



# Standard Test Method for Determining Abrasion Resistance of Inks and Coatings on Substrates Using Dry or Wet Abrasive Medium<sup>1</sup>

This standard is issued under the fixed designation F3152; 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 describes the procedure for subjecting inks or coatings on substrates to an abrasive medium, with or without the application of chemicals, at a specified force.

1.2 Within certain limitations, as described in this standard, this test method is applicable for materials including, but not limited to: printed or coated polyester, polycarbonate, and silicone rubber. The samples can be either flat or contoured.

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. Terminology

### 2.1 Definitions:

2.1.1 *final breakthrough, n*—the number of cycles until complete removal of the first surface ink or coating being tested.

2.1.2 *membrane switch, n*—a momentary switching device in which at least one contact is on, or made of, a flexible substrate.

2.1.3 *wear limit, n*—in testing membrane switches, the number of cycles until an underlying layer of different color may be seen through the first layer (not applicable for transparent coatings).

## 3. Significance and Use

3.1 Membrane switch keys are subjected to repeated actuations, usually by a human finger. This can transfer body oil, hand creams, automotive fluids and so forth. Materials are often subjected to other conditions (for example, wiping,

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cleaning, rubbing) during handling, end-use, shipment, or storage that may cause abrasion damage. The result may be a significant removal of the coatings, text, or decorative inks.

3.2 This test method is applicable to a wide range of materials. The main criterion is that the abrasion process produces visible wear or breakthrough of the surface being tested.

3.3 The amount of abrasion damage to a surface is dependent on numerous variables. This test method provides a way of comparing relative abrasion resistance and the effect of chemicals on inks, coatings, and substrates. In no way do the results provide a correlation value of the number of human finger touches before coating failure. It only provides a means to compare results of tests performed using the same equipment, abrasive materials and loading conditions.

3.4 The test method can be used for quality control purposes, as a research and development tool, to evaluate material combinations for a given application, or for the comparison of materials with relatively similar properties and the effect of chemicals on the abrasion resistance.

## 4. Interferences

4.1 Inconsistent wear can occur which will compromise the results. Caution is necessary to ensure the mounting method does not deflect the specimen, which may influence the wear characteristics.

4.2 Contoured surfaces can be tested but results may be more difficult to duplicate and some equipment is not designed to test non-flat surfaces.

4.3 Whenever possible, a smooth surface is preferred. Extra care should be taken when evaluating a non-uniform surface (that is, rough surface), and for the user to recognize potential variations between specimens.

## 5. Apparatus

5.1 Machine capable of providing cyclic abrasion to a test specimen under controlled loading conditions.

5.2 Suggested sources: