petition stated that this change would be consistent with the procedure in other standards in which the vehicle manufacturer specifies test parameters, such as those for fuel tank capacity, seat back angle and vehicle seat track position, and vehicle weight.

The Alliance petition also supported greater specificity in the TPMS test procedures, including paragraph S6(d). The petitioner argued that those test procedures are overly design-restrictive and may hamper development and performance of indirect TPMSs. The Alliance provided a detailed discussion of the various TPMS algorithms and the corresponding relationship between the complexity, capabilities, and timing requirements of such algorithms. The Alliance asked the agency to substitute a calibration procedure specified by the manufacturer in the specified range of test speeds from 50 to 100 km/hr.

Although the Second Circuit's decision likely will lead to increased use of direct TPMSs in the near term, NHTSA has decided to address the calibration issue in any event, in anticipation of the use of indirect TPMSs (or other systems for which calibration issues may be important) that can meet the requirements of the standard. Because NHTSA strives for standards that are technology-neutral, issues raised in the petitions for reconsideration related to test procedures, including but not limited to calibration, remain ripe for resolution.

While NHTSA acknowledges that the performance of an indirect TPMS may be sensitive to road conditions and vehicle operating conditions, it is important to ensure that each TPMS performs its intended function during normal driving by the public. The purpose of paragraph S6(d) of the TPMS test procedure, under both the June 5, 2002 final rule and this NPRM, is to provide an opportunity for the vehicle to learn the variables associated with distinct tire types under varying conditions. Thus, we reject the suggestion that NHTSA be required to conduct its compliance testing in accordance with the manufacturer's specifications. That would allow a manufacturer to design a TPMS that would function only in very limited circumstances, as opposed to the wide variety of circumstances found in real-world driving.

We also believe that it is necessary to specify some objective limit on calibration time for the following reasons. First, if the calibration period is excessively long (*e.g.*, several hours), there is an increased chance that the vehicle could develop a serious leak leading to significant tire under-inflation for which the TPMS would provide no warning. Second, the public is likely to expect that, after they follow the reset instructions in the vehicle owner's manual, the TPMS will function as intended within a brief period of time. Further, TPMS manufacturers have stated that their systems can properly calibrate within 20 minutes, which demonstrates that such a timeframe is practicable.[37]

In order to ensure that our test procedures for calibration reflect normal driving situations and to ensure objectivity, in the NPRM, we are proposing to change paragraphs S5 and S6 as follows:

(1) We are proposing that the road test surface for compliance testing, including calibration, would be any portion of the Southern Loop of the Treadwear Course defined in Appendix A and Figure 2 of 49 CFR 575.104. (*See* S5.2);

(2) We are proposing a new paragraph entitled *System calibration/learning phase* which would specify that the vehicle be driven in one direction for 10–15 minutes cumulatively (not necessarily continuously) within a speed range of 50–100 km/h, and then driven for 5–15 minutes under similar conditions in the opposite direction. The sum of the total cumulative driving time in both directions would not be less than 20 minutes. Time would not accumulate during periods when the brake pedal is applied. (*See* S6(d)).

Detection of Low Tire Pressure Within Ten Minutes

The June 2002 final rule specified performance requirements for the TPMS to detect when tire pressure drops below a specified level and to then illuminate a telltale mounted on the instrument panel. Under S6(e) of the standard, the inflation pressure in a tire or tires was to be reduced to the specified level, depending on the option selected by the manufacturer. Paragraph S6(f) stated that the vehicle is then driven at any speed between 50 km/hr and 100 km/hr, and the TPMS telltale must illuminate within 10 minutes after the vehicle has reached 50 km/hr.

The Delphi petition raised a concern regarding the ability of the TPMS, in certain cases, to detect under-inflation within 10 minutes, as required by FMVSS No. 138 S4.2.2(a) and the related test procedure at S6(f). Delphi stated that in most cases, the TPMS should detect under-inflation within the June 2002 final rule's 10-minute time limit; however, the petitioner asserted that certain periods of non-linear driving (*e.g.*, sudden start-ups, sudden decelerations, shifting weight conditions) could impact the rolling of a vehicle's tires on the road, and thereby delay the TPMS's detection of tire

[37] *See e.g.*, Docket No. NHTSA–2000–8572–259.

under-inflation. If such driving conditions constitute a sizable portion of the standard's testing time, the petitioner argued that the TPMS may fail to illuminate within the allotted 10-minute detection time period. Delphi contended that this variance, based upon real world conditions, could render the compliance test unobjective and unrepeatable. Consequently, Delphi petitioned NHTSA to revise S4.2.2 and S6(f) to specify that the calculation of the 10-minute driving time for detection of significant tire under-inflation and illumination of the TPMS telltale will occur after not more than ten minutes of straight line, smooth driving.

The Alliance petition argued that the June 5, 2002 final rule for TPMS lacked specificity in its test procedures, thereby causing the standard not to be objective. Although the TPMS rule specified ambient temperature, test surface, test weight, and vehicle speed, the Alliance petition argued that the rule fails to specify other essential parameters for the compliance test, such as whether the vehicle is to be driven on a straight or curved road, or whether there are any constraints on acceleration, braking, and steering inputs during testing. The Alliance argued that without specific direction regarding how these inputs will be controlled during compliance testing, manufacturers could never be sure that their vehicles would pass NHTSA's tests, because they could not predict what driving conditions would be used by the agency to verify compliance. Consequently, the Alliance recommended revision of the final rule's test procedure to require that a minimum of eight minutes cumulatively (although not continuously) of the total 10-minute detection time under the standard be driven on smooth, dry, level, and straight segments of roadway.

These arguments regarding the specificity of the test procedures for TPMS warning lamp activation are similar to those raised about calibration test procedures. We again reiterate that, to provide an appropriate degree of safety, TPMSs must be designed so that they function properly under a full range of normal driving conditions, and vehicle manufacturers must ensure that their TPMSs function properly across the full range of such conditions.

In order to ensure that our test procedures for detection of low tire pressure reflect normal driving situations and to ensure objectivity, we are proposing to incorporate the following elements in paragraphs S5 and S6 of the NPRM:

(1) The road test surface for compliance testing would be any portion of the Southern Loop of the Treadwear Course defined in Appendix A and Figure 2 of 49 CFR 575.104 (*See* S5.2); and

(2) We are proposing a new paragraph entitled *System detection phase*, which would specify that the vehicle will be driven in one direction up to 7 minutes cumulatively (not necessarily continuously) within the speed range of 50–100 km/h, or until the low tire pressure telltale illuminates, whichever occurs first. Time would not accumulate during periods when the brake pedal is applied. If the telltale does not illuminate during that period, vehicle direction would be reversed, and the vehicle would be driven an additional period of time up to a total of 10 minutes (counting both directions), or until the low tire pressure telltale illuminates. (*See* S6(f)).

Inflation Pressure

As discussed earlier, NHTSA is proposing to require vehicles to comply with the TPMS standard with the tires that are installed on the vehicle at the time of initial sale.[38]

We are proposing that vehicles must meet the standard when tested at any weight between the lightly loaded vehicle weight (LLVW) and the GVWR. We believe the TPMS should operate properly at all vehicle weights within the likely load range, and this requirement should not impose a burden on vehicle manufacturers.

Under the proposed test procedures, the vehicle's tires would be inflated to the vehicle manufacturer's recommended cold tire inflation pressure at GVWR, as specified on the vehicle placard or the tire information label, regardless of the test weight. We are proposing this approach for two reasons. First, as discussed in further detail in the next section, we expect that consumers would consult the vehicle placard or tire inflation pressure label in order to obtain the recommended inflation pressure for their tires, and based upon new regulatory requirements, the placard or label will include only a single tire size and the recommended inflation pressure for that tire size at GVWR. In addition, most consumers generally do not increase or decrease their tire inflation pressure every time they change the amount of load they are carrying.

[38] In most cases, vehicles are equipped with four tires of the same size. However, in some cases, vehicle manufacturers or dealers may install different size tires on different axles. We are proposing that the TPMS must comply with the standard in those cases as well.

Reset Inflation Pressures

Paragraph S6(a) of FMVSS No. 138 in the June 5, 2002 final rule stated that the vehicle's tires would be inflated to the manufacturer's recommended cold inflation pressure for the applicable vehicle load conditions specified in paragraph S5.3.1 of the standard (*i.e.*, at the vehicle's lightly loaded vehicle weight and at its GVWR). Paragraph S6(c) of the standard stated that the TPMS would be reset in accordance with the instructions specified in the vehicle owner's manual.

The Volkswagen petition stated that for some vehicles, the manufacturer specifies distinct tire pressures for fully-loaded and partially-loaded vehicles to provide optimum ride, handling, and occupant comfort. Volkswagen stated that its direct TPMS does not have a vehicle loading or weight sensor, so the system must be reset manually to accommodate the different tire pressures that correspond to current vehicle loading conditions. Volkswagen sought confirmation that the testing procedure under section S6(c) of the standard will include programming or setting the TPMS for the applicable vehicle loading condition.

As we explained when we adopted new tire information requirements in late 2002 (*see* 67 FR 69600, 69610, November 18, 2002), we anticipate that consumers will increasingly rely upon the tire information found on the vehicle placard or tire inflation pressure label as their primary source for tire pressure information. A primary reason for this assumption is that effective September 1, 2004, FMVSS No. 110, *Tire Selection and Rims*, will require the vehicle placard (and optional tire inflation pressure label) to specify only one tire size and one inflation pressure appropriate for the maximum loaded vehicle weight, which must be applicable to the original tires installed on the vehicle at the time of initial vehicle sale.[39] Beginning September 1, 2004, that standard will apply to all motor vehicles with a GVWR of 4,536 kg or less, except motorcycles.[40]

[39] *See* 68 FR 33655 (June 5, 2003).

