



## **Tire Sealant Static Creep 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 static imbalance of a sealant tire caused by sealant creep (dislocation) in a high temperature environment.

**1.2 Applicability.** This procedure applies to passenger car tires 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

#### **2.3 Additional References.**

- European Tyre and Rim Technical Organisation (ETRTO) Year Book, Brussels, Belgium ([www.etrto.org](http://www.etrto.org))
- The Tire and Rim Association Incorporated (T&RA) Year Book, Copley, Ohio ([www.us-tra.org](http://www.us-tra.org))

### **3 Resources**

**3.1 Facilities.** Tire testing laboratory with a 1.7 m, or greater, diameter road wheel dynamometer.

#### **3.2 Equipment.**

**3.2.1** Wheels appropriate for testing the tire per the appropriate published tire standards (e.g., The Tire and Rim Association, Incorporated (T&RA) Year Book, European Tyre and Rim Technical Organisation (ETRTO) Year Book, or equivalent).

**3.2.2** An oven capable of accepting at least one (1) tire-wheel assembly, and temperature capability of 72 °C.

**3.2.3** Static tire balance equipment.

**3.2.4** Tire mounting equipment.

#### **3.3 Test Vehicle/Test Piece.**

**3.3.1** Tires with sealant applied using production equipment.

**3.3.2** Minimum of two (2) sealant tires must be tested.

#### **3.4 Test Time.**

Calendar time: 3 days

Test hours: 49 hours

Coordination hours: 1 hour

**3.5 Test Required Information.** Not applicable.

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**Documents**

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**3.6 Personnel/Skills.** Dynamometer operators must be trained in the proper set up and operation of the equipment and this test procedure.

## 4 Procedure

### 4.1 Preparation.

**4.1.1** Mount sealant tires on test wheels following acceptable mounting procedures.

**4.1.2** Inflate sealant tire to the test inflation pressure shown in Table 1, and place in a room temperature environment to thermally equilibrate prior to beginning the test.

### 4.2 Conditions.

**4.2.1 Environmental Conditions.** Not applicable.

**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.

**4.2.3** Test inflation pressure is specified in Table 1. These pressures result from a consideration of both the maximum sidewall markings and expected usage pressures and commonization across various tire standards.

**Table 1: Test Inflation Pressure**

| Tire Type and Load Range     | Cold Inflation Pressure (kPa) |
|------------------------------|-------------------------------|
| <b>Passenger Car</b>         |                               |
| Standard Load and Light Load | 250                           |
| Extra Load or Reinforced     | 290                           |

### 4.3 Instructions.

**4.3.1** Record the information on Data Sheet A1, Appendix A.

**4.3.2** Reset the inflation pressure to the test inflation pressure, cap the valve stem, and record the pressure on the data sheet. No further inflation pressure adjustments are necessary.

**4.3.3** Statically balance tire-wheel assembly. Record any residual static imbalance.

**4.3.4** Place the tire-wheel assembly into the oven in the upright position, with the valve stem at the lowest point. This position orients the gravitation force the same as if the tire was mounted on a vehicle. The tire may be either suspended or rested on the tread.

**4.3.5** Set the oven to 72 °C, recording the set point on Data Sheet A1, Appendix A.

**4.3.6** Soak the tire-wheel assembly at this temperature for 48 h.

**4.3.7** Remove the tire-wheel assembly from the oven, while maintaining the upright orientation with the valve stem at the lowest point.

**4.3.8** Allow test assembly to cool to ambient temperature to facilitate comfortable handling by a person.

**4.3.9** Measure the final tire-wheel static imbalance using the static balance equipment and record on Data Sheet A1, Appendix A.

**4.3.10** Measure and record the final inflation pressure on the Data Sheet A1, Appendix A.

**4.3.11** Record the average oven temperature during the 48 h soak period on Data Sheet A1, Appendix A.

## 5 Data

**5.1 Calculations.** Not applicable.

**5.2 Interpretation of Results.** Sealant tire-wheel assembly must not change by more than 7200 g-mm of static imbalance due to this tire sealant static creep test.

**5.3 Test Documentation.** The test results documentation should include the following:

- Test results report
- Test result data files (Extensible Markup Language (XML) format)

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- Completed datasheet(s)

A sample is shown in Data Sheet A1, Appendix A and a sample report is shown in Table B1, Appendix B.

**Note:** For data being loaded into the Global Tire-Wheel Test System (GTWTS), submit electronically the test result's data files (XML format) and other supporting files listed. GMW16590 defines the electronic file details, (e.g., file types, file naming convention, and detailed file formats) for the GTWTS.

## 6 Safety

This Engineering Standard may involve safety requirements for hazardous materials, the method of operations and equipment. This standard does not propose to address all the safety issues associated with its use. It is the responsibility of the user of this standard to ensure compliance with all appropriate safety and health practices. This would include any specific training that may be required. The safety and health standards include site specific rules and procedures, company rules and procedures, and Government Standards. Contact shall be made with the appropriate site Safety and Health personnel for further direction and guidance in these matters.

## 7 Notes

### 7.1 Glossary.

Sealant Tire: A tire equipped with sealant, either applied directly over the inner liner or built into tire.

### 7.2 Acronyms, Abbreviations, and Symbols.

|                 |                                              |
|-----------------|----------------------------------------------|
| <b>DOT</b>      | Department of Transportation                 |
| <b>ETRTO</b>    | European Tyre and Rim Technical Organisation |
| <b>g-m</b>      | grams-meter                                  |
| <b>g-mm</b>     | grams-millimeter                             |
| <b>GSSLT</b>    | Global Subsystem Leadership Team             |
| <b>GTWTS</b>    | Global Tire-Wheel Test System                |
| <b>ID</b>       | Identification                               |
| <b>PQMS</b>     | Performance and Quality Management System    |
| <b>T&amp;RA</b> | The Tire and Rim Association, Incorporated   |
| <b>TIP</b>      | Test Improvement Process                     |
| <b>TR</b>       | Test Request                                 |
| <b>XML</b>      | Extensible Markup Language                   |

## 8 Coding System

This standard shall be referenced in other documents, drawings, etc., as follows:

Test to GMW15144

## 9 Release and Revisions

This standard was originated in February 2006. It was first approved by the Tire Global Subsystem Leadership Team in July 2006. It was first published in December 2006.

| Issue | Publication Date | Description (Organization)                                                                                                      |
|-------|------------------|---------------------------------------------------------------------------------------------------------------------------------|
| 1     | DEC 2006         | Initial publication.                                                                                                            |
| 2     | SEP 2011         | Five year refresh. Revisions: Simplified Table 1 and added GTWTS report and references. (Tire Global Subsystem Leadership Team) |
| 3     | SEP 2016         | Revised to current template. (Chassis Tire and Wheel Global Subsystem Leadership Team (GSSLT))                                  |

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