

**Submission by the United States of America for information on the status of the rulemaking on
the new tire standard, FMVSS 139**

TIRE STANDARD UPGRADE – FMVSS 139

Major Commenters to NPRM: Docket No. 8011

- ?? Advocates for Highway and Auto Safety [Advocates]
- ?? Alliance of Automobile Manufacturers [Alliance]
- ?? American Honda Motor Co., Inc [Honda]
- ?? American Society for Testing and Materials [ASTM]
- ?? Association of International Automobile Manufacturers, Inc [AIAM]
- ?? Consumers Union [CU]
- ?? DaimlerChrysler Corporation [DaimlerChrysler]
- ?? Denman Tire Corporation. [Denman]
- ?? ECE GRRF Ad Hoc group [ECE/GRRF]
- ?? European Tyre and Rim Technical Organization [ETRTO]
- ?? Ford Motor Company [Ford]
- ?? General Motors North America [GM]
- ?? Hoosier Racing Tire [Hoosier]
- ?? Int'l Tire & Rubber Assoc., Inc. & Tire Assoc. of N. America [ITRA/TANA]
- ?? Japan Automobile Tyre Manufacturers Association Inc. [JATMA]
- ?? Mitsubishi Motors Corporation [Mitsubishi]
- ?? Public Citizen [Public Citizen]
- ?? Rubber Manufacturers Association [RMA]
- ?? Specialty Equipment Market Association [SEMA]
- ?? Specialty Tires of America, Inc. [Specialty Tires]
- ?? Subaru of America, Inc [Subaru]
- ?? The Tire and Rim Association, Inc. [T&RA]
- ?? Toyota Motor North America, Inc. [Toyota]
- ?? United States Congressman [Bill Shuster]
- ?? United States Senators [Richard G. Lugar and Evan Bayh]

Decision Issues

- 1. High Speed Performance**
- 2. Endurance Performance**
- 3. Low Pressure Performance**
- 4. Resistance to Bead Unseating Performance**
- 5. Road Hazard Impact Performance**
- 6. Aging Effects Performance**
- 7. Applicability to FMVSS 139**
- 8. Tire Selection Criteria/Load Limits**
- 9. Effective Dates/Implementation**
- 10. Cost and Benefits**

1. High Speed Performance

I. SUMMARY OF NPRM PROPOSAL

- ?? Purpose: To evaluate a tire's performance at high speeds
- ?? Pass/Fail criteria: No visual evidence of tire failure and no loss in inflation pressure.
- ?? Ambient Temperature: 40°C (104°F)
- ?? Load: 85 percent
- ?? Inflation Pressure: 220 kPa (32 psi) for standard P-metric tires; 260 kPa (38 psi) for extra load P-metric tires; 320 kPa (46 psi), 410 kPa (60 psi), 500 kPa (73 psi), for LT tires load range C, D and E, respectively.
- ?? Speed: 140, 150, 160 km/h (88, 94, 100 mph)
- ?? Duration: 30 minutes at each speed

II. DOCKET COMMENTS - SUMMARY

- ?? Majority of commenters want a system based on speed ratings.
- ?? RMA accepts NHTSA's High Speed test parameters for P-metric tires (speeds of 140/150/160 km/h for 30 minutes at each speed step) except for the ambient temperature, for which they recommend 38°C instead of 40°C. For Light Truck (LT) tires, RMA recommends the lower ambient temperature, test speeds of 130/140/150 km/h, along with higher inflation pressures than proposed by NHTSA. RMA recommends a longer break-in period (2 hours vs. 15 minutes) and longer wait time (1 hour vs. 15 minutes) to measure inflation pressure, after testing. RMA agrees with the recommended 85% load.
- ?? ETRTO believes that tires should be tested based on speed rating of the tire. However, LT tires are not designed for speeds up to 160 km/h and it is not justified to test them at that speed.
- ?? The Alliance of Automobile Manufacturers commented that agency should consider GTS-2000 for harmonization considerations since there is no evidence of a safety problem with tires complying with ECE R30.
- ?? Ford agrees with agency that tire robustness can be increased through additional load margins, which would reduce the risk of tire failure for some customers. Ford suggested a high-speed test load of 105% of rated load at test speeds corresponding to the rated speeds of the tire.
- ?? Consumers Union supports the GTS-2000 high-speed test raised to 40°C, since it provides a greater promise for achieving global harmonization.
- ?? UNECE/GRRF recommends the draft GTR for the high-speed test, which is based on the speed rating of the tire. It does not support ambient of 40°C.

