

provided with any, that suggest that light trucks equipped with LT tires are operated at lower speeds than light trucks equipped with P-metric tires. In fact, tire industry data indicate that light truck owners choose LT tires as replacement tires more often than the installation rate for LT tires by the OE vehicle manufacturer. (*Modern Tire Dealer* (<http://www.mt.dealer.com>), *RMA Factbook 2002*)

The agency is also adopting a 2-hour break-in period for the test. Current FMVSS No. 109 requirements include a 2-hour break-in. The NPRM proposed a 15-minute break-in for the test, essentially because RMA had indicated in connection with GTS-2000 that a break-in period was unnecessary. Since that time, RMA has reversed its position on this issue based on its high speed testing. Additionally, the agency, based on its own testing and experience with the 2-hour break-in period believes that this length of break-in enhances test repeatability by making the surface of the tire consistent, e.g., removing tire "whiskers" from the tire tread surface.

e. Duration

RMA's suggested 10-minute durations at each speed step (10-minute speed build-up from 0 km/h to ITS, then three 10-minute speed steps and one 20-minute speed step).

Agency testing indicates that 10 minutes is too short a period to provide a proper evaluation of high-speed performance. Very few failures occurred in the agency's testing using the 10-minute duration for speed steps. Additionally, RMA indicated in its DOE

that the tire temperature generally stabilized within 15 minutes for any given set of test conditions. RMA's suggestion also reduced the duration in FMVSS No. 109 by almost 50 percent.

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

2. Endurance Test

The agency is adopting an endurance test for FMVSS No. 139 to be conducted using the following five parameters:

- (1) *Ambient Temperature*: 38° C.
- (2) *Load*: 85/90/100 percent.
- (3) *Inflation Pressure*: 180 kPa (26 psi) for standard load P-metric; 220 kPa (32 psi) for extra load P-metric; 260 kPa (38 psi), 340 kPa (49 psi), 410 kPa (59 psi) for LT load ranges C, D, E, respectively.
- (4) *Speed*: 120 km/h.
- (5) *Duration*: 34 hours total—4 hours at 85 percent load, 6 hours at 90 percent load, and 24 hours at 100 percent load.

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

This combination of these parameters for P-metric tires is believed to correlate well with actual field performance and

represents an increase in stringency over FMVSS No. 109's endurance test with a 50 percent increase in speed.

Two alternatives to the proposed test parameters were considered by the agency, that submitted by RMA and that submitted by Goodyear. The RMA alternative includes no change in the load combination of 85/90/100 percent and duration from the current standard, FMVSS No. 109, retains the 120 km/h from the agency proposal for P-metric tires but a lower speed (110 km/h) for LT tires, and recommends increasing the inflation pressure for LT tires. The Goodyear alternative is similar to RMA's except that they suggest a test speed of 104 km/h and do not adjust down the inflation pressures for LT tires. Both of these tests, especially the Goodyear test, demonstrate a lower failure rate than the agency's tests.

The agency adopts an endurance test that has parameters different from those proposed in the NPRM. The load decrease of 10% from the proposed loading level represents an offset of the effects of the test wheel. Further, the agency notes that the increase in duration of the final load step from 22 hours in the proposal to 24 hours combined with the adopted test speed of 120 km/h represents an increase in the total test distance from 2720 km (1700 miles) to 4080 km (2550 miles).

The following table provides a comparison of the endurance test parameters used in FMVSS No. 109, FMVSS No. 119, RMA recommendation, and FMVSS No. 139.

TABLE 3—ENDURANCE TEST COMPARISON

| Test parameters | FMVSS 109 | FMVSS 119 | RMA | Goodyear | Proposed FMVSS 139 | FMVSS No. 139 As adopted |
|------------------------------|-------------------|-------------------|----------------------------------|--------------------|--------------------|--------------------------|
| Ambient (°C) | 38 | 38 | 38 | 38 | 40 | 38 |
| Load (%): | | | | | | |
| P-metric | 85/90/100 | | 85/90/100 | 85/90/100 | 90/100/110 | 85/90/100 |
| LT-load C/D | | 75/97/114 | 85/90/100 | 85/90/100 | 90/100/110 | 85/90/100 |
| LT-load E | | 70/88/106 | 85/90/100 | 85/90/100 | 90/100/110 | 85/90/100 |
| Inflation Pressure (kPa): | | | | | | |
| Standard load P-metric | 180 | | 180 | 180 | 180 | 180 |
| Extra load P-metric | 220 | | 220 | 220 | 220 | 220 |
| LT-load C/D | | max infl | 285/370 | 260/340 | 260/340 | 260/340 |
| LT-load E | | max infl | 450 | 410 | 410 | 410 |
| Speed (km/h) | 80 | 80 | 120 (75 mph) (110 km/h for LTs). | 104 (65 mph) | 120 (75 mph) | 120 (75 mph) |
| Duration (hrs) | 34 (4/6/24) | 34 (4/6/24) | 34 (4/6/24) | 40 (8/10/22) | 40 (8/10/22) | 34 (4/6/24) |

a. Ambient Temperature

The agency has decided to lower the ambient temperature to 38° C from the 40° C proposed in the NPRM for the same reasons cited in the high speed test discussion.

b. Load

In its comments to the NPRM, RMA recommended an endurance test using lower loads, 85/90/100 percent of maximum load rating for 34 hours for

both P-metric and LT tires due to high percentages of failures due to chunking.

Goodyear commented that (1) heat induced damage mode (Tread Chunking) exhibited in proposed FMVSS No. 139 endurance testing is not