



Designation: D 3121 – 05

Standard Test Method for Tack of Pressure-Sensitive Adhesives by Rolling Ball¹

This standard is issued under the fixed designation D 3121; 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 measurement of the comparative tack of pressure-sensitive adhesives by a rolling ball and is most appropriate for low-tack adhesives. This test method is only one of several available for the measurement of tack.

1.1.1 This test method is not recommended for the specification of end use products.

1.2 Values stated in either SI or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents, therefore, each system must be used independently without combining values in any way.

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:*²

D 907 Terminology of Adhesives

E 171 Specification for Standard Atmospheres for Conditioning and Testing Flexible Barrier Materials

D 5750/D 5750M Guide for Width and Length of Pressure-Sensitive Tape

3. Terminology

3.1 *Definitions*—Many of the terms found in this test method are defined in Terminology D 907.

4. Summary of Test Method

4.1 In the determination of tack by the rolling-ball method, a steel ball is released at the top of an incline, allowed to accelerate down the incline and roll on to a horizontal surface covered with a pressure-sensitive adhesive. Tack is determined

by measuring the distance that the ball travels across the adhesive before stopping. There are two major retarding forces applied by the adhesive to the ball: (1) the adhesion between the ball and the adhesive, often called “grab,” and (2) the “plowing effect” or energy required to push the adhesive out of the ball’s path.

4.2 Test results are influenced by (1) adhesive film thickness, (2) bond of adhesive to backing, and (3) backing rigidity, so these factors must be carefully controlled for satisfactory comparisons.

5. Significance and Use

5.1 The rolling-ball tack test is fast, easy to run, and requires little investment in equipment and little operator training. This test is intended primarily for quality control use since it demonstrates good reproducibility within a single laboratory and ability to detect batch-to-batch variations accurately if adhesive film thickness is held constant. Rolling ball tack is not intended as an investigative tool since for most pressure sensitive adhesive applications rolling ball tack results do not correlate well with application tack requirements.

6. Apparatus (Fig. 1 and Fig. 2)

6.1 *Inclined Trough* equipped with a release lever at the top³ through which the ball gains downhill momentum. The ball is a 11 mm ($\frac{7}{16}$ in.) diameter steel ball unless otherwise specified.

7. Reagents

7.1 *Purity of Reagents*—Reagent grade chemicals should be used in all tests. Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening accuracy of the determination.

7.2 *Solvents:*

7.2.1 Any of the following solvents may be used for cleaning:

7.2.1.1 Diactone alcohol non-residual, technical grade or better,

7.2.1.2 Methanol (95 %),

7.2.1.3 Methyl ethyl ketone (MEK),

7.2.1.4 n-Heptane, or

¹ This test method is under the jurisdiction of ASTM Committee D14 on Adhesives and is the direct responsibility of Subcommittee D14.50 on Hot Melts, Pressure Sensitives, and Archival Adhesives.

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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 A suitable apparatus is available through ChemInstruments, 9349 Hamilton Dr., Mentor OH 44060–4559.