2. Endurance Performance

I. SUMMARY OF NPRM PROPOSAL

- ?? Purpose: To evaluate a tire's ability to operate at near maximum loading for sustained periods.
- ?? Pass/Fail criteria: No visual evidence of tire failure and no loss in inflation pressure.
- ?? Ambient temperature: 40°C.
- ?? Load: 90/100/110 percent of maximum rated load on sidewall.
- ?? Inflation pressure to be 180 kPa (26psi) for P-metric; for LT tires, 260 kPa (38 psi), 340 kPa (50 psi), and 410 kPa (59 psi), for LT load range C, D and E, respectively.
- ?? Speed: 120 km/h (75 mph)
- ?? Duration (hrs): 8, 10, 22 (total 40) at the corresponding loads listed above.

II. DOCKET COMMENTS – SUMMARY

- ?? For P-metric tires, RMA recommends an Endurance test using lower loads, 85/90/100 percent of maximum load rating for 34 hours. For LT tires, RMA recommends same loads and duration as for P-metric, but with a lower test speed of 110 km/h and higher inflation pressures. RMA claims that the lower speed makes stringency of test for LT tires equivalent to that for P-metric.
- ?? ETRTO commented that the cumulative increase in severity (load, speed, duration, ambient temperature) is excessive and failure modes may not reflect failure mode in regular road service.
- ?? The Alliance was critical of the agency's approach for determining test parameters and indicated that the agency has not established what is a minimum level required for safety.
- ?? Ford recommends that FMVSS 109 test protocol be retained and revised by including an additional 48-hour step at 130% of the rated load.
- ?? ECE/GRRF feels that the Endurance test is a longer high speed test and there is nothing to be gained by running the tire longer.
- ?? Public Citizen believes that the agency should adopt a higher load of 100/110/115% for the endurance test to adequately provide for the loading conditions of the heavier commercial vehicles. Also wants test speeds at rated speed of tire to validate manufacturers claims.

3. Low Pressure Performance Requirement

I. SUMMARY OF NPRM PROPOSAL

?? Purpose: To evaluate a tire's low pressure performance at the low inflation threshold levels established for the tire pressure monitoring systems in the new FMVSS 138.

The agency proposed two alternatives for this test.

?? Pass/Fail criteria: No visual evidence of tire failure and no loss in inflation pressure.

Alternative 1:

?? Test speed: 120 km/h

?? Inflation pressure: 140 kPa (20 psi) for standard load tires; inflation pressures are different for other tires

?? Test load: 100% of the maximum load rating that is labeled on the tire

?? Test Duration: 90 minutes

?? Ambient temperature: 40°C

Alternative 2:

?? Test speed: 140, 150, 160 km/h

?? Inflation pressure: 140 kPa (20 psi) for standard load tires; inflation pressures are different for other tires

?? Test load: 67% of the maximum load rating that is labeled on the tire

?? Test Duration: 30 minutes at each speed; total test time is 90 minutes

?? Ambient temperature: 40°C

II. DOCKET COMMENTS

?? RMA supports Alternative 1, but recommends a lower test speed, 110 km/h, for LT tires.

?? ETRTO cannot accept the concept of the low pressure test because there is no justification to test a tire at 140 kPa.

?? Alliance commented that it would be better to run the low pressure test after the aging test. The Alliance believes that the parameters for both low pressure tests are arbitrary and that there is no data to suggest that their application will result in benefits.

?? Ford recommends a low pressure test on tires that have been aged to the oven aging procedure (50/50 blend of oxygen/nitrogen at 70°C for 14 days) Ford recommends.

?? CU favors Alternative 1 and recommends that the test duration be increased to 4 hours so as to better simulate the distance traveled (300 miles) on a tank of fuel.

?? Public Citizen feels that the stringency of the endurance based low pressure test is questionable since all the tires passed the test, and recommends the low pressure high speed test.

?? ECE/GRRF commented that it is opposed to such a test since the test conditions are excessive in relation to its service use.

