



# Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers<sup>1</sup>

This standard is issued under the fixed designation D 624; 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 (€) indicates an editorial change since the last revision or reapproval.

*This standard has been approved for use by agencies of the Department of Defense.*

€<sup>1</sup> NOTE—The table in Fig. 1 on DIE C was corrected editorially in March 2001.

## 1. Scope

1.1 This test method describes procedures for measuring a property of conventional vulcanized rubber and thermoplastic elastomers called tear strength.

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

1.3 *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:

D 412 Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers – Tension<sup>2</sup>

D 1349 Practice for Rubber— Standard Temperatures for Testing<sup>2</sup>

D 3182 Practice for Rubber— Materials, Equipment, and Procedures for Mixing Standard Compounds and Preparing Standard Vulcanized Sheets<sup>2</sup>

D 3183 Practice for Rubber— Preparation of Pieces for Test Purposes from Products<sup>2</sup>

D 3767 Practice for Rubber— Measurement of Dimensions<sup>2</sup>

D 4483 Practice for Determining Precision for Test Method Standards in the Rubber and Carbon Black Industries<sup>2</sup>

### 2.2 ISO Standard:

ISO/34 Rubber, Vulcanized – Determination of Tear Strength (Trouser, Angle, and Crescent Tear Pieces)<sup>3</sup>

## 3. Terminology

3.1 The tear of rubber is a mechanical rupture process initiated and propagated at a site of high stress concentration

caused a cut, defect, or localized deformation. The following definitions define different techniques for measuring the resistance to tear, i.e. the tear strength, required for use with this standard.

### 3.2 Definitions of Terms Specific to this Standard:

3.2.1 *Type A tear strength*—the maximum force required to cause a nick or cut in a Type A (nicked crescent) test piece to grow by tearing the rubber, divided by the thickness of the test piece.

3.2.2 *Type B tear strength*—the maximum force required to cause a nick or cut in a Type B (nicked tab end) test piece to grow by tearing the rubber, divided by the thickness of the test piece.

3.2.3 *Type C tear strength*—the maximum force required to cause a rupture of a Type C (right angle) test piece, divided by the thickness of the test piece.

3.2.4 *Type T or trouser tear strength*—the mean or median force, calculated in accordance with procedures in this method, required to propagate a tear in a Type T (trouser) test piece, divided by the thickness of the test piece.

3.2.5 *Type CP or constrained path tear strength*—the mean or median force, calculated in accordance with procedures in this method, required to propagate a tear in a type CP (constrained path) test piece, divided by the thickness of the torn section.

3.2.6 *complete trace*—the section of a graphical plot of force versus jaw separation distance between the point at which the first peak occurs and the point at which the test is terminated.

3.2.7 *peak*—a point at which the slope of a trace changes from positive to negative.

3.2.8 *range*—the difference between the greatest and the smallest observed test values.

3.2.9 *valley*—a point at which the slope of a trace changes from negative to positive.

## 4. Summary of Test Method

4.1 A tearing strain (and stress) is applied to a test specimen by means of a tensile testing machine operated without interruption at a constant rate of crosshead traverse until the specimen is completely torn.

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D11 on Rubber and is the direct responsibility of Subcommittee D11.10 on Physical Testing.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 09.01.

<sup>3</sup> Available from American National Standards Institute, 11 West 42<sup>nd</sup> St., 13th Floor, New York, NY 10036.