



Standard Test Method for Electrical Resistance of Tires Under Load On the Test Bench¹

This standard is issued under the fixed designation F1971; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers the measurement of the electrical resistance between the wheel of a mounted and inflated tire-wheel assembly and a flat conducting surface in loaded contact with the tire.

1.2 This test method specifies procedures and equipment such that electrical resistance can be accurately determined for tires with values up to $10^{12} \Omega$ (ohms).

1.3 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

F538 Terminology Relating to the Characteristics and Performance of Tires²

2.2 Other Standards:

The Tire and Rim Association Inc. Yearbook (TRA), current issue³

The European Tyre and Rim Technical Organization (ETRTO), current issue⁴

The Japan Automobile Tire Manufacturers Association, Inc.

Yearbook (JATMA), current issue⁵

International Standard ISO 16392 Electrical Resistance—Test Methods to Measure the Electrical Resistance of Tyres on a Test Rig⁶

Wirtschaftsverband der deutschen Kautschukindustrie e.V. (W.d.K) 110 Measurement of the Electrical Resistance of Tyres

3. Terminology

3.1 Definitions:

3.1.1 *connection point, n*—any point on the wheel or metal loading plate where the resistance measuring instrument's leads are connected. **F538**

3.1.2 *rim, n*—the specially shaped circular periphery to which a tire may be mounted with appropriate bead fitment. **F538**

3.1.3 *test load, n*—the force applied to a tire through the rim; it is normal to the metal loading plate onto which the tire is loaded. **F538**

3.1.4 *tire electrical resistance, n*—the electrical resistance in ohms (Ω) measured between the wheel of a mounted and inflated tire-wheel assembly and a metallic plate onto which the tire is loaded at a specified load. **F538**

3.1.5 *wheel, n*—a rigid structure consisting of a rim connected to a central disk that permits rotationally centered attachment to an axle. **F538**

3.1.6 For additional definitions of terms used in this test method, refer to Terminology **F538**.

4. Summary of Test Method

4.1 The electrical resistance of an inflated tire-wheel assembly (see **Note 1**) is measured between the wheel and the conducting surface against which the tire is loaded. This measurement involves the use of an appropriate resistance meter and voltage application system, as well as a special test fixture or measuring stand.

¹ This test method is under the jurisdiction of ASTM Committee **F09** on Tires and is the direct responsibility of Subcommittee **F09.30** on Laboratory (Non-Vehicular) Testing.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from the Tire and Rim Association, Inc., 175 Montrose West Ave., Suite 150, Copley, OH 44321.

⁴ Available from the European Tyre and Rim Technical Organization, 32/2 avenue Brugmann, B-1060 Brussels, Belgium.

⁵ Available from the Japan Automobile Tire Manufacturers Association, No. 33 Mori Building, 8th Floor, 3-8-21 Toranomon, Minato-Ku, Tokyo, Japan 105-0001.

⁶ Available from International Organization for Standardization (ISO), 1 rue de Varembe, Case postale 56, CH-1211, Geneva 20, Switzerland.