4. Resistance to Bead Unseating Performance

I. SUMMARY OF NPRM PROPOSAL

- ?? Purpose: To evaluate a tire's ability to remain seated on its rim during severe vehicle maneuvers.
- ?? Pass/Fail criteria: Tire is mounted vertically on a rim, a sliding wedge block applies force laterally to the tread area; tire cannot lose any air pressure.

II. DOCKET COMMENTS – SUMMARY

- ?? RMA commented that there is nothing inherently wrong with the concept of the current procedure and recommends that the current FMVSS 109 test be retained. However, it does need to be modified to consider the different aspect ratios of tires.
- ?? The Alliance recommends that the agency use the T&RA maximum load values at the appropriate tire pressure, since the use of maximum load rating on the sidewall is unwarranted. Alliance also recommends that a test wheel specification be developed since bead unseating is also a function of the specific test wheel on which the tire is mounted.
- ?? CU recommends more research to develop a bead-unseating test.
- ?? Public Citizen supports the agency's air loss bench test method but does not support the 200 mm per second force applied to the tire. Alter the test by subjecting the tire to a peak lateral force.
- ?? ECE/GRRF believes that this test does not provide any safety benefit given the expected cost of equipment to perform the test.

5. Road Hazard Impact Performance

I. SUMMARY OF NPRM PROPOSAL

- ?? Purpose: To evaluate a tire's ability to withstand road hazards such as potholes and curb edges.
- ?? **This requirement would replace the FMVSS 109 strength (plunger) test.**
- ?? Pass/Fail criteria: No visual evidence of tire damage of any kind and no loss in inflation pressure.
- ?? The test machine positions the tire so that the striker impacts it across the width of the tire tread with a free falling 54 kg pendulum striker.
- ?? The impact force must be applied at five equally spaced points around the circumference of the tire.
- ?? Inflation pressure proposed is 180 kPa (26psi) for P-metric; for LT tires, 260 kPa (38 psi), 340 kPa (50 psi), and 410 kPa (59 psi), for load ranges C, D and E, respectively.

II. DOCKET COMMENTS – SUMMARY

- ?? RMA recommends that a Road Hazard Impact or Plunger test is not necessary for regulatory purposes. RMA indicates that it was originally developed to evaluate bias ply tires and that it is not appropriate for radial tires.
- ?? The Alliance recommends that the agency retain the current plunger test until a test that correlates with field performance is developed.
- ?? Ford does not support the Road Hazard Impact test but recommends the current plunger test be revised for a higher load and a revised test rim to accommodate the higher load without bottoming out.
- ?? CU commented that the plunger test has limited value for radial tires but recommends that the test be retained for bias tires.
- ?? Public Citizen suggested that a dynamic test be added to test the tire after the Road Hazard Impact test.
- ?? ECE/GRRF says more research is needed.

6. Aging Effects Performance Requirement

I. SUMMARY OF NPRM PROPOSAL

- ?? Purpose: To evaluate tire performance as a result of the aging that occurs during a tire's life. Three alternative tests proposed: 1) Adhesion (Peel) test based on ASTM D413; 2) Long term durability endurance test; and 3) Oven aging test.
- ?? Pass/Fail criteria: No visual evidence of tire failure and no loss in inflation pressure. For the Adhesion test, a minimum peel strength of 30 lbs/in was proposed.

Alternative 1: Adhesion Test

- ?? Test description: Test is based on ASTM D413, which uses a test specimen cut from the tire and determines the force required to separate adjacent belts. The tire is conditioned using a 24-hour endurance test before the peel test is performed. The test conditions for the 24-hour test are as follows:
- ?? Test speed: 120 km/h (75 mph); inflation pressure: 180 kPa (26 psi) for standard load tires; test load: 90%/100%/110% of the maximum load rating that is labeled on the tire; test duration: 8 hours at each load; ambient temperature: 40°C
- ?? Adhesion test is then performed on a specimen of the tire using the ASTM D413-98 test procedure.