[40] FMVSS No. 120, *Tire Selection and Rims for Motor Vehicles Other Than Passenger Cars*, presently applies to multi-purpose passenger vehicles (MPVs), trucks, and buses. Currently, FMVSS No. 120 requires tire information either on the vehicle's certification label or on a separate label located in the same vicinity as the certification label. The label must provide the tire size designation and the recommended cold inflation pressure for those tires appropriate for the vehicle's front and rear gross axle weight ratings. FMVSS No. 120 does not require that the tire size installed on the vehicle and the inflation pressure for those tires be listed. However, beginning September 1, 2004, the tire labeling requirements of FMVSS No. 110

Therefore, NHTSA is proposing to use only the vehicle manufacturer's recommended inflation pressure required to be provided under FMVSS No. 110 when testing for compliance. Most consumers will not add or reduce their tire inflation pressure every time they change the amount of load they are carrying, nor are they likely to recalibrate their TPMS in such situations. NHTSA has drafted paragraph S6(a) of the standard in the NPRM to reflect this approach.

As noted previously, NHTSA is proposing to require vehicles to meet the requirements of the standard at any weight between LLVW and GVWR. NHTSA would follow the entire proposed test procedures section (S6), including paragraph S6(c), which states that the TPMS will be reset in accordance with the instructions specified in the vehicle owner's manual, to the extent that such a reset is consistent with the discussion above.

The Delphi petition requested a further change to paragraph S6(c) of the June 5, 2002 standard. It requested the addition of language stating that as part of the testing procedures, the system will be reset and recalibrated, as explained in the vehicle's owner's manual. According to Delphi, recalibration may be necessary in certain instances, for example, to reflect changes in rolling radius or other characteristics accompanying a new replacement tire.

We find it unnecessary to alter paragraph S6(c) of the NPRM to add language regarding the need for system calibration after reset, because the next sequential step in the proposed testing procedure (S6(d)) specifies a calibration process.

5. System Disablement

The June 2002 final rule did not permit disablement of the TPMS, as it is the agency's normal practice not to allow safety systems to be disabled. Paragraphs S4.2.1 and S4.2.2 stated that the TPMS telltale must continue to illuminate as long as any of the vehicle's tires is experiencing under-inflation at the level specified under each option when the ignition locking system is in the ''On'' (''Run'') position. The preamble to the TPMS final rule specifically stated that NHTSA decided to prohibit any control that automatically disables the TPMS under any condition, dismissing arguments for even temporary disablement of the system.

The issue of system disablement was raised in the petitions of both Porsche and the Alliance. In keeping with its own planned direct TPMS, Porsche asked the agency to reconsider its position on system disablement to permit a TPMS automatically to disable and then reactivate itself when it encounters confusing signals. The Porsche-designed TPMS would illuminate a yellow telltale and text such as ''system not active—brief disturbance'' when one of the following situations is encountered: (1) When the customer transports snow tires on rims with wheel sensors in the trunk when driving to the tire shop; (2) when a full-size spare tire without a wheel sensor is installed on the vehicle; (3) when the vehicle is in an area of considerable high frequency density; and (4) when components of the system are damaged. Porsche's suggestion in this regard is similar to the request made by the Alliance that the TPMS be allowed to indicate a system malfunction.

The agency acknowledged in the June 5, 2002 final rule that all technology has limitations, and situations may arise in which the TPMS may not function properly. 67 FR 38704, 38730. However, while acknowledging such limitations, we are concerned that allowing system disablement in specified situations would remove manufacturers' incentives to improve the TPMS technology in order to overcome such limitations. Consequently, rather than permitting disablement of the TPMS in such instances such as those described by Porsche, NHTSA hopes that additional improvements in technology may overcome these instances of system malfunction. Although under the NPRM we are proposing to require manufacturers to certify TPMSs to the requirements of S4 of the standard, NHTSA has designed its proposed test conditions and procedures in S5 and S6 so as to avoid these anomalous situations.

In general, the types of situations described by Porsche for which it requests system disablement are very different from the sort of voluntary and active disablement by the vehicle operator which the agency had considered and addressed previously. Instead, most situations raised by the petitioner are more akin to instances of TPMS malfunction, which are infrequent events that may be beyond the control of the vehicle operator. As discussed in Section III.C.1 above, the agency is proposing to require the TPMS to indicate a system malfunction to the vehicle operator.

We continue to believe as a general matter that it would be inappropriate to permit any manual or automatic disablement of the TPMS. However, should the unusual events cited above occur, manufacturers would be required to alert the driver regarding impairment of the TPMS through a system malfunction warning.

The Alliance petition asked the agency to revise the TPMS standard to permit one instance in which an indirect or hybrid TPMS may be disabled temporarily, namely when a differential or transfer case is locked. According to the Alliance, in such instances, relative wheel speed data are affected and, therefore, cannot be relied upon in making an inference of low inflation pressure. The Alliance stated that in such situations, the TPMS may provide false warnings if left activated.

We note that the locking differential or transfer case scenario presented by the Alliance is quite different from the situations described in the Porsche petition, and we tentatively believe that it is not a good reason for TPMS disablement. Unlike the situations presented in the Porsche petition, which would be expected to be infrequent and of short duration, the locking transfer case situation presented by the Alliance could be encountered with some degree of frequency. It would not be appropriate to allow a vehicle to operate without a functioning TPMS when the transfer case is locked, since the situation can continue for extended periods, especially during the winter.

6. Instruction Manuals and Other Public Awareness Efforts

In its petition, RMA asked NHTSA to revise the June 2002 TPMS rule's requirements for written instructions in owner's manuals under S4.5.1 and S4.5.2. The petitioner asked NHTSA to add language to make consumers aware that inclusion of a TPMS in a vehicle does not relieve them of their responsibility to routinely check tire pressure. RMA recommended the following language:

> The tire pressure monitoring system installed in your vehicle, required by government regulation, is not designed to warn you if the air pressure in one or more of your tires drops below the recommended cold inflation pressure (known as ''placard pressure'') established by the vehicle manufacturer.

NHTSA does not believe that it is necessary to change the language as RMA has requested because paragraph S4.5, as included in the June 2002 final rule, already contains an express statement regarding the importance of maintaining proper tire pressure. As proposed, paragraph S4.5 specifies mandatory language to be included in

will apply also to those types of vehicles currently covered under FMVSS No. 120.

the vehicle's owner's manual, including: ''Each tire, including the spare (if provided), should be checked monthly when cold and set to the inflation pressure recommended by the vehicle manufacturer.''

Further, we believe that the language suggested by RMA would have the unintended effect of confusing consumers. The purpose of the TPMS, consistent with the TREAD Act, is to provide a safety warning to the vehicle operator when one or more tires become significantly under-inflated. It is not designed to alert the driver whenever a tire deviates from placard pressure. RMA's recommended language could cause the consumer to doubt the capability of the TPMS to warn about *any* drop in air pressure. Consequently, we believe that the proposed language in S4.5 and long-standing agency advisories make clear that vehicle operators routinely should monitor and maintain proper tire pressure.

The JATMA petition stated that the tire industry and automobile industry need to conduct an educational campaign to increase consumer awareness about the importance of maintaining proper tire pressure, and JATMA asked NHTSA to help promote such a campaign. NHTSA supports industry efforts to make consumers aware of the importance of maintaining adequate tire pressure. The agency has produced a tire safety brochure in conjunction with tire manufacturers and tire dealers that is titled ''Tire Safety, Everything Rides On It.'' This brochure is part of a public campaign to provide information on tire pressure monitoring, tire inspection, and the selection of replacement tires. The brochure also stresses the importance of tires to overall vehicle performance. (Please note that newly proposed owner's manual language related to replacement tires and the TPMS malfunction indicator is discussed under Section III.C.1 (*Replacement Tires*).)

7. Reserve Load

The concept of ''tire reserve load'' refers to a tire's remaining load-carrying capabilities when a tire is inflated to a specific cold inflation pressure and the vehicle is loaded to a particular level. NHTSA did not address the issue of reserve load requirements in the TPMS rulemaking, and the June 2002 final rule for TPMS did not discuss tire reserve load in either the preamble or the regulatory text.

JATMA expressed concern that if vehicle owners allow their tires to remain in an under-inflated condition for an extended period of time, these tires would deteriorate from fatigue and would be more likely to experience tire breakdown, even if the level of under-inflation were not great enough to trigger the TPMS warning. Consequently, JATMA asked the agency to set a reserve load of at least 10 percent.

RMA stated that unless a sufficient reserve is built into placard pressure so that such pressure is sufficiently above the minimum required pressure, a TPMS detection level cannot safely be tied to placard pressure. RMA contended that without an adequate reserve load, tires operating at an inflation pressure almost 25–30% below placard pressure could have insufficient pressure to carry the vehicle's maximum load yet still not trigger the TPMS telltale.

In order to address its concerns about reserve load, RMA filed a petition for rulemaking with the agency to amend FMVSS No. 110, *Tire Selection and Rims*, to establish a reserve load requirement, with an effective date consistent with the scheduled implementation of Part I of FMVSS No. 138. RMA recommended that the reserve load be determined based primarily on the vehicle placard pressure, the type of TPMS on the vehicle, and the load/pressure relationship for the selected tires, according to the Tire and Rim Association tables.

