



# Standard Test Method for Evaluating Load Containment Performance of Stretch Wrap Films by Vibration Testing<sup>1</sup>

This standard is issued under the fixed designation D 5415; 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 is used to evaluate and compare the ability of stretch-wrap films to contain unitized loads during shipping.

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 Environments<sup>2</sup>
- D 999 Test Methods for Vibration Testing of Shipping Containers<sup>2</sup>

## 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 *amplitude*—the maximum value of a sinusoidal quantity (zero to peak).

3.2.2 *resonance*—a system of forced vibration existing when any change, however small, in the frequency of excitation causes a decrease in the response of the system.

## 4. Significance and Use

4.1 This test method is intended to be used mainly as a means of comparing the performance of stretch-wrap films. It can also be used to compare the effectiveness of different wrap cycles with the same wrapping materials. No direct correlation between these test results and actual field performance has been established.

4.2 This test method simulates the shipping of unitized loads by way of truck and rail, concentrating on the vibration element associated with these modes. Other elements of the

distribution system, such as mechanical handling, are not addressed specifically in this test method.

4.3 This test method establishes a method for rating the performance of films, but it leaves open to the discretion of the user the establishment of an acceptable rating for the specific end-use intended.

## 5. Apparatus

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

5.2 *Vibration Table*—A vibration testing apparatus conforming to Method D 999, preferably equipped with the capability of varying the frequency or amplitude, or both, of vibration input in a controlled fashion and maintaining a set vibration mode.

5.2.1 The table shall be large enough and have a weight capacity sufficient to hold an entire wrapped shipping unit.

5.2.2 The table should have a means for attaching the bottom of the wrapped test unit securely to the table (for example, threaded holes in the table surface for bolting a pallet securely to the table).

5.3 *Accelerometer* (optional), to measure the output response of the test load at various vibration table input frequencies. This is the most accurate way of determining the resonant frequency of the test load.

## 6. Procedure

6.1 Prepare the test load. Arrange the units comprising the test load in layers and stack them in the manner normally used for shipping the product.

6.2 When the units are normally shipped on pallets, stack the units on the pallet in the normal manner.

6.3 When the units are normally shipped on slip sheets without pallets, stack the units on slip sheets and affix the bottom layer to the slip sheet in the normal manner (glue, hot melt adhesive, and adhesion promoter). The slip sheet should have been fixed previously to a pallet surface to provide a means of securing the load to the vibration table.

6.4 Wrap the test load with the stretch-wrap film at a predetermined percent stretch and wrap cycle.

6.5 Allow the wrapped load to stand undisturbed for a minimum of 16 h before testing. This gives the stress retention forces in the stretched wrapping material time to equilibrate.

<sup>1</sup> 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.

Current edition approved July 15, 1995. Published September 1995. Originally published as D 5415 – 93. Last previous edition D 5415 – 93.

<sup>2</sup> *Annual Book of ASTM Standards*, Vol 15.09.