



Standard Test Method for Evaluation of Mechanical Handling of Unitized Loads Secured with Stretch Wrap Films¹

This standard is issued under the fixed designation D 5331; 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 evaluation and comparison of the ability of unitizing films to survive various methods of mechanical handling.

1.2 The test method described is applicable to common means of material handling, including the following: forklift, push/pull, clamp truck, crane, and spade lift-type handling systems.

1.3 The test levels may be varied to reflect known levels of intensity accurately for the specific unit load under testing.

1.4 The methodology of performing the mechanical handling tests is described in detail in Test Methods D 6055 and Test Methods D 6179. This test method will describe only sample preparation and evaluation in the special case of evaluating the performance of stretch film for load unitizing.

1.5 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.6 *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 996 Terminology of Packaging and Distribution Environments
- D 4169 Practice for Performance Testing of Shipping Containers and Systems
- D 6055 Test Methods for Mechanical Handling of Unitized Loads and Large Shipping Cases and Crates
- D 6179 Test Methods for Rough Handling of Unitized Loads and Large Shipping Cases and Crates

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

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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. 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 *large shipping case or crate*—for the purposes of this test method, a shipping container constructed of any material, and of such size and weight, to require mechanical handling. A case or crate of this type may weigh from 100 lb (45 kg) to many tons and measure proportionally. The case or crate may be secured to or carried by a base or pallet. Frame members may be provided for rigidity throughout the container.

3.2.2 *spade life attachment*—a lift truck attachment used for top handling products packaged in interlocking flange cartons (IFC) or folded cap or folded flap style cartons.

3.2.3 *unitized load*—for the purposes of this test method, consisting of a number of packages (two or more) wrapped or banded together as a shipping unit. When unitized, these packages typically weigh more than 100 lb (45 kg). The unitized method may be shrink wrapping, banding, strapping, taping, or gluing. A base consisting of a pallet or slip sheet may or may not be used.

4. Significance and Use

4.1 This test method is intended for use primarily as a means of comparing the performance of unitizing 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 mechanical handling anticipated during all distribution phases.

4.3 This test method leaves open to the discretion of the user the establishment of test levels and numbers of cycles constituting the test, so that the user might tailor the test to simulate a particular distribution environment. The section on mechanical handling over 100 pounds (45 kg) in Practice D 4169 may provide some guidance in this regard.

5. Apparatus

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