



Tire Sealant Fleet 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 determine sealant tire puncture sealing efficiency in a fleet test environment.

1.2 Applicability. The test applies to passenger car tires and to punctures for which sealant technology is deemed appropriate.

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

3 Resources

3.1 Facilities.

3.1.1. Test areas. Perform the test in a location expected to have puncturing objects representative of the intended usage market.

3.1.2 Alternatives. Alternative test facilities and equipment may also be used. However, any method deviations must be pre-approved by GM prior to performing the test.

3.2 Equipment.

3.2.1 Production wheels appropriate for the test tire, per Tire and Rim Association (T&RA) or equivalent standardizing organization.

3.2.2 Suitable fleet of vehicles, sufficiently large to support at least 100 test tires. The fleet will be preferably a taxi fleet or another type of fleet with similar usage.

3.2.3 An important consideration when selecting the test fleet is the ability to adequately meet the distance accumulation and timing requirements for the test.

3.3 Test Vehicle/Test Piece.

3.3.1 The minimum sample size for this test is 100 tires; 50 control tires and 50 sealant tires.

3.3.2 The control tires and the sealant tires are to be identical in all respects with the exception of the addition of the sealant material to the sealant tires.

3.3.3 The control tires and the sealant tires are to have the same build codes, including the same date of manufacture.

3.3.4 The control tires and sealant tires are to visually appear identical to prevent any possible data bias.

3.4 Test Time.

3.4.1 The test time is dependent upon the total exposure the test requester desires to evaluate.

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3.4.2 Typical tests will run for a given amount of time, (e.g., 6 months), or for a specific distance accumulation, (e.g., 50 000 km), distribution within the results.

3.5 Test Required Information.

3.5.1 The following information regarding the tire must be provided in order to facilitate the test:

- Construction number.
- Tire size.
- Service description.
- Supplier (manufacturer).
- Load rating.

3.5.2 The following information related to the desired test conditions must also be specified:

- Rim width.
- Inflation pressure.

3.6 Personnel/Skills. Test technician/engineer with valid driver's license and experience running sealant tests. Refer to 3.2.2 for further description on the volume of test.

4 Procedure

4.1 Preparation.

4.1.1 Mount the tires on the suitable production wheels.

4.1.2 Dynamically balance tire and wheel assemblies.

4.1.3 Set inflation as specified on test vehicle or as directed on the tire test request.

4.1.4 Each tire must be uniquely identified with markings visible on the outside of the tire.

4.1.5 Each tire is to be assigned to a specific vehicle and to a specific position on that vehicle.

4.1.6 Test tires are not to be rotated between vehicles or to different positions on the vehicle.

4.1.7 Test tires are to be installed in sets of four (4) on the vehicle. A single test vehicle should have all control tires or all sealant tires.

4.1.8 Sealant and control tire groups must be run concurrently.

4.2 Conditions.

4.2.1 Environmental Conditions.

4.2.1.1 Ambient Temperature. The fleet location should be such that the test will include some cold weather ($< 0^{\circ}\text{C}$) and some hot weather ($> 30^{\circ}\text{C}$) content.

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.

4.2.2.1 The inflation pressure of the test tires may be different than specified on the test vehicle's placard because the projected usage of the tire may differ from that of the test vehicle.

4.2.2.2 Loading conditions will be dictated by the type of fleet chosen for the testing. A taxi cab fleet is preferred and, therefore, the loading will vary as the vehicle completes its daily tasks.

4.2.2.3 The test route will also be dictated by the type of fleet, as well as the location of that fleet. This test procedure does not prescribe the route, only the exposure of the test tires to a real-world environment.

4.3 Instructions.

4.3.1 Daily Vehicle Operation.

4.3.1.1 Vehicles are to be operated in a manner consistent with the fleet's normal operation.

4.3.1.2 Maintain specified inflation pressure for the duration of the test. Record daily pressure checks on Appendix A, Data Sheet A1. The supplier shall work with the GM Lead Engineer to comprehend these requirements.

4.3.2 Tire Repair.

4.3.2.1 Every attempt should be made to list chronological history of road hazard events for each test tire.

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4.3.2.2 As road hazard events occur, record each event occurrence in the comments sections of the Appendix A Data Sheet A1.

4.3.2.3 Record the following information relative to each road hazard event on the Appendix B Data Sheet B1. The supplier shall work with the GM Lead Engineer to comprehend these requirements. This information will include the following:

- Date of occurrence.
- Vehicle odometer reading.
- Tire position on the vehicle.
- Description of the road hazard.
- Location of road hazard on the tire.
- If the tire was repaired.
- Type of repair method used.
- If the tire was removed from test.
- Inflation Pressure.

4.3.2.4 Any test tire disabled by a road hazard must be visually inspected to determine if it is repairable.

4.3.2.5 Repair procedure should be consistent with those used by fleet operator. Repairs to both sealant and control tires shall be made using the same procedures.

4.3.2.6 After repair is completed, reinstall the test tire on same vehicle in the same position from which it was removed. Record on the Appendix B, Data Sheet B1 that the tire was returned to test and note the vehicle odometer reading.

4.3.3 Tire Removal from Test.

4.3.3.1 The following conditions constitute tire removal from test. Either one of the following conditions will prevent the tire from continuing test distance accumulation.

4.3.3.1.1 Road hazard determined not to be repairable.

4.3.3.1.2 Tread wearout, as described in 7.1.

4.3.3.2 Record the removal of the test tire on the Appendix A Data Sheet A1.

4.3.4 End of Test.

4.3.4.1 The end of test is reached when the total exposure of the sealant design to the selected environment has been achieved. All test distance accumulation is stopped at this point.

4.3.4.1.1 Judgment will likely be required to determine when to stop the physical testing. While the goal is to accumulate as much distance as possible on each test tire, the variable nature of fleet testing may not provide the desired exposure for all test tires.

4.3.4.2 Complete the data entries on the Appendix A, Data Sheet A1 for all test tires which have not been previously removed from test.

4.3.4.3 Remove all test tire and wheel assemblies from vehicles.

4.3.4.4 Dismount all test tires from the test wheels.

4.3.5 Final Inspection of Tires.

4.3.5.1 All test tires must be inspected after removal from test. Record all visible repairs and related road hazard information on the Appendix B, Data Sheet B1.

4.3.5.2 X-ray inspection of the test tires is recommended. Most road hazards leave permanent deformations in the tire belts and are easily seen with x-ray analysis. Record findings on the Appendix B, Data Sheet B1.

5 Data

5.1 Calculations.

5.1.1 Tabulate the number of repairs for each tire test group, sealant and control, from the Appendix B Data Sheet B1.

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