We believe that the issue of reserve load is a tire issue most properly considered under FMVSS No. 110, as amended (*see* 67 FR 69600 (November 18, 2002) and 68 FR 37981 (June 26, 2003)). NHTSA has issued Special Orders to both tire manufacturers and vehicle manufacturers requiring them to submit comprehensive information on real world tire failures and the tire reserve load associated with the tires and vehicles on which those failures occurred. We are in the process of analyzing the information received in response to these Special Orders to determine whether there is any correlation between tire reserve load and real world tire failures. A 1981 study of tire failure and reserve load did not demonstrate such a correlation.[41] If new data indicate a sufficiently strong correlation, NHTSA will propose appropriate amendments to its standards.

8. Temperature-Corrected Inflation Pressure

The concept of ''temperature-corrected inflation pressure'' involves determining cold tire inflation pressure by compensating for the increased tire inflation pressure resulting from the rise in internal temperature caused by driving. The issue of temperature compensation was discussed in the preamble to the June 2002 final rule, but the agency decided not to specify any test procedure that explicitly relates to temperature correction. Therefore, the June 2002 final rule did not include a procedure that compensates for pressure build-up that might occur due to increased temperature resulting from a vehicle being driven.

JATMA's recommended language for revising S4.2 introduces the concept of ''temperature-corrected inflation pressure'' which it defines as ''an inflation pressure that has been corrected to the cold inflation pressure from the increased inflation pressure due to the rise of internal temperature caused by driving a vehicle.'' However, JATMA's petition did not provide any explanation for its recommendation related to ''temperature-corrected inflation pressure'' beyond the above language.

NHTSA again declines to adopt the recommendation of the JATMA petition regarding temperature compensation. The procedure suggested by JATMA would introduce unnecessary complexity to the standard. NHTSA agrees that if a TPMS-equipped vehicle is tested immediately after the vehicle has been driven for some time, the stringency of the proposed standard's requirements could be reduced, because the tire from which pressure is released will be at 25 percent below the manufacturer's recommended cold tire inflation pressure, while the other tires may be up to 4 psi above that recommended pressure. However, nothing in the proposed standard requires NHTSA to test the performance of the TPMS immediately following calibration of the system. The agency plans to wait for up to an hour after calibration before releasing any pressure, which should allow all of the tires to cool down to approximately the ambient temperature. See paragraph S6(e).

9. Standardization of TPMS Parts

In its petition, JATMA urged NHTSA to require standardization of TPMS parts and service methods, in order to increase the number of facilities that are available to consumers to service and maintain the TPMS. While NHTSA supports broad availability of vehicle maintenance and repair, JATMA has not provided any evidence to suggest that existing vehicle repair facilities would be unable to service TPMSs produced

[41] ''The Relationship Between Tire Reserve Load Percentage and Tire Failure Rate,'' Crash Avoidance Division, Office of Vehicle Safety Standards, NHTSA (81–09–NPRM–N01–002) (1981).

pursuant to either the June 5, 2002 final rule or this NPRM. Consequently, we do not find it necessary or advisable to impose additional design restrictions on TPMS manufacturers.

10. Definitions

''Significant Under-Inflation''

As published in the June 5, 2002 final rule, FMVSS No. 138 did not include a definition for the term ''significant under-inflation'' in paragraph S3, Definitions. The term is used in section 13 of the TREAD Act, which requires the Secretary of Transportation to issue ''a regulation to require a warning system in new motor vehicles to indicate to the vehicle operator when a tire is significantly under inflated.'' In recognition of the difficulty in determining precisely when tire under-inflation becomes ''significant,'' NHTSA chose to link the concept of ''significant under-inflation'' to a performance requirement that would provide a warning before significant safety concerns would be implicated. The TPMS standard also used the term as part of the required statement for inclusion in the owner's manual for vehicles covered under this standard.

RMA petitioned the agency to define the term ''significant under-inflation.'' Citing section 13 of the TREAD Act, RMA argued that NHTSA's approach of linking ''significant under-inflation'' to illumination of the TPMS telltale provides an inadequate and misleading message to the public.

In reiteration of its comments submitted pursuant to the NPRM, RMA urged NHTSA to adopt RMA's definition of ''significant under-inflation,'' meaning ''any inflation pressure that is less than the pressure required to carry the actual vehicle load on the tire per industry standards (or any pressure less than the pressure to carry the maximum vehicle load on the tire if the actual load is unknown).'' RMA reasoned that consumers should not be encouraged to believe that under-inflated tires only require attention when the TPMS telltale illuminates. Instead, RMA argued that tires may require attention at an earlier point of pressure loss below the tire industry's recommended pressure. According to RMA, consumers should be discouraged from substituting reliance on TPMSs for regular maintenance and monitoring of their vehicles' tire pressure.

In addition, JATMA's petition asked NHTSA to revise S4.2.1 of the standard to set the TPMS telltale's warning threshold at 20 percent below the vehicle manufacturer's recommended cold inflation pressure.

We agree that it is important for consumers to maintain tire pressure in a manner consistent with vehicle specifications. In the June 2002 final rule, we explained our (still valid) reasoning for rejecting RMA's suggestion to tie the definition of ''significantly under-inflated'' to the load carrying capacity of the tire rather than the placard pressure (see 67 FR 38704, 38725). We declined to adopt this recommendation because the vehicle manufacturer's recommended pressure assumes loading at GVWR and also takes into consideration ride, handling, and other factors for safe vehicle operation. Therefore, we believe that it could be counterproductive for the agency to substitute this new frame of reference without a strong reason for doing so.

RMA's petition for reconsideration did not provide any new justification for changing NHTSA's approach to defining ''significantly under-inflated'' or substituting load carrying capacity for placard pressure, beyond RMA's earlier arguments in its comments presented at the earlier NPRM stage. We continue to believe that under-inflation becomes significant when safe operation of the vehicle is threatened. As we explained in the June 2002 final rule, our new performance standard for tires requires that standard load P-metric tires be able to operate without failure when the tire is inflated to only 20 pounds per square inch (psi) and tested under full loading for at least 90 minutes at 75 mph with no failure. We are proposing 20 psi as the minimum activation pressure for standard load P-metric tires under FMVSS No. 138, which is consistent with both the results of NHTSA's own tire testing and the values listed in the handbooks of the European Tyre and Rim Technical Organization (ETRTO), the Japanese Automobile Tyre Manufacturers Association (JATMA), and the Tire & Rim Association (T&RA). Consequently, we are not including RMA's recommendation as part of this NPRM.

Regarding JATMA's request to amend the standard to set the TPMS telltale's warning threshold at 20 percent below the vehicle manufacturer's recommended cold inflation pressure, JATMA did not provide convincing evidence to support such a change, and we are not incorporating its suggestion.

''Small Volume Manufacturer''

The June 2002 final rule excluded small volume manufacturers (SVMs) from compliance with the TPMS standard and associated reporting requirements during the phase-in period (*i.e.*, November 1, 2003 to October 31, 2006). A SVM was defined under the standard as a manufacturer that produces fewer than 5,000 vehicles worldwide during the year. The SVM exclusion from compliance only applied to the three-year phase-in period. According to the June 2002 final rule, beginning on November 1, 2006, new vehicles covered under Part II of the final rule would have had to be equipped with a TPMS that meets the requirements of FMVSS No. 138, regardless of the size of the vehicle manufacturer.

The petitions of Ferrari S.p.A., Maserati S.p.A., and Vehicle Services Consulting, Inc. all asked the agency to modify the final rule's definition of ''small volume manufacturer'' to make it consistent with the definition of SVM in the agency's final rule for advanced air bags under FMVSS No. 208 (66 FR 65375, Dec. 18, 2001). Specifically, the petitioners requested a revision to paragraph S7.6 of the standard to exclude from the phase-in requirements those manufacturers that produce or assemble fewer than 5,000 vehicles annually for sale in the United States.

We note that the agency strives for consistency in its regulations to the extent possible, but the complexity of technical requirements and their safety implications may vary considerably in the context of different rulemakings. Thus, provisions for implementation of one rule may not be appropriate for implementation of another. Therefore, we retain our discretion regarding how we may structure phase-in requirements for small volume manufacturers and will make such determinations on a case-by-case basis.

However, we agree with the petitioners that in the case of the TPMS rule, it would be appropriate to grant the request to modify the definition of SVM so as to extend the exclusion from the phase-in requirements to manufacturers that produce fewer than 5,000 vehicles annually for sale in the United States. The TPMS standard will necessitate a change in vehicle design, and the United States is the only country that currently has such a standard. Consequently, NHTSA is proposing to change the way in which we define SVMs for phase-in purposes under S7.6 of the NPRM, moving from a 5,000 vehicle calculation based upon worldwide production to one of 5,000 vehicles produced for the U.S. market. We note that in the NPRM, we are proposing a modified phase-in schedule (S7), to which paragraph S7.6 is related.

''Tire Pressure Monitoring System''

The June 2002 final TPMS rule defined ''tire pressure monitoring

system'' as a system that detects when one or more of a vehicle's tires are under-inflated and illuminates a low tire pressure warning telltale. 67 FR 38704, 38746.

RMA petitioned NHTSA to modify the final rule's definition of the term ''tire pressure monitoring system'' to delete that portion of the definition stating that the TPMS ''detects when one or more of a vehicle's tires are under-inflated.'' RMA stated that its recommendation is intended to make clear to vehicle operators that TPMSs do not activate automatically whenever a tire experiences *any* under-inflation, but only when under-inflation reaches a certain level consistent with available technology and current policy.

In drafting the NPRM, NHTSA did not incorporate RMA's recommended modification of the definition of ''tire pressure monitoring system.'' Although it is true that a TPMS will not alert a vehicle operator as soon as a tire deviates from recommended placard pressure, the original definition did not state that a vehicle's tires are properly inflated until the moment the telltale illuminates. However, to further minimize any possible confusion, we have added the word ''significantly'' before the word ''under-inflated'' in the definition of ''tire pressure monitoring system.''

