



Standard Test Method for Evaluating Abrasion Resistance of Stretch Wrap Films by Vibration Testing¹

This standard is issued under the fixed designation D 5416; 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 compares the abrasion resistance of similar types of stretch wrap films.

1.2 *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 996 Terminology of Packaging and Distribution Environments²

D 999 Methods for Vibration Testing of Shipping Containers²

3. Terminology

3.1 *Definitions*—General definitions for packaging and distribution environments are found in Terminology D 996.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *overlap*—the width of stretch wrap material that covers a previous layer of stretch wrap material.

3.2.2 *stretch wrap material*—a material used for overwrapping, which when applied under tension, elongates and conforms to the item(s) packaged through elastic recovery.

3.2.3 *wrap cycle*—the series of operations used to wrap a load.

4. Significance and Use

4.1 This test method is intended to provide only a comparative procedure for evaluating unknown films against a standard or control film whose performance has been defined as adequate in actual field conditions.

4.2 This test method leaves open to the discretion of the user several key factors, including film wrap method, abrasion surfaces, and definition of failure, so that it can be tailored to an individual user's distribution parameters.

¹ This test method is under the jurisdiction of ASTM Committee D-10 on Packaging and is the direct responsibility of Subcommittee D10.25 on Palletizing and Unitizing of Loads.

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² *Annual Book of ASTM Standards*, Vol 15.09.

4.3 This test method is meant to simulate, in an accelerated mode, the abrasion that an outer wrapping of film might encounter in a typical shipping and distribution environment.

4.4 This is a test procedure that allows the user to make relative comparisons of the abrasion resistance of a film, such as that the film is containing a palletized load while that load is undergoing vibration.

5. Equipment and Preparation

5.1 *Load Wrapping Apparatus*—A machine or apparatus to wrap the test load. The method of application is preferably as near as possible to that used in an actual production situation (for example, stretch wrapper or manual wrapping unit).

5.2 *Vertical Vibration Table*, preferably equipped with the capability of varying the frequency or amplitude, or both, of vibration in a controlled fashion and maintaining a set vibration mode.

5.3 *Upright Supports*—Rigid upright supports that can be bolted or secured otherwise to the vibration table. These supports shall also be adjusted laterally so as to confine the test load and prevent excessive side to side movement or toppling.

5.4 *Abrasive Surfaces*, attached to the inner faces of upright supports so that the wrapped test load comes into contact with and abrades against this surface during the test sequence.

5.4.1 The abrasive surface can be composed of any one of a variety of possible substances, chosen at the user's discretion, to simulate the actual abrasive surfaces that might be encountered in the actual distribution cycle. Possibilities include rough side of exterior-grade plywood, wooden slats, corrugated metal, corrugated paperboard, brick facings, and standard grit sandpaper.

5.5 *Timing Device*—Stopwatch, clock, or timer.

5.6 *Accelerometer* (optional), which may be used to measure the output response of the test load at various vibration table input amplitudes. This is the most accurate way of determining the resonant frequency of the test load.

6. Procedure

6.1 Prepare two single columns of units to be wrapped.

6.2 Wrap each single column of units individually using the method to be used under normal conditions.

6.3 If other stretch levels are not defined in the production situation, the standard levels of stretch film application of 50, 100, or 150 % stretch may be used.

6.4 If it is desired to simulate a two-column-high stacking