Alternative 2: Long Term Durability Endurance Test

- ?? Test description: Test is based on a Michelin procedure for endurance testing
- ?? Test speed: 96 km/h (60 mph); inflation pressure: 275 kPa (40 psi) for standard load tires; filling gas: 50% O₂ and 50% N₂; test load: 111% of the maximum load rating that is labeled on the tire; test duration: 250 hours; ambient temperature: 40°C

Alternative 3: Oven Aging

- ?? Test description: The tire is oven-aged in an oven at 75°C (167°F) for 14 days. After this oven aging is completed, the tire is then tested to a 24-hour endurance test. The test conditions for the road wheel test are as follows:

?? Test Speed: 120 km/h; inflation pressure: 180 kPa (26 psi) for standard load tires; test load: 90%/100%/110% of the maximum load rating that is labeled on the tire; test duration: 8 hours at each load; ambient temperature: 40°C

II. DOCKET COMMENTS

- ?? RMA does not support an aging test because they believe it is redundant in light of the revised high speed, endurance, and low pressure tests. However, RMA indicates that the Oven Aging test is the least objectionable of the three aging proposals and provided test parameters they could support.
- ?? The Alliance commented that the three aging tests cause the tire wedge region to age anaerobically, whereas the NHTSA ODI data on field tires report that tires do not age anaerobically. The proposed tests may not improve real-world performance or increase safety.
- ?? Ford recommends a revised version of the agency's oven aging test, using a 50/50 blend of oxygen/nitrogen as the filling gas, aged in the oven for 14 days followed by a dynamic test on the roadwheel. This aging test simulates the performance of a 2-3 years oxidatively aged tire. In a meeting with Ford representatives, they stated that stowed spare tires aged three to four years fail with the same frequency, when performance tested, as tires mounted on the vehicle. Ford added that tires spend most of their operational life in a static environment.
- ?? Public Citizen supports the Michelin aging test as a starting point for the proposed aging test.
- ?? ECE/GRRF could support the oven-aging proposal but it needs further investigation and could be combined with the endurance test.

7. Applicability to FMVSS 139

I. SUMMARY OF NPRM PROPOSAL

- ?? Purpose: To define the range of tires to which the new standard applies.
- ?? NPRM proposed that FMVSS 139 apply to new pneumatic tires for use on motor vehicles with a GVWR of 10,000 pounds or less, manufactured after **1975**, except for motorcycles.
- ?? Given the increasing consumer preference for light truck use for passenger purposes, the agency proposed that the NPRM also be made applicable to LT tires (load range C, D, and E) used on light trucks with GVWR of 10,000 pounds or less.

DOCKET COMMENTS – SUMMARY

- ?? RMA commented that FMVSS 139 should apply to pneumatic radial tires used on powered motor vehicles other than motorcycles. Exclude temporary spares, various trailer tires, and all bias tires.
- ?? The Tire and Rim Association is concerned with the automatic inclusion of special tires under FMVSS 139. They ask that ST, FI, 8-12 rim diameter and below tires be excluded and continue to be covered under FMVSS 109.

- ?? Specialty Tires of America say that bias ply tires should not be included under FMVSS 139. Bias tires should be covered under FMVSS 109.
- ?? Hoosier Tires and Denman, makers of small lot specialty tires of both bias and radial design (<15,000 per year), seek exemption from FMVSS 139 and wish to continue to produce tires under current regulations FMVSS 109/119.
- ?? Consumer Union feels that bias ply tires should continue to be regulated under FMVSS 109/119.

8. Tire Selection Criteria/Load Limits

I. SUMMARY OF NPRM PROPOSAL

- ?? Purpose: To ensure proper tire selection for vehicle application
- ?? NPRM proposes to retain de-rating factor of 1.10 for P-metric tires used on non-passenger cars.
- ?? Vehicle normal load for passenger cars is based on 85% of the load rating at the vehicle's placard pressure. Same proposal applies to non-passenger cars using LT tires.
- ?? Vehicle normal load for other light vehicles using P-metric tires is based on the de-rated value of 85% of the load rating at the vehicle's placard pressure.
- ?? Proposed to expand occupant loading and distribution table for vehicle normal load for designated seating capacities up to 22 occupants.