11. Alternative Systems

As noted earlier, section 13 of the TREAD Act required the Secretary of Transportation to issue a regulation requiring a warning system in new motor vehicles that indicates to the operator when a tire is significantly under-inflated (a responsibility delegated to NHTSA). Based upon this requirement, the June 2002 final rule stated in paragraph S4.3 that the TPMS must include a low tire pressure-warning telltale that is mounted inside the occupant compartment in front of and in clear view of the driver.

Aviation Upgrade Technologies submitted a petition for reconsideration seeking to modify the TPMS standard so as to permit use of its valve cap system for monitoring tire pressure, which does not include a telltale mounted inside the occupant compartment. The petitioner's system is external to the vehicle, being located on the valve stem of each tire, and it is designed to constantly flash a red light whenever tire pressure drops by 4 psi or more. Aviation Upgrade Technologies indicated that the wheel rim-mounted TPMS telltale would alert a driver of a tire with low pressure before that person enters and starts the vehicle, if a tire loses air pressure while the vehicle is not in operation. The petitioner also stated that when a wheel-mounted telltale illuminates while the vehicle is in operation, the driver may be alerted by fellow motorists who see the illuminated telltale and warn the driver.

The petitioner made a number of claims as to why its system is superior to the TPMSs permitted under the June 2002 final rule, including the significantly lower cost of its system, ease of installation and self-calibration features, ease of maintenance, its efficacy with all types of tires and rims, and its suitability for use on both new and used vehicles.

In drafting this NPRM, we decided not to propose language to accommodate Aviation Upgrade Technologies' system for the following reasons. First, we believe that the language of and the safety need addressed by section 13 of the TREAD Act would be best satisfied by requiring that the TPMS warning display be inside the motor vehicle in order to indicate to the driver when a tire is significantly under-inflated. We believe that external TPMS warning indicators do not provide a clear, timely, and effective safety warning, as compared to TPMS indicators in the vehicle's occupant compartment.

Specifically, TPMSs with external indicators cannot provide a warning to the driver about low tire inflation pressure while the vehicle is in operation, which is the most critical time period from a safety perspective. If a vehicle developed a significant pressure loss while it is being driven, the driver would not receive a prompt warning from the system and is unlikely to be aware of the under-inflation problem. We do not believe, as asserted in the Aviation Upgrade Technologies petition, that reliance on possible gestures or other signals from persons in passing vehicles would provide an adequate safety warning in those situations.

Even in those cases in which the vehicle is stopped, we believe that external TPMS warning indicators would not provide as effective a warning as a TPMS telltale inside the occupant compartment. People routinely do not walk around their vehicle prior to driving, so it is likely that many drivers would miss the message provided when there is an under-inflated tire. Therefore, we believe that valve cap devices would not provide an adequate warning to the driver.

Second, NHTSA also finds benefit to the centralization of warning indicators in a single, highly visible location, where they can provide important safety-related information to the driver. Historically, NHTSA has required safety warnings to be provided to the vehicle operator inside the vehicle.

Therefore, we are not accommodating TPMSs that do not include an on-board telltale as part of this NPRM.

IV. Benefits

In preparing its June 5, 2002 final rule, NHTSA prepared a Final Economic Analysis (FEA), which was placed in the docket.[42] In that document, we discussed the costs and benefits of both the four-tire, 25-percent option and the one-tire, 30-percent option incorporated in the final rule. However, in *Public Citizen, Inc.* v. *Mineta,* the Second Circuit determined that the TREAD Act requires TPMSs to be four-tire systems and invalidated the one-tire, 30-percent option. Accordingly, that option has not been included in this NPRM.

Although the FEA included analyses related to TPMSs with a four-tire, 25-percent under-inflation detection capability (the same performance standard proposed in this NPRM), circumstances have changed to a certain extent since the June 2002 final rule. New technologies are emerging (*e.g.*, batteryless direct TPMSs that could greatly reduce maintenance costs for such systems), and new requirements have been proposed (*e.g.*, requirement for a TPMS malfunction indicator). Accordingly, the agency has prepared a new Preliminary Regulatory Impact Analysis (PRIA) to accompany this proposed rule for tire pressure monitoring systems. The PRIA has been submitted to the Docket under the docket number for this notice.

The purpose of the PRIA is to reassess the costs and benefits of TPMS requirements, particularly in light of our proposed resolution of the replacement tire issue and the proposed requirement for a TPMS malfunction indicator. (The PRIA states that incorporation of a TPMS malfunction indicator may save an additional two equivalent lives, assuming a one-percent malfunction rate for replacement tires.) The PRIA examines various technologies suitable for compliance with the proposed standard, as well as additional regulatory alternatives considered by the agency. It also discusses the uncertainties analyses and sensitivities analyses conducted by the agency as part of the PRIA, per OMB Circular A–4, Regulatory Analysis, issued September 2003.

The following discussion summarizes the benefits associated with this NPRM and its proposed four-tire, 25-percent

[42] Docket No. NHTSA–2000–8572–216.

requirement. Estimates of monetary impacts (both in the section IV. Benefits and section V. Costs) are presented using a 3% discount rate; however, the PRIA also presents these impacts using a 7% discount rate.

The agency notes that the PRIA estimates 90% confidence bounds for many of the benefit and cost statistics. Those bounds reflect a 90% certainty level that the value is within that range (both for a 3% and a 7% discount rate). However, to simplify the discussion here, we are presenting the mean values for the benefit estimates in this section and the cost estimates in the next section, with the ranges below reflecting differences in the mean values based upon manufacturers' technology selection. The mean values are our best estimates. Please consult the PRIA for a more complete discussion of benefits and costs. The full ranges of benefits and costs, as well as their 90% confidence bounds, can be found in the PRIA's uncertainty analysis (Chapter X).

Under-inflation of tires affects the likelihood of many different types of crashes. These include crashes which result from: (1) Skidding and/or losing control of the vehicle in a curve, such as a highway off-ramp, or in a lane-change maneuver; (2) hydroplaning on a wet surface, which can cause increases in stopping distance and skidding or loss of control; (3) increases in stopping distance; (4) flat tires and blowouts, and (5) overloading the vehicle. In assessing the impact of this proposal on those crashes, the agency assumes that 90 percent of drivers will respond to a low tire pressure warning by re-inflating their tires to the placard pressure.

Based upon this assumption and depending upon the specific technology chosen for compliance, the agency estimates that the total quantified safety benefits from reductions in crashes due to skidding/loss of control, stopping distance, and flat tires and blowouts will be 119–121 fatalities prevented and 8,373–8,568 injuries prevented or reduced in severity each year, if all light vehicles met the TPMS requirement.

Further, NHTSA anticipates additional economic benefits from the standard due to improved fuel economy, longer tread life, property damage savings, and travel delay savings. Correct tire pressure improves a vehicle's fuel economy. Based upon data provided by Goodyear, we have determined that a vehicle's fuel efficiency is reduced by one percent for every 2.96 psi that its tires are below the placard pressure. The agency estimates that if all light vehicles met the TPMS requirement, vehicles' higher fuel economy would translate into an average discounted value of $19.07–$23.08 per vehicle over the lifetime of the vehicle, depending upon the specific technology chosen for compliance.

Correct tire pressure also increases a tire's tread life. Data from Goodyear indicate that, for every 1-psi drop in tire pressure, tread life decreases by 1.78 percent. NHTSA estimates that if all light vehicles met the proposed four-tire, 25-percent compliance requirement, average tread life would increase by 740 to 900 miles. The agency estimates that the average discounted value of resulting delays in new tire purchases would be $3.42–$4.24 per vehicle, depending upon the specific technology chosen for compliance.

To the extent that TPMSs provide improvements related to stopping distance, blowouts, and loss of control in skidding, we expect that some crashes would be prevented and that in others, the severity of the impacts and the injuries that result would be reduced. As a related matter, we expect that property damage and travel delays would also be mitigated by these improvements. To the extent that crashes are avoided, both property damage and travel delay would be completely eliminated. Crashes that still occur, but do so at less serious impact speeds, would still cause property damage and delay other motorists, but to a lesser extent than they otherwise would have. The value of property damage and travel delay savings is estimated to be from $7.70–$7.79 per vehicle.

V. Costs

The PRIA also contains an in-depth analysis of the costs associated with the proposed TPMS standard. It analyzes the cost of different TPMS technologies, overall vehicle costs, maintenance costs, testing costs, and opportunity costs. The PRIA also analyzes the cost impact of the proposed requirement for a TPMS malfunction warning and its effectiveness in resolving the replacement tire issue.[43] Again, please consult the PRIA for a more complete discussion of costs.[44] The following points summarize the key tentative determinations related to costs.

The agency examined three types of technology that manufacturers could use to meet the proposed TPMS requirement. Assuming that manufacturers will seek to minimize compliance costs, the agency expects that manufacturers would install hybrid TPMSs on the 67 percent of vehicles that are currently equipped with an ABS and direct TPMSs on the 33 percent of vehicles that are not so equipped. The highest costs for compliance would result if manufacturer installed direct TPMSs with an interactive readout of individual tire pressures that included sensors on all vehicle wheels. Thus, the agency estimates that the average incremental cost for all vehicles to meet the proposed requirement would range from $48.44–$69.89 per vehicle, depending upon the specific technology chosen for compliance. Since approximately 17 million vehicles are produced for sale in the U.S. each year, the total annual vehicle cost would range from approximately $823–$1,188 million per year.

