

million differential over the other options. RMA also stated that the industry has had little or no experience with this test methodology, although the test was suggested by Michelin, a member of RMA.

While RMA asserted that it finds an aging test redundant in light of the revised high speed, endurance, and low pressure tests, it did provide the agency with their suggestion for test parameters for the oven aging tests: (1) 70° C as the aging temperature instead of the proposed 75° C, and (2) three endurance steps of 4 hours at 85% load, 6 hours at 90% load, and 14 hours at 100% load.

The Alliance and Ford commented that the proposed aging tests cause the tire wedge to age anaerobically (caused by absence of oxygen), a condition that is not exhibited in ODI field data. Ford recommended a revised version of the agency's oven aging test using a 50/50 blend of oxygen/nitrogen as the filling gas and a 14 day duration in an oven followed by a dynamic test on a test wheel. Ford indicated that this test would simulate the performance of a tire oxidatively aged for 2–3 years.

ECE/GRRF suggested that the aging test be combined with the endurance test.

With regard to the 250-hour long-term durability endurance test, the agency does not have enough information to conclude that this test would be appropriate for regulatory purposes because of its length and resultant cost. Michelin has indicated that the test is most effective and provides better correlations at a duration of approximately 350–400 hours. This amount of time makes this test considerably more expensive than either a peel test or an oven aging test and would impose a large cost burden on the industry as well as a large regulatory burden on the agency's compliance testing. We cannot at present show that burden would be justified by the safety benefits.

The agency conducted Michelin-like dynamic aging testing (250-hour test inflated with oxygen-nitrogen mixture), oven aging testing, and adhesion strength testing. The parameters for the oven aging testing and adhesion strength testing are the same as those proposed by the agency. The data show that, in general, most of the tires completed the drum tests including the dynamic aging and oven aging tests. Three P-metric tires had catastrophic and partial damage failures during the dynamic aging tests, and two other P-metric tires had failures during the oven aging test. The adhesion data demonstrate a wide range of results from a low of 19.9 lbs/in to a high of

76.9 lbs/in adhesion strength between the tire belts. From these data, however, the agency has been unable to draw any definite correlations of tire conditioning on adhesion strength. A report that more fully discusses these data and analysis is contained in the Docket (NHTSA–02–8011–27).

The agency has decided to defer rulemaking on an aging test until further research is completed. The agency intends to develop and propose an oven-aging test for FMVSS No. 139 in approximately 2 years. In developing an oven-aging test, the agency will consider the recommendations submitted to the agency including those mentioned above pursuant to refining both the static and dynamic components of the test. Additionally, the agency will assess the performance of the test tires and tires in the field to assure that the test correlates with the field data. The agency has opened a docket for the collection of information relevant to tire aging (Docket No. NHTSA–2002–13865).

After analysis and consideration of the comments, as well as results from agency's own testing, the agency concurs with commenters that the peel test is not appropriate to pursue at this juncture. With regard to the peel test, RMA commented that its testing indicated an inverse correlation between peel strength and a tire's endurance. In the agency's testing, some tires that demonstrated a low peel strength value performed well under the proposed endurance parameters, while some tires that exhibited high peel strength values failed to complete the proposed endurance test. These results, along with RMA's suggestion that the peel test proposal evaluates a tire's belt compound for ultimate tensile strength in a non-aged state but does not simulate long-term duration of field exposure, has led the agency to determine that a peel test is not sufficiently useful for evaluating tire aging to be included in the standard as a performance requirement.

The agency acknowledges that, during the Firestone hearings, members of Congress suggested that an aging test could evaluate the risk of tire failure at a period later in the life of a tire than the period tested by the current endurance test. Additionally, reports (Clark, Govindjee) resulting from the Ford-Firestone investigation recommended that the agency should consider instituting an aging test in its revised regulation because of the known degradation of peel strength with time and temperature. For several reasons, the agency has been unable, during the limited time available, to develop a

workable aging test with the capacity to enhance real world safety.

At present, an industry-wide recommended practice for the accelerated aging of tires does not exist. With the exception of Michelin, the tire industry did not respond to the agency's request in the NPRM for information on corporate design and testing specifications. Additionally, the agency did not acquire sufficient test data and field data to enable it to evaluate the performance of an aging test and determine whether correlations exist in the data. Recently, however, some industry members have begun a dialogue and offered to share data with the agency.

7. Post-Test Pressure Measurement

For the high speed, endurance, and low inflation pressure performance tests, the NPRM proposed that the inflation pressure be measured within 15 minutes after the completion of the specified test. Any decrease in pressure from the initial inflation pressure would signify failure. The agency had borrowed the 15 minute specification from GTS–2000 and because it represented what the agency thought was a more objective criterion than the current requirement in 109 for measurement to be taken “immediately” after the test.

In response to the proposal, RMA, citing safety reasons, urged the agency to revise the time-period for measurement to specify that it be taken within an hour. According to RMA, requiring measurement of the temperature of a hot tire, which must be performed manually, within 15 minutes of test completion subjects the technician to great danger due to the risk of tire explosion. Additionally, RMA argued that the additional time for measurement would not unfairly bias the success rates of the tires being tested because the inflation pressure would reduce, rather than increase, over time as the tire cools. Therefore, it is more likely that a tire tested within 15 minutes of completion of a test would contain the requisite amount of pressure necessary to pass the test than a tire tested at closer to 1 hour after completion of the test.

The agency conducted experiments at VRTC concerning post-testing pressure measurements. These tests indicated tires require longer than 15 minutes for the pressure inside of them to stabilize after a performance tests and that a span of 1 hour after testing provides sufficient time to allow cooling of the tire and stabilization of its internal pressure. Measurements taken before the end of the 1-hour period may be