II. DOCKET COMMENTS

- ?? RMA strongly supports retaining de-rating of 1.10 for P-metric tires used on non-passenger car vehicles, and the FMVSS 110 proposal to determine normal load based on 85% of the load at the vehicle placard pressure.
- ?? The Alliance supports extending the applicability of FMVSS 110 to light trucks and vans under 10,000 pounds GVWR. It urged the agency to preserve the 1.10 de-rating, and the vehicle normal load requirement at 88% of the maximum load rating. The Alliance believes that NHTSA has provided no new information to justify increasing the load reserve requirement, and indicates that the proposed change will impact other areas of vehicle performance such as braking, CAFÉ, and Noise, Vibration and Harshness (NVH).
- ?? ECE/GRRF urges the agency to develop a reserve requirement for tires.
- ?? Public Citizen recommends that the agency require between 18 and 20 percent reserve load, since they believe that 15% does not adequately address typical loading conditions for light vehicles over 6,000 lbs GVWR.
- ?? The Alliance commented that de-rating of the tire load capacity by dividing by 1.10 should be applied only when comparing the GAWR with the vehicle maximum load and not on the vehicle normal load on tire for passenger car tires used on MPVs and light trucks. The agency should de-link tire selection criteria from load used in the high-speed test since there is no rationale for such a linkage.
- ?? AIAM commented that including MPVs, light trucks, buses, and trailers <10,000 lbs GVWR in the proposed FMVSS 110 creates a unique situation for P-metric tires used

- on those vehicles in that they are subjected to both the 85% load reduction for normal load at recommended pressures, as well as a de-rating of 1.10. This represents a significant increase in stringency and will result in larger, extra load and/or higher load range tires. In lieu of the NHTSA proposal, we recommend simply maintaining the 1.10 de-rating of P-metric tires used on non-passenger car vehicles.
- ?? The Alliance indicated that the proposed standard could require larger, extra load, or higher load range tires. The consequences could include the need for larger brakes, reduced CAFÉ performance, revised ABS calibration, and revised DSC. Subaru requests that the agency delete proposed changes in FMVSS 110, S4.2.2.3(a). The 85% factor at placard pressure load limits would require higher inflation pressures, which will have an adverse effect on vehicle ride, leading to customer dissatisfaction especially on passenger cars.
 - ?? The Alliance commented that the subject of 88% load versus 85% load was discussed at length in 47 FR 36180, August 19, 1982. The 88% factor was not explicitly intended to provide a reserve load, but was used to account for the differences between actual on-road conditions and the lab test conditions. In the 1982 proposal, the agency said that NHTSA sees no reason why this correction factor would not be adequate in Standard No. 109. The Alliance is not aware of any more recent data to justify changing this correction factor.
 - ?? Ford agrees that tire robustness can be increased through additional load margin in the application or rating of tires. Studies conducted by Ford suggest that consumers drive on under-inflated and/or overloaded tires. Requiring that tires have additional load margins to anticipate such misuse would reduce the risk of tire failure for some customers.
 - ?? While the proposed 85% normal load will result in increased load margins at lighter loading conditions, Ford data indicate that tires do not become critically stressed at 85% rated load. Ford recommends that tires be tested at 105% of rated load for all vehicles under 10K lbs GVWR. The additional 5% reserve capability at the maximum rated load condition would provide increased robustness. This proposal has the added benefit of providing increased robustness to all consumers who purchase replacement tires, whereas the 85% normal load rule would affect only OE tires on new vehicles.
 - ?? Currently, in compliance with FMVSS 110, Subaru has vehicle normal loads of 56-81% of the tire maximum load rating. Subaru testing and product follow-up analysis shows that these tire applications function reliably and are more than adequate for both the FMVSS and real-world demands on their load-carrying capacity. For the 7 tire variants used on Subaru vehicles, 3 tires were 0.2 – 3.0% over the proposed limit on the front axle. For an additional 3 tire applications, the result was within the compliance limit but by less than 5%.
 - ?? GM has determined that 22% of its car and 6% of its light truck volumes would not comply with the proposed tire selection criteria. We have not had time to evaluate the impact on future-model vehicles, but we expect that a similar percentage of already designed future vehicles would need to be changed.
 - ?? RMA strongly supports the agency's proposal to retain the 1.10 de-rating of P-metric tires when used on SUVs, vans, pickup trucks and trailers. RMA believes that the changes from 88% of tire maximum load rating to 85% of tire load rating at placard

will reduce the potential for the overloading of tires. These changes are encouraging but inadequate when combined with a TPMS that allows tire pressure to drop 30% below placard before the driver is warned.