The agency estimates that the net cost per vehicle [vehicle cost + maintenance costs + opportunity costs − (fuel savings + tread life savings + property damage and travel delay savings)] would be $26.63–$100.25, assuming a one-percent TPMS malfunction rate for replacement tires. (Maintenance costs would be variable, depending upon whether the TPMS has batteries or is batteryless.) As noted above, the agency estimates the total annual vehicle cost for the fleet would be about $823–$1,188 million. Thus, using the same equation, the agency estimates the total annual net cost would be about $453–$1,704 million.

NHTSA estimates that the net cost per equivalent life saved would be approximately $2.4–$9.1 million, depending upon the specific technology chosen for compliance. Placing 90% confidence bounds around the cost per equivalent life saved results in a range of $1.5–$14.5 million.

Net benefits-costs (benefits, including fatalities and injuries, valued in dollars minus costs) were also calculated per OMB Circular A–4. The value of a statistical life is uncertain, and a wide range of values has been established in the literature. (In general, the statistical value of a life is valued in the range of $1 million to $10 million per life, with a mean of $5.5 million.) For this analysis, we have examined values of

[43] As noted in the discussion of benefits in the section immediately above, the following discussion of costs estimates monetary impacts using a 3% discount rate and provides the mean values for cost statistics based upon manufacturers' technology selection. The mean values are our best estimates. However, the PRIA provides a full range of costs, as well as their 90% confidence bounds, and it also presents these impacts using a 7% discount rate.

[44] With future technological development, it may become possible for indirect TPMSs and other types of systems to meet the proposed four-tire, 25-percent requirement. However, until such new, compliant TPMSs are developed, it is impossible to accurately estimate their costs.

$3.5 million and $5.5 million, both of which fall within the range of accepted values. The mean value for net benefits-costs ranges from a net cost of $650 million to a net benefit of $599 million, depending upon the specific technology chosen for compliance. A 90 percent confidence bound around the net benefits-costs results in a range of a net cost of $1,156 million to a net benefit of $1,302 million.

VI. Regulatory Alternatives

The proposed performance requirements contain two key variables: the number of tires monitored and the threshold level for providing tire pressure warnings. As noted elsewhere in this preamble, the Second Circuit determined in *Public Citizen, Inc.* v. *Mineta* that the TREAD Act unambiguously mandates TPMSs capable of monitoring each tire up to a total of four tires, effectively precluding any option with less than a four-tire detection capability. Further, the Court found that the agency had justification for adopting a four-tire, 25-percent option instead of the four-tire, 20-percent option proposed at an earlier stage of the rulemaking.

Although NHTSA is proposing a 25 percent below placard threshold, technically, other threshold levels could also be established. Selecting an appropriate notification threshold level is a matter of balancing the safety benefits achieved by alerting consumers to low tire pressure against over-alerting them to the point of becoming a nuisance and causing consumers to ignore the warning, thus negating the potential of this proposal to produce safety benefits. Degradation in vehicle braking and handling performance does not become a significant safety issue at small pressure losses. There does not appear to be a specific threshold level at which benefits are maximized by a combination of minimum reduction in placard pressure and maximum response by drivers. NHTSA is confident that existing technology can meet the proposed 25 percent threshold. Setting a lower threshold might result in the opportunity for more savings if drivers' response levels were maintained; however, we are concerned that setting a lower threshold could result in a higher rate of non-response by drivers who regard the more frequent notifications as a nuisance. Current direct TPMS systems have a margin of error of 1–2 psi. That means, for example, that for a 30-psi tire, manufacturers would have to set the system to provide a warning when tires are 4 psi below placard if we were to require a 20 percent threshold. We tentatively conclude that this may be approaching a level at which a portion of the driving public would begin to regard the warning as a nuisance. We have not examined lower threshold levels in this analysis because we believe that the net impact of these offsetting factors (quicker notification, but lower frequency of driver response) is unknown and unlikely to produce a significant difference in safety benefits. We note that a 20 percent 4-tire option was examined in the March 2002 analysis, and that the total benefit for the 20 percent threshold was about 15 percent higher than from the 25 percent threshold. However, that calculation assumed the same level of driver response for both thresholds. It is also possible that lower thresholds might limit technology and discourage innovation.

Overall, we tentatively conclude that the 25 percent threshold adequately captures the circumstances at which low tire pressure becomes a safety issue. We also believe that this level would be acceptable to most drivers and would not be considered a nuisance to the point that it would be ignored by large numbers of drivers. We also believe there is no reason to examine higher thresholds (*e.g.,* a 30 percent threshold), since they would provide fewer benefits for similar costs.

VII. Public Participation

How Do I Prepare and Submit Comments?

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

Your comments must not be more than 15 pages long (*see* 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 under **ADDRESSES.**

You may also submit your comments 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 also will consider comments that Docket Management receives after that date. If Docket Management receives a comment too late for us to consider it in developing the final rule, 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 under **ADDRESSES.** The hours of the Docket are indicated above in the same location.

You also may 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. Although the comments are imaged documents, instead of word processing documents, the ''pdf'' versions of the document are 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.

VIII. 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 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.

Since the June 5, 2002 final rule, to which this NPRM is directly related, was determined to be economically significant, the agency prepared and placed in the docket a Final Economic Analysis (FEA). This proposed rule likewise was determined to be economically significant. As a significant notice, it was reviewed under Executive Order 12866. The rule is also significant within the meaning of the Department of Transportation's Regulatory Policies and Procedures. The agency has estimated that compliance with this proposed rule would cost $823—$1,188 million per year, since approximately 17 million vehicles are produced for the United States market each year. Thus, this rule would have greater than a $100 million effect.

As noted above, this NPRM was necessitated by the August 6, 2003 opinion of the Court of Appeals for the Second Circuit in *Public Citizen, Inc.* v. *Mineta.* In that case, the court determined that the TREAD Act requires TPMSs to be four-tire systems, invalidated the one-tire, 30-percent option contained in the June 5, 2002 final rule, and vacated the standard. As part of the NPRM, NHTSA also has responded substantively to issues raised in the 13 petitions for reconsideration filed in response to the June 5, 2002 final rule, the majority of which remain relevant even after that court decision. Accordingly, the agency has prepared and placed in the docket a Preliminary Regulatory Impact Analysis (PRIA) for this NPRM.

B. Regulatory Flexibility Act

Pursuant to the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.,* as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996), whenever an agency is required to publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effect of the rule on small entities (*i.e.,* small businesses, small organizations, and small governmental jurisdictions). The Small Business Administration's regulations at 13 CFR Part 121 define a small business, in part, as a business entity ''which operates primarily within the United States.'' (13 CFR 121.105(a)). No regulatory flexibility analysis is required if the head of an agency certifies the rule will not have a significant economic impact on a substantial number of small entities. SBREFA amended the Regulatory Flexibility Act to require Federal agencies to provide a statement of the factual basis for certifying that a rule will not have a significant economic impact on a substantial number of small entities.

NHTSA has considered the effects of this proposed rule under the Regulatory Flexibility Act. I certify that this proposed rule would not have a significant economic impact on a substantial number of small entities. The rationale for this certification is that currently there are only four small motor vehicle manufacturers (*i.e.*, only four with fewer than 1,000 employees) in the United States that would have to comply with this proposed rule. These manufacturers would have to rely on suppliers to provide the TPMS hardware, and then they would have to integrate the TPMS into their vehicles.

There are a few small manufacturers of recreational vehicles that would have to comply with this proposed rule. However, most of these manufacturers use van chassis supplied by the larger manufacturers (*e.g.*, GM, Ford, or DaimlerChrysler) and could use the TPMSs supplied with the chassis. These manufacturers should not have to test the TPMS for compliance with this proposed rule since they should be able to rely upon the chassis manufacturer's incomplete vehicle documentation.

Under the June 5, 2002 final rule, commenters expressed concerns about the final rule's impact upon aftermarket wheel and rim manufacturers, many of which are small businesses. These manufacturers were concerned that certain provisions of the final rule would have had the effect of restricting their ability to provide a full range of wheel and tire combinations to consumers, thereby negatively impacting their business. However, these concerns have largely been resolved by the agency's current proposal, which does not contain requirements for spare tires and aftermarket rims.

We also analyzed the impact of this proposal on 14 identified suppliers of TPMS systems. However, of these companies, only three have fewer than 750 employees. Of these three companies, one (SmarTire) has its headquarters located outside of the United States, and another (Cycloid) has only ten employees and outsources the manufacturing of its products.

In conclusion, the agency believes that this proposal would not affect a substantial number of small businesses.

C. Executive Order 13132 (Federalism)

Executive Order 13132, ''Federalism'' (64 FR 43255, August 10, 1999), requires NHTSA to develop an accountable process to ensure ''meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications.'' ''Policies that have federalism implications'' are defined in the Executive Order to include regulations that have ''substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.'' Under Executive Order 13132, the agency may not issue a regulation with Federalism implications, that imposes substantial direct compliance costs, and that is not required by statute, unless the Federal government provides the funds

necessary to pay the direct compliance costs incurred by State and local governments, the agency consults with State and local governments, or the agency consults with State and local officials early in the process of developing the proposed regulation. NHTSA also may not issue a regulation with Federalism implications and that preempts a State law unless the agency consults with State and local officials early in the process of developing the regulation.

Although statutorily mandated, this proposed rule for TPMS was analyzed in accordance with the principles and criteria set forth in Executive Order 13132, and the agency determined that the rule would not have sufficient Federalism implications to warrant consultations with State and local officials or the preparation of a Federalism summary impact statement. This proposed rule would not have any substantial effects on the States, or on the current distribution of power and responsibilities among the various local officials.

D. Executive Order 12988 (Civil Justice Reform)

Pursuant to Executive Order 12988, ''Civil Justice Reform'' (61 FR 4729, February 7, 1996), the agency has considered whether this rulemaking would have any retroactive effect. This proposed rule does not have any retroactive effect. Under 49 U.S.C. 30103, 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. 30161 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 a suit in court.

