



Tire Bead Unseating Test

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. To test the bead unseating performance of tubeless tires on the rim during cornering and incremental reduction of tire pressure.

1.2 Applicability. For all tires intended for production which are also acceptable for the automated production assembly.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW16590

2.3 Additional References.

Component Test Specification (CTS)

3 Resources

3.1 Facilities. Skid pad on the Dudenhofen Proving Ground with a 50 m concrete circular track or equivalent.

3.2 Equipment.

3.2.1 Ballast to simulate permissible total weight (sand bags, water-filled dummies).

3.2.2 Two (2) new test tires.

3.2.3 Two (2) new, production intent rims meeting the appropriate dimensional specifications. When applicable, one steel and one light-alloy rim will be required.

3.2.4 External speed display or calibrated speedometer.

3.3 Test Vehicle/Test Piece.

3.3.1 A vehicle with the highest front axle load, highest front Gross Axle Weight Rating (GAWR), within the relevant model series shall be used.

3.3.2 If the rim contours of the steel and light-alloy rims are identical, the test shall be performed with one steel and one light-alloy rim. In the case of dissimilar rim contours, two steel and two light-alloy rims shall be tested.

3.4 Test Time.

Calendar time: 1 day

Test hours: 6 hours

Coordination hours: 2 hours

3.5 Test Required Information. Not applicable.

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3.6 Personnel/Skills. Personnel shall possess the required certifications as necessary to execute the test procedure on the track as indicated by this procedure. No specific tire and wheel knowledge is required beyond that normally possessed by an experienced test technician.

4 Procedure

4.1 Preparation.

4.1.1 The test tire shall be mounted on the test wheel within 5 h of the test following safe mounting guidelines.

4.1.1.1 Production intent lubricant shall be used during the mounting process.

4.1.1.2 Only a thin film of lubricant should be used during the mounting process as excessive lubricant can affect the test results.

4.1.1.3 The vehicle, with test assemblies, shall not be driven prior to the bead unseating test.

4.1.2 The vehicle shall be loaded to permissible total weight at maximum front axle load (± 10 kg), front GAWR. The total vehicle mass should be near the Gross Vehicle Weight Rating (GVWR) (± 20 kg).

4.1.2.1 Light trucks, vans and crossover vehicle types shall have simulated passengers (68 kg) near each seating location. Additional ballast is then to be added as water-level ballast in the cargo area, behind the driver seating area and in front of the rear axle, until GVWR or a front or rear GAWR is reached. If the front GAWR is reached first, then continue ballasting as required to reach GVWR. Additional ballast is to be placed such that it does not change the front axle load.

4.1.3 The test assembly shall be installed on the front axle outboard position. For example, mount the test assembly on the right front position when testing is performed while driving the vehicle in a counterclockwise direction around the circular course.

4.1.4 Adjust the tire inflation pressure to the value specified for partial vehicle load, when applicable, as indicated on the vehicle placard.

4.2 Conditions.

4.2.1 Environmental Conditions. The test surface shall be dry.

4.2.2 Test Conditions. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

4.3 Instructions.

4.3.1 Check and adjust the inflation pressure in all the tires on the vehicle to the appropriate values, setting the inflation pressure in the test assembly as indicated above in 4.1 Preparation.

4.3.2 The vehicle shall be driven onto the circular track (radius = 25 m) at a tangent, without turning in suddenly, and shall be driven three (3) laps evenly, with as little steering correction as possible.

4.3.2.1 The target speed on the circular track is 55 km/h.

4.3.2.2 Many factors may limit the maximum achievable speed during this test. If the target speed of 55 km/h cannot be sustained evenly with limited steering correction, the speed shall be reduced to the point where limited steering correction is needed during the test.

4.3.3 Stop the vehicle and record the inflation pressure in the test assembly.

4.3.4 The inflation pressure in the test assembly shall be systematically reduced and three (3) laps completed at each pressure as described in Table 1. If excessive heating of the tread surface is occurring during the three (3) lap segments, the tire should be cooled between each inflation pressure. The test inflation pressure for each segment shall be set immediately before driving the three (3) laps on the circular track.

4.3.4.1 Calculate the Maximum Theoretical Rebound Pressure (MTRP). The MTRP is equal to two-thirds ($\frac{2}{3}$) of the relevant partial load tire pressure (placard inflation pressure). For example, a front axle partial load tire pressure of 180 kPa will result in a MTRP of 120 kPa ($\frac{2}{3} \times 180$ kPa).

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