- ?? RMA commented that NHTSA should adopt a specific tire load reserve limit that requires the vehicle placard pressure to include a pressure reserve with at least as much as the pressure drop required to activate the TPMS selected by the vehicle manufacturer. RMA will submit a petition for such a rulemaking in the near future.

9. Effective Dates/Implementation

I. SUMMARY OF NPRM PROPOSAL

Alternative 1 - with Phase-in

- ?? P-metric tires: Beginning September 1, 2003, 50% of new P-metric tires must comply with new requirements;
- ?? P-metric tires: Beginning September 1, 2004, all new P-metric tires must comply with new requirements
- ?? LT tires: Beginning September 1, 2005, all new LT tires must comply with the new requirements

Alternative 2 - without Phase-in

- ?? P-metric tires: Beginning September 1, 2003, all new P-metric tires must comply with new requirements
- ?? LT tires: Beginning September 1, 2004, all new LT tires must comply with the new requirements

II. DOCKET COMMENTS

- ?? RMA supports an effective date for full compliance 5 years after the final rule.
- ?? Alliance supports a September 1, 2007 effective, with optional compliance to FMVSS 109 or 135 during that phase-in period. They want the agency to undertake further analysis of existing data and collect additional data as is needed to provide a sound scientific basis for the revised tire regulatory requirements that meet demonstrated safety needs. This would include research to: 1) establish the extent of tire failure; 2) determine the role of tire failure in crash causation; 3) determine the role of various factors such as loading, speed, and low inflation pressure in observed tire failures; 4) establish the correlation of aging, bead unseating, and road hazard impact tests to real world performance.
- ?? CU wants the new rule to be implemented as soon as possible.
- ?? Advocates supports neither implementation schedule. They believe that LT tires need to be improved just as quickly, if not more quickly, than P-metric tires and urge an effective date of September 1, 2002 for all tires to comply with the new requirements.

10. Cost and Benefits

I. SUMMARY OF PEA FOR NPRM

- ?? The agency estimates that the lowest price aftermarket tire will increase by the same margin as the lowest priced OE tire, \$3, to improve up to the performance levels required in the High Speed and Endurance Tests.
- ?? If the cost for these improved tires was spread across the entire new light vehicle fleet, the average new vehicle price increase would be \$4.09 per vehicle.
- ?? The agency anticipates that 32.8 percent of the combined sales of P-metric and LT tires would not pass the High Speed and Endurance Tests. There are an estimated 287 million light vehicle tires sold of which 32.8 percent might increase in price by \$3 per tire.
- ?? The overall annual cost of these two tests for new original equipment and replacement tires is estimated at \$282 million and the net costs per equivalent life saved would be about \$7.2 million.

II. DOCKET COMMENTS – SUMMARY

- ?? ETRTO believes that the cost analysis is largely underestimated.
- ?? RMA commented that the costs to manufacturers of compliance with this proposal are far beyond NHTSA's estimate of \$3 per tire. RMA estimates over \$1.5 billion in the first year alone, and in excess of \$400 million every year afterwards to maintain these tests. These estimates also do not include any tire manufacturers that are not members of RMA, which includes many small manufacturers and foreign manufacturers that import tires to the U.S.
- ?? The Alliance believes that the changes to upgrade the tire performance standards have not been justified and the PEA presents no compelling evidence. The agency has not adequately described how it developed the estimate of \$3 per tire for complying with the proposed tire upgrade.
- ?? GM believes that the cumulative costs at the vehicle level are dramatic, yet largely omitted from the PEA. GM and the Alliance both point out that the Agency has not taken into account the potential vehicle-level costs associated with this proposed rulemaking. The agency's estimate was an increase of \$3 to upgrade a tire that would fail our tests to a tire that would pass. They believe that consumers will not get their money's worth for many aspects of this NPRM.
- ?? GM stated that the load change from 88% to 85% would affect 22% of their passenger cars and 6% of their light trucks. They point out that there are numerous ways to resolve this including simply increasing the tire pressure, or selecting a higher load range tire. In some very limited conditions they report they will be required to select larger tires. This is the real cause for their concern.
- ?? CU commented that the demonstrated benefit of improved tire safety performance at less than one dollar per tire at retail is a good trade-off. An additional benefit stemming from this change would be that light trucks would also have the same reserve load as cars under normal loading conditions.