E. Executive Order 13045 (Protection of Children From Environmental Health and Safety Risks)

Executive Order 13045, ''Protection of Children from Environmental Health and Safety Risks'' (62 FR 19855, April 23, 1997), applies to any rule that: (1) Is determined to be ''economically significant'' as defined under Executive Order 12866, and (2) concerns an environmental, health, or safety risk that the agency has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, the agency must evaluate the environmental health or safety effects of the planned rule on children, and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the agency.

Although the TPMS rule has been determined to be an economically significant regulatory action under Executive Order 12866, the problems associated with under-inflated tires equally impact all persons riding in a vehicle, regardless of age. Consequently, this proposed rule does not involve decisions based upon health and safety risks that disproportionately affect children, as would necessitate further analysis under Executive Order 13045.

F. Paperwork Reduction Act

Under the Paperwork Reduction Act of 1995 (PRA), a person is not required to respond to a collection of information by a Federal agency unless the collection displays a valid OMB control number. In the NPRM, it is proposed that each of the estimated 21 affected vehicle manufacturers provide one phase-in report for each of two years, beginning, at the earliest, in the fall of 2006.

Pursuant to the June 5, 2002 TPMS final rule, the OMB has approved the collection of information ''Phase-In Production Reporting Requirements for Tire Pressure Monitoring Systems,'' assigning it Control No. 2127–0631 (expires 6/30/06). NHTSA has been given OMB clearance to collect a total of 42 hours a year (2 hours per respondent) for the TPMS phase-in reporting. However, until a new final rule is issued specifying phase-in reporting requirements, NHTSA will not collect any information pursuant to Control No. 2127–0631. If it should be necessary to do so, NHTSA may ask OMB for an extension of this clearance for an additional period of time.

G. National Technology Transfer and Advancement Act

Section 12(d) of the National Technology Transfer and Advancement Act of 1995 (NTTAA), Public Law 104–113, (15 U.S.C. 272) directs the agency to evaluate and use voluntary consensus standards in its regulatory activities unless doing so would be inconsistent with applicable law or is otherwise impractical. Voluntary consensus standards are technical standards (*e.g.*, materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies, such as the Society of Automotive Engineers (SAE). The NTTAA directs us to provide Congress (through OMB) with explanations when the agency decides not to use available and applicable voluntary consensus standards. The NTTAA does not apply to symbols.

There are no voluntary consensus standards related to TPMS available at this time. However, NHTSA will consider any such standards as they become available.

H. Unfunded Mandates Reform Act

Section 202 of the Unfunded Mandates Reform Act of 1995 (UMRA) requires federal 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 for inflation with base year of 1995 (so currently about $109 million)). Before promulgating a NHTSA rule for which a written statement is needed, section 205 of the UMRA generally requires the agency to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective, or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows the agency to adopt an alternative other than the least costly, most cost-effective, or least burdensome alternative if the agency publishes with the final rule an explanation of why that alternative was not adopted.

This proposed rule would not result in the expenditure by State, local, or tribal governments, in the aggregate, or more than $109 million annually, but it would result in an expenditure of that magnitude by vehicle manufacturers and/or their suppliers. In the June 5, 2002 final rule, the precursor to the current proposal, the agency chose two compliance options (*i.e.*, four-tire, 25-percent and one-tire, 30-percent) in order to minimize compliance costs with the standard during the phase-in period.

However, the Second Circuit in *Public Citizen, Inc.* v. *Mineta* struck down the one-tire, 30-percent option. Thus, in this proposed rule, NHTSA is proposing to adopt a four-tire, 25-percent requirement, which we believe is consistent with safety and the mandate in the TREAD Act, as fully discussed in the June 5, 2002 final rule. We note that in proposing a performance standard,

NHTSA has left the door open for an array of technologies that may be used to meet the standard's proposed requirements. With further TPMS development, we expect that vehicle manufacturers would have a number of technological choices that will provide broad flexibility to minimize their costs of compliance with the standard.

I. National Environmental Policy Act

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

J. Regulatory Identifier Number (RIN)

The Department of Transportation assigns a regulation identifier number (RIN) to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. You may use the RIN contained in the heading at the beginning of this document to find this action in the Unified Agenda.

K. Privacy Act

Please note that anyone is able to search the electronic form of all comments received into any of our dockets by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, etc.). You may review DOT's complete Privacy Act Statement in the **Federal Register** published on April 11, 2000 (Volume 65, Number 70; Pages 19477–78), or you may visit *http://dms.dot.gov.*

List of Subjects in 49 CFR Parts 571 and 585

Imports, Motor vehicle safety, Reporting and recordkeeping requirements, Tires.

In consideration of the foregoing, NHTSA is proposing to amend 49 CFR Parts 571 and 585 as follows:

PART 571—FEDERAL MOTOR VEHICLE SAFETY STANDARDS

1. The authority citation for Part 571 of Title 49 would continue to read as follows:

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

2. Section 571.101 would be amended by revising paragraph S5.2.3 and Table 2 to read as follows:

§ 571.101 Standard No. 101; Controls and displays.

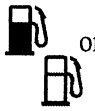
* * * * *

S5.2.3 Except for the Low Tire Pressure Telltale and the TPMS Malfunction Telltale, any display located within the passenger compartment and listed in column 1 of Table 2 that has a symbol designated in column 4 of that table shall be identified by either the symbol designated in column 4 (or symbol substantially similar in form to that shown in column 4) or the word or abbreviation shown in column 3. The Low Tire Pressure Telltale (either the display identifying which tire has low pressure or the display which does not identify which tire has low pressure) and the TPMS Malfunction Telltale shall be identified by the appropriate symbol designated in column 4, or both the symbol in column 4 and the words in column 3. Additional words or symbols may be used at the manufacturer's discretion for the purpose of clarity. Any telltales used in conjunction with a gauge need not be identified. The identification required or permitted by this section shall be placed on or adjacent to the display that it identifies. The identification of any display shall, under the conditions of S6, be visible to the driver and appear to the driver perceptually upright.

* * * * *

BILLING CODE 4910–59–P

Table 2
Identification and Illustration of Displays

Column 1	Column 2	Column 3	Column 4	Column 5
Display	*Telltale Color*	*Identifying Words or Abbreviation*	*Identifying Symbol*	*Illumination*
Turn Signal Telltale	Green	Also See FMVSS 108	 1,5	———
Hazard Warning Telltale		Also See FMVSS 108	 2,5	———
Seat Belt Telltale	———4	Fasten Belts or Fasten Seat Belts Also See FMVSS 208	 or	———
Fuel Level Telltale		Fuel	 or	———
Gauge	———			Yes
Oil Pressure Telltale		Oil		———
Gauge	———			Yes
Coolant Temperature Telltale		Temp		———
Gauge	———			Yes
Electrical Charge Telltale		Volts, Charge or Amp		———
Gauge	———			Yes
Highbeam Telltale	Blue or Green 3	Also See FMVSS 108	 5	———
Brake System 8	Red 3	Brake, Also see FMVSS 105 and 135	———	———

1. The pair of arrows is a single symbol. When the indicator for left and right turn operate independently, however, the two arrows will be considered separate symbols and may be spaced accordingly.
2. Not required when arrows of turn signal telltales that otherwise operate independently flash simultaneously as hazard warning telltale.
3. Red can be red-orange. Blue can be blue-green.
4. The color of the telltale required by S4.5.3.3 of Standard No. 208 is red; the color of the telltale required by S7.3 of Standard No. 208 is not specified.
5. Framed areas may be filled.
8. In the case where a single telltale indicates more than one brake system condition, the word for Brake System shall be used.

Table 2 (continued)

Column 1	Column 2	Column 3	Column 4	Column 5
Display	*Telltale Color*	*Identifying Words or Abbreviation*	*Identifying Symbol*	*Illumination*
Malfunction in Anti-lock or	Yellow	Antilock, Anti-lock or ABS. Also see FMVSS 105 and 135	———	———
Variable Brake Proportioning System 8	Yellow	Brake Proportioning, Also see FMVSS 135	———	———
Parking Brake Applied 8	Red 3	Park or Parking Brake, Also see FMVSS 105 and 135	———	———
Malfunction in Anti-lock	Yellow	ABS, or Antilock; Trailer ABS, or Trailer Antilock, Also see FMVSS 121	———	———
Brake Air Pressure Position Telltale	———	Brake Air, Also see FMVSS 121	———	———
Speedometer	———	MPH, or MPH and km/h 7	———	Yes
Odometer	———	——— 6	———	———
Automatic Gear Position	———	Also see FMVSS 102	———	Yes
Low Tire Pressure Telltale (that does not identify which tire has low pressure)	Yellow	Low Tire. Also see FMVSS 138		———
Low Tire Pressure Telltale (that identifies which tire has low pressure)	Yellow	Low Tire. Also see FMVSS 138		———
Tire Pressure Monitoring System Malfunction Telltale	Yellow	TPMS		———

3. Red can be red-orange. Blue can be blue-green.
6. If the odometer indicates kilometers, then "KILOMETERS" or "km" shall appear, otherwise, no identification is required.
7. If the speedometer is graduated in miles per hour and in kilometers per hour, the identifying words or abbreviations shall be "MPH and km/h" in any combination of upper or lower case letters.
8. In the case where a single telltale indicates more than one brake system condition, the word for Brake System shall be used.

BILLING CODE 4910–59–C

3. Section 571.138 would be added to read as follows:

§ 571.138 Standard No. 138; Tire pressure monitoring systems.

