



Standard Test Methods for Single-Filament Tire Bead Wire Made from Steel¹

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1. Scope

1.1 These test methods cover testing of single-filament steel wires that are components of tire beads used in the manufacture of pneumatic tires. By agreement, these test methods may be applied to similar filaments used for reinforcing other rubber products.

1.2 These test methods describe test procedures only and do not establish specifications and tolerances.

1.3 These test methods are written in SI units. The inch-pound units which are provided are not necessarily exact equivalents of the SI units. Either system of units may be used in these test methods. In case of referee decisions the SI units will prevail.

1.4 These test methods cover the determination of the mechanical properties listed below:

1.5 *This standard does not purport to address all of the safety problems, 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.*

Property	Section
Breaking Force (Strength)	7-13
Yield Strength	7-13
Elongation	7-13
Torsion Resistance	14-20
Diameter (Gage)	21-27

2. Referenced Documents

2.1 ASTM Standards:

A 370 Test Methods and Definitions for Mechanical Testing of Steel Products²

D 76 Specification for Tensile Testing Machines for Textiles³

D 123 Terminology Relating to Textiles³

D 2969 Test Method for Steel Tire Cords³

E 6 Terminology Relating to Methods of Mechanical Testing⁴

E 558 Test Method for Torsion Testing of Wire⁴

3. Terminology

3.1 Definitions:

3.1.1 *breaking force, n*—the maximum force applied to a material carried to rupture.

3.1.2 *percent elongation, n*—the increase in length of a specimen expressed as a percentage of the original length.

3.1.3 *tire bead, n*—that part of a tire that comes in contact with the rim and that is shaped to secure the tire to the rim.

3.1.4 *tire bead wire, n*—a monofilament steel wire with a metallic coating, usually bronze, used in forming a tire bead.

3.1.5 *torsion resistance, n*—in tire bead wire, the number of turns of twist in a short length of wire that causes rupture.

3.1.6 *yield strength, n*—the stress at which a material exhibits a specified limiting deviation from the proportionality of stress to strain.

3.1.6.1 *Discussion*—It is customary in this instance to express the deviation in terms of strain and to determine yield strength by the offset method where a strain of 0.2 % is specified (see 10.9.1).

3.1.7 For definitions of other textile terms, refer to Terminology D 123.

4. Summary of Test Methods

4.1 A summary of the directions prescribed for the determination of specific properties of tire bead wire is stated in the appropriate sections of the specific test methods that follow.

5. Significance and Use

5.1 The procedures for the determination of properties of single-filament bead wire made from steel are considered satisfactory for acceptance testing of commercial shipments of this product since the procedures are the best available and have been used extensively in the trade.

5.1.1 In case of a dispute arising from differences in reported test results when using these test methods for acceptance testing of commercial shipments, the purchaser and supplier should conduct comparative tests to determine if there is a statistical bias between their laboratories. Competent statistical assistance is recommended for the investigation of bias. As a minimum, the two parties should take a group of test specimens which are as homogeneous as possible and which are from a lot of material of the type in question. The test specimens then should be randomly assigned in equal numbers to each laboratory for testing. The average results from the two laboratories should be compared using Student's *t*-test for

¹ These test methods are under the jurisdiction of ASTM Committee D-13 on Textiles and are the direct responsibility of Subcommittee D13.19 on Tire Cord and Fabrics.

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² Annual Book of ASTM Standards, Vol 01.03.

³ Annual Book of ASTM Standards, Vol 07.01.

⁴ Annual Book of ASTM Standards, Vol 03.01.