



Designation: D5181 – 04

# Standard Test Method for Abrasion Resistance of Printed Matter by the GA-CAT Comprehensive Abrasion Tester<sup>1</sup>

This standard is issued under the fixed designation D5181; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope\*

1.1 This test method covers the procedure for determining the abrasion resistance of printed matter using a GA-CAT Comprehensive Abrasion Tester.

1.2 This test method is applicable to packaging labels, book, catalog, and magazine covers, bar codes, corrugated boxes, and other containers having applied graphics on any flat substrate. It is not recommended for powder coatings.

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:*<sup>2</sup>

[E171 Specification for Atmospheres for Conditioning and Testing Flexible Barrier Materials](#)

## 3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *abrasion resistance, n*—resistance against the act of scraping, smudging, or rubbing off.

3.1.2 *abrasiveness, n*—the degree to which a product tends to cause abrasion by the act of rubbing or scraping.

3.1.3 *receptor, n*—film or paper of standard abrasiveness onto which material removed from the specimen is deposited during the abrasion testing process. Alternatively, printed paper from which material is removed onto the specimen that has a higher degree of abrasiveness than the receptor (in case of testing abrasiveness).

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.56 on Printing Inks.

Current edition approved July 1, 2004. Published July 2004. Originally approved in 1991. Last previous edition approved in 1997 as D5181 – 91 (1997)<sup>e1</sup>. DOI: 10.1520/D5181-04.

<sup>2</sup> 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.

## 4. Summary of Test Method

4.1 The test print and a receptor are sandwiched in the panel holder of the GA-CAT Comprehensive Abrasion Tester, clamped together with a known force, and made to slide over each other at a known frequency and over a known distance for a predetermined time period.

4.2 The test specimen is examined for degree of print degradation and the receptor for amount of ink or other material transferred from the specimen surface. Results may be rated relative to a comparative control run in the identical manner, or they may be quantified by comparison to a ranking scale numbered from zero to ten (zero being the most abrasion resistant and ten the least abrasion resistant).

## 5. Significance and Use

5.1 Abrasion resistance during transport and storage is essential to prevent marring of type matter, designs, or protective coatings on the exterior of labels and other printed materials. Recognizing that the actual amount of abrasion occurring in the field depends on relative humidity, temperature, tightness of packing, and a host of other variables, this test method provides a rapid means for comparing the abrasion resistance of test surfaces under laboratory conditions. It is useful for specification acceptance between the supplier and the customer.

5.2 This test method can also be used to evaluate the relative abrasion resistance of printed inks, varnishes, laminates and substrates, and the abrasiveness of inks.

## 6. Apparatus

6.1 *GA-CAT Comprehensive Abrasion Tester.*<sup>3</sup>

6.2 *Ranking Book,*<sup>3</sup> containing specimens whose degree of ruboff is ranked from 0 (no ruboff) to + 10 (most ruboff).

## 7. Materials

7.1 *Standard Receptors,* approximately 102 by 114 mm (4 by 4½ in.), of an appropriate grade, as follows:

<sup>3</sup> The sole source of supply of the apparatus known to the committee at this time is Gavarti Assoc., Ltd., 9240 N. Sleepy Hollow Lane, Milwaukee, WI 53217. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,<sup>1</sup> which you may attend.

\*A Summary of Changes section appears at the end of this standard.