S1 *Purpose and scope.* This standard specifies performance requirements for tire pressure monitoring systems (TPMSs) to prevent significant under-inflation of tires and the resulting safety problems.

S2 *Application.* This standard applies to passenger cars, multipurpose passenger vehicles, trucks, and buses that have a gross vehicle weight rating of 4,536 kilograms (10,000 pounds) or less, except those vehicles with dual wheels on an axle, according to the phase-in schedule specified in S7 of this standard.

S3 *Definitions.* The following definitions apply to this standard:

Lightly loaded vehicle weight means unloaded vehicle weight plus the weight of a mass of 180 kg (396 pounds), including test driver and instrumentation.

Tire pressure monitoring system means a system that detects when one or more of a vehicle's tires is significantly under-inflated and illuminates a low tire pressure warning telltale.

Vehicle Placard and *Tire inflation pressure label* mean the sources of information for the vehicle manufacturer's recommended cold tire inflation pressure pursuant to section 571.110 of this Part.

S4 *Requirements.*

S4.1 *General.* To the extent provided in S7.1 through S7.3, each vehicle must be equipped with a tire pressure monitoring system that meets the requirements specified in S4 under the test conditions specified in S5 and the test procedures specified in S6 of this standard.

S4.2 *TPMS detection requirements.* The tire pressure monitoring system must:

(a) Illuminate a low tire pressure warning telltale not more than 10 minutes after the inflation pressure in one or more of the vehicle's tires, up to a total of four tires, is equal to or less than either the pressure 25 percent below the vehicle manufacturer's recommended cold inflation pressure, or the pressure specified in the 3rd column of Table 1 of this standard for the corresponding type of tire, whichever is higher;

(b) Continue to illuminate the low tire pressure warning telltale as long as the pressure in any of the vehicle's tires is equal to or less than the pressure specified in S4.2(a), and the ignition locking system is in the ''On'' (''Run'') position, whether or not the engine is running. The telltale must be extinguished after the inflation pressure is corrected.

S4.3 *Low tire pressure warning telltale.*

S4.3.1 Each tire pressure monitoring system must include a low tire pressure warning telltale that:

(a) Is mounted inside the occupant compartment in front of and in clear view of the driver;

(b) Is identified by one of the symbols shown for the ''Low Tire Pressure Telltale'' in Table 2 of Standard No. 101 (49 CFR 571.101); and

(c) Is illuminated under the conditions specified in S4.2.

S4.3.2 In the case of a telltale that identifies which tire(s) is (are) under-inflated, each tire in the symbol for that telltale must illuminate when the tire it represents is under-inflated to the extent specified in S4.2.

S4.3.3:

(a) Except as provided in paragraph (b) of this section, each low tire pressure warning telltale must illuminate as a check of lamp function either when the ignition locking system is turned to the ''On'' (''Run'') position when the engine is not running, or when the ignition locking system is in a position between ''On'' (''Run'') and ''Start'' that is designated by the manufacturer as a check position.

(b) The low tire pressure warning telltale need not illuminate when a starter interlock is in operation.

S4.4 *TPMS malfunction.*

(a) The vehicle shall be equipped with a tire pressure monitoring system that includes a telltale that illuminates whenever there is a malfunction that affects the generation or transmission of control or response signals in the vehicle's tire pressure monitoring system and extinguishes when the malfunction has been corrected. The vehicle's TPMS malfunction indicator shall meet the requirements of either S4.4(b) or S4.4(c).

(b) *Dedicated TPMS malfunction telltale*

The vehicle meets the requirements of S4.4(a) when equipped with a dedicated TPMS malfunction telltale that:

(1) Is mounted inside the occupant compartment in front of and in clear view of the driver;

(2) Is identified by the symbol shown for ''TPMS Malfunction Telltale'' in Table 2 of Standard No. 101 (49 CFR 571.101);

(3) Is illuminated under the conditions specified in S4.4 for as long as the malfunction exists, whenever the ignition locking system is in the ''On'' (''Run'') position; and

(4) (i) Except as provided in paragraph (ii), each dedicated TPMS malfunction telltale must be activated as a check of lamp function either when the ignition locking system is turned to the ''On'' (''Run'') position when the engine is not running, or when the ignition locking system is in a position between ''On'' (''Run'') and ''Start'' that is designated by the manufacturer as a check position.

(ii) The dedicated TPMS malfunction telltale need not be activated when a starter interlock is in operation.

(c) *Combination low tire pressure/TPMS malfunction telltale*

The vehicle meets the requirements of S4.4(a) when equipped with a combined Low Tire Pressure/TPMS malfunction telltale that:

(1) Meets the requirements of S4.2 and S4.3; and

(2) Flashes for one minute upon detection of any condition specified in S4.4(a) after the ignition locking system is turned to the ''On'' (''Run'') position. After the first minute, the telltale must remain continuously illuminated as long as the malfunction exists and the ignition locking system is in the ''On'' (''Run'') position. This flashing and illumination sequence must be repeated upon vehicle start-up until the situation causing the malfunction has been corrected. The TPMS malfunction telltale must extinguish after the malfunction has been corrected.

S4.5 *Written instructions.*

(a) The owner's manual in each vehicle certified as complying with S4 must provide an image of the Low Tire Pressure Telltale symbol (and an image of the TPMS Malfunction Telltale symbol, if a dedicated telltale is utilized for this function) with the following statement in English:

Each tire, including the spare (if provided), should be checked monthly when cold and inflated to the inflation pressure recommended by the vehicle manufacturer on the vehicle placard or tire inflation pressure label. (If your vehicle has tires of a different size than the size indicated on the vehicle placard or tire inflation pressure label, you should consult the appropriate section of this owner's manual to determine the proper tire inflation pressure.) When the low tire pressure telltale is illuminated, one or more of your tires is significantly under-inflated. You should stop and check your tires as soon as possible, and inflate them to the proper pressure. Driving on a significantly under-inflated tire causes the tire to overheat and can lead to tire failure. Under-inflation also reduces fuel efficiency and tire tread life, and may affect the vehicle's handling and stopping ability.

Your vehicle has also been equipped with a TPMS malfunction telltale to indicate when the system is not operating properly. When the malfunction telltale is illuminated, the system may not be able to detect or signal

low tire pressure as intended. TPMS malfunctions may occur for a variety of reasons, including the installation of incompatible replacement tires on the vehicle. Always check the TPMS malfunction telltale after replacing one or more tires on your vehicle to ensure that the replacement tires are compatible with the TPMS.

(b) The owner's manual may include additional information about the significance of the low tire pressure warning telltale illuminating, a description of corrective action to be undertaken, whether the tire pressure monitoring system functions with the vehicle's spare tire (if provided), and how to use a reset button, if one is provided.

(c) If a vehicle does not come with an owner's manual, the required information shall be provided in writing to the first purchaser of the vehicle.

S5 *Test conditions.*

S5.1 *Ambient temperature.* The ambient temperature is between 0 °C (32 °F) and 40 °C (104 °F).

S5.2 *Road test surface.*

Compliance testing is conducted on any portion of the Southern Loop of the Treadwear Test Course defined in Appendix A and Figure 2 of section 575.104 of this chapter. The road surface is dry during testing.

S5.3 *Vehicle conditions.*

S5.3.1 *Test weight.* The vehicle may be tested at any weight between its lightly loaded vehicle weight and its gross vehicle weight rating (GVWR) without exceeding any of its gross axle weight ratings.

S5.3.2 *Vehicle speed.* The vehicle's TPMS is calibrated and tested at speeds between 50 km/h (31.1 mph) and 100 km/h (62.2 mph).

S5.3.3 *Rim position.*

The vehicle rims may be positioned at any wheel position, consistent with any related instructions or limitations in the vehicle owner's manual.

S5.3.4 *Stationary location.*

The vehicle's tires are shaded from direct sun when the vehicle is parked.

S5.3.5 *Brake pedal application.* Driving time shall not accumulate during service brake application.

S5.3.6 *Range of conditions or test parameters.*

Whenever a range of conditions or test parameters is specified in this standard, the vehicle must meet applicable requirements when tested at any point within the range.

S6 *Test procedures.*

(a) Inflate the vehicle's tires to the cold tire inflation pressure(s) provided on the vehicle placard or the tire inflation pressure label.

(b) With the vehicle stationary and the ignition locking system in the ''Lock'' or ''Off'' position, turn the ignition locking system to the ''On'' (''Run'') position or, where applicable, the appropriate position for the lamp check. The tire pressure monitoring system must perform a check of lamp function for the low tire pressure telltale as specified in paragraph S4.3.3 of this standard. If the vehicle is equipped with a separate TPMS malfunction telltale, the tire pressure monitoring system also must perform a check of lamp function as specified in paragraph S4.4(b)(4) of this standard.

(c) If applicable, reset the tire pressure monitoring system in accordance with the instructions in the vehicle owner's manual.

(d) *System calibration/learning phase.*

(1) Drive the vehicle along any portion of the test course for 10–15 minutes of cumulative time (not necessarily continuously).

(2) Drive the vehicle in the opposite direction along the test course for 5–15 minutes of cumulative time (not necessarily continuously).

(3) The sum of the total cumulative driving time under paragraphs S6(d)(1) and (2) shall not be less than 20 minutes.

(e) Stop the vehicle and keep the vehicle stationary for up to one hour with the engine off. Deflate any combination of one to four tires until the deflated tire(s) is (are) at 7 kPa (1 psi) below the inflation pressure at which the tire pressure monitoring system is required to illuminate the low tire pressure warning telltale.

(f) *System detection phase.*

(1) Drive the vehicle for up to 7 minutes of cumulative time (not necessarily continuously) along any portion of the test course, or until the low tire pressure telltale illuminates, whichever occurs first.

(2) If the telltale did not illuminate during the step in paragraph S6(f)(1), reverse direction on the course and drive the vehicle for an additional period of time up to a total cumulative time of 10 minutes (including the time in S6(f)(1), and not necessarily continuously), or until the low tire pressure telltale illuminates.

(3) If the low tire pressure telltale did not illuminate, discontinue the test.

(g) If the low tire pressure telltale illuminated during the procedure in paragraph S6(f), turn the ignition locking system to the ''Off'' or ''Lock'' position. After a 5-minute period, turn the vehicle's ignition locking system to the ''On'' (''Run'') position. The telltale must illuminate and remain illuminated as long as the ignition locking system is in the ''On'' (''Run'') position.

(h) Keep the vehicle stationary for a period of up to one hour with the engine off.

(i) If the vehicle's TPMS has a manual reset feature, attempt to reset the system in accordance with instructions specified in the vehicle owner's manual prior to re-inflating the vehicle's tires. If the low tire pressure telltale illuminates, discontinue the test.

(j) Inflate all of the vehicle's tires to the same inflation pressure used in paragraph S6(a). If the vehicle's tire pressure monitoring system has a manual reset feature, reset the system in accordance with the instructions specified in the vehicle owner's manual. Determine whether the telltale has extinguished. If necessary, drive the vehicle for a time period of up to 10 minutes.

(k) The test may be repeated, using the test procedures in paragraphs S6(a) through (j), with any one, two, three, or four of the tires on the vehicle under-inflated.

(l) *TPMS malfunction detection.*

(1) Simulate one or more TPMS malfunction(s) by disconnecting the power source to any TPMS component, disconnecting any electrical connection between TPMS components, by simulating a TPMS sensor malfunction, or by installing a tire on the vehicle that is incompatible with the TPMS.

(2) Turn the ignition locking system to the ''On'' (''Run'') position or, where appropriate, the position for lamp check. The TMPS malfunction telltale must illuminate in accordance with paragraph S4.4.

(3) If the vehicle is equipped with a TPMS reset feature to extinguish the low tire pressure and/or malfunction telltale, reset the system according to the manufacturer's instructions. Verify that the TPMS continues to identify a system malfunction as specified in paragraph S4.4.

(4) Restore the TPMS to normal operation, reset if necessary, and verify that the malfunction telltale is extinguished.

S7 *Phase-in schedule.*

S7.1 *Vehicles manufactured on or after September 1, 2005, and before September 1, 2006.* For vehicles manufactured on or after September 1, 2005, and before September 1, 2006, the number of vehicles complying with this standard must not be less than 50 percent of:

(a) The manufacturer's average annual production of vehicles manufactured on or after September 1, 2002, and before September 1, 2005; or

(b) The manufacturer's production on or after September 1, 2005, and before September 1, 2006.

S7.2 *Vehicles manufactured on or after September 1, 2006, and before September 1, 2007.* For vehicles manufactured on or after September 1, 2006, and before September 1, 2007, the number of vehicles complying with this standard must not be less than 90 percent of:

(a) The manufacturer's average annual production of vehicles manufactured on or after September 1, 2003, and before September 1, 2006; or

(b) The manufacturer's production on or after September 1, 2006, and before September 1, 2007.

S7.3 *Vehicles manufactured on or after September 1, 2007.* All vehicles manufactured on or after September 1, 2007 must comply with this standard.

S7.4 *Calculation of complying vehicles.*

(a) For purposes of complying with S7.1, a manufacturer may count a vehicle if it is certified as complying with this standard and is manufactured on or after (date to be inserted that is 60 days after date of publication of the final rule), but before September 1, 2006.

(b) For purposes of complying with S7.2, a manufacturer may count a vehicle if it:

(1)(i) Is certified as complying with this standard and is manufactured on or after (date to be inserted that is 60 days after date of publication of the final rule), but before September 1, 2007; and

(ii) Is not counted toward compliance with S7.1; or

(2) Is manufactured on or after September 1, 2006, but before September 1, 2007.

S7.5 *Vehicles produced by more than one manufacturer.*

S7.5.1 For the purpose of calculating average annual production of vehicles for each manufacturer and the number of vehicles manufactured by each manufacturer under S7.1 through S7.3, a vehicle produced by more than one manufacturer must be attributed to a single manufacturer as follows, subject to S7.5.2:

(a) A vehicle that is imported must be attributed to the importer.

(b) A vehicle manufactured in the United States by more than one manufacturer, one of which also markets the vehicle, must be attributed to the manufacturer that markets the vehicle.

S7.5.2 A vehicle produced by more than one manufacturer must be attributed to any one of the vehicle's manufacturers specified by an express written contract, reported to the National Highway Traffic Safety Administration under 49 CFR Part 585, between the manufacturer so specified and the manufacturer to which the vehicle would otherwise be attributed under S7.5.1.

S7.6 *Small volume manufacturers.* Vehicles manufactured during any of the two years of the September 1, 2005 through August 31, 2007 phase-in by a manufacturer that produces fewer than 5,000 vehicles for sale in the United States during that year are not subject to the requirements of S7.1, S7.2, and S7.4.

S7.7 *Final-stage manufacturers and alterers.* Vehicles that are manufactured in two or more stages or that are altered (within the meaning of 49 CFR 567.7) after having previously been certified in accordance with Part 567 of this chapter are not subject to the requirements of S7.1 through S7.2 and S7.4.

Tables to § 571.138

Table 1 - Low Tire Pressure Warning Telltale - Minimum Activation Pressure

Tire Type	Maximum or Rated Inflation Pressure		Minimum Activation Pressure	
	(kPa)	(psi)	(kPa)	(psi)
P-metric -- Standard Load	240, 300, or 350	35, 44, or 51	140 140 140	20 20 20
P-metric - Extra Load	280 or 340	41 or 49	160 160	23 23
Load Range C	350	51	200	29
Load Range D	450	65	260	38
Load Range E	550	80	320	46

PART 585—PHASE-IN REPORTING REQUIREMENTS

4. Proposed amendments to Part 585 were published on August 6, 2003, that would consolidate phase-in reporting requirements for various standards (68 FR 46546). Consistent with that proposal, Part 585 would be amended further, as follows:

1. The authority citation for Part 585 of Title 49 would be added to read as follows:

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

2. Subpart D would be revised to read as follows:

Subpart D—Tire Pressure Monitoring System Phase-in Reporting Requirements

Sec.

Subpart D—Tire Pressure Monitoring System Phase-in Reporting Requirements

§ 585.31 Scope.

This subpart establishes requirements for manufacturers of passenger cars, multipurpose passenger vehicles, trucks, and buses with a gross vehicle weight rating of 4,536 kilograms (10,000 pounds) or less, except those vehicles with dual wheels on an axle, to submit a report, and maintain records related to the report, concerning the number of such vehicles that meet the requirements of Standard No. 138, *Tire pressure monitoring systems* (49 CFR 571.138).

§ 585.32 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. 138.

§ 585.33 Applicability.

This subpart applies to manufacturers of passenger cars, multipurpose passenger vehicles, trucks, and buses with a gross vehicle weight rating of 4,536 kilograms (10,000 pounds) or less, except those vehicles with dual wheels on an axle. However, this subpart does not apply to manufacturers whose production consists exclusively of vehicles manufactured in two or more stages, and vehicles that are altered after previously having been certified in accordance with part 567 of the chapter. In addition, this subpart does not apply to manufacturers whose production of motor vehicles for the United States market is less than 5,000 vehicles in a production year.

§ 585.34 Definitions.

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

§ 585.35 Response to inquiries.

At any time prior to August 31, 2007, each manufacturer must, upon request from the Office of Vehicle Safety Compliance, provide information identifying the vehicles (by make, model, and vehicle identification number) that have been certified as complying with Standard No. 138. The manufacturer's designation of a vehicle as a certified vehicle is irrevocable.

§ 585.36 Reporting requirements.

(a) General reporting requirements. Within 60 days after the end of the production years ending August 31, 2006 and August 31, 2007, each manufacturer must submit a report to the National Highway Traffic Safety Administration concerning its compliance with Standard No. 138 (49 CFR 571.138) for its passenger cars, multipurpose passenger vehicles, trucks, and buses with a gross vehicle weight rating of less than 4,536 kilograms (10,000 pounds) produced in that year. Each report must—

(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 the requirements of Standard No. 138 (49 CFR 571.138) 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 statement of compliance.* Each manufacturer must provide the number of passenger cars, multipurpose passenger vehicles, trucks, and buses with a gross vehicle weight rating of 4,536 kilograms (10,000 pounds) or less, except those vehicles with dual wheels on an axle, 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 must report the number of such vehicles manufactured during the current production year.

(2) *Production.* Each manufacturer must report for the production year for which the report is filed: the number of passenger cars, multipurpose passenger vehicles, trucks, and buses with a gross vehicle weight rating of 4,536 kilograms (10,000 pounds) or less that meet Standard No. 138 (49 CFR 571.138).

(3) *Vehicles produced by more than one manufacturer.* Each manufacturer whose reporting of information is affected by one or more of the express written contracts permitted by S7.5.2 of Standard No. 138 (49 CFR 571.138) must:

(i) Report the existence of each contract, including the names of all parties to the contract, and explain how the contract affects the report being submitted.

(ii) Report the actual number of vehicles covered by each contract.

§ 585.37 Records.

Each manufacturer must maintain records of the Vehicle Identification Number for each vehicle for which information is reported under § 590.6(b)(2) until December 31, 2009.

§ 585.38 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 § 585.36(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, DC 20590.

Issued: September 10, 2004.

Stephen R. Kratzke,

Associate Administrator for Rulemaking.

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