

Package Testing Guidelines for Large Packages

SEVENTH AVENUE®

**1112 7th Avenue
Monroe WI 53566**



Version: 09/08

Last Updated: September 9th, 2008

If you have questions related to this test or need assistance locating a package testing facility please contact Seventh Avenue Packaging.

Seventh Avenue Packaging Contact List

Department	Name	Phone	Email
Packaging & Labeling	Sheri Heimann, Hard Goods Packaging Technician	608-324-5049	heimann@sccompanies.com
Packaging & Labeling	Brian Woelfel, Hard Goods Packaging Engineer	608-328-8918	woelfel@sccompanies.com

This package test procedure is to be used for all packages meeting our definition of a large package.

Large Package – Any package item where the package is equal to or greater than 50 pounds, equal to or greater than 50 inches in length or equal or greater than 5 cubic feet.

Seventh Avenue Terminology

Carton / Package – The package material that protects an individual item, i.e. 1.5 mil polybag, corrugated box, etc.

Item – Any unique manufactured or purchased part. This is the product we purchase from your company that is eventually shipped to the customer as the package label number (PLN).

Large Package – Any package item where the package is equal to or greater than 50 pounds, equal to or greater than 50 inches in length or equal or greater than 5 cubic feet.

Master Carton – A carton that contains more than one cartoned/packaged item -- Example: a master carton could contain twelve cartons or twelve packages.

Package Label Number (PLN) – The Seventh Avenue number that identifies the item that is shipped to the customer. This number is referenced on our Purchase Orders.

Reailer or Reshipper – Carton with protective packaging able to withstand the distribution, storage, handling, and shipment through the small parcel distribution environment (UPS, USPS, etc.) without any additional packaging supplied by Seventh Avenue.

Selling unit – The product packaged and shipped as described in the catalog.

Ship- Alone – A packaged item that is greater than 26” in length, or 15” in width, or greater than 1.70 cubic feet. These items will be sent directly to the customer. Seventh Avenue will provide no additional packaging. Ship-Alones can be packed in master cartons.

Small Package – Any packaged item where the package is less than 50 pounds, less than 50 inches in length or less than 5 cubic feet.

Small Parcel Distribution – Distribution environment managed by small parcel carriers, such as UPS, USPS, FedEx, etc.

Truck Ship Products – Items that must be shipped via LTL / motor carrier to the final customer. Truck ship items are items with Length + girth greater than 165 inches or greater than 150 pounds.

Unitized – The boxes or cartons that are part of a pallet and/or shipment.

Seventh Avenue Packaging Testing	
Procedure Name: Large Package Testing Procedure	Version: CA.LPTP.0708
Use: Drop Test and Vibration Procedures for testing products defined as a large package.	Date Created: 7/01/2008
	Last Update: 7/22/2008

Overview of Testing Procedures

This section outlines the requirements of Large Package Test to determine the ability of the packaging to adequately protect the merchandise against the hazards of the distribution and handling system from the point of manufacture to our warehouse and small parcel distribution to the ultimate customer. It was developed based on industry data, internal analyses and established testing standards.

This procedure consists of 6 test segments (drop, vibration, hazard impact and 2 rotational drops) designed to approximate distribution hazards. Compliance with these tests does not in any way relieve the supplier from adherence to published carrier regulations or tariffs.

This procedure applies to all packaged merchandise where a package test is required **and** meets our definition of a large item. It is the responsibility of the supplier to:

- Make arrangements to have the tests performed and revisions in packaging made, where such revisions are necessary to pass the test.
- Those items that are in a Remailer should be tested as such and not over boxed.
- Items that are not in a Remailer should be packed, with void fill if necessary, in a corrugated carton of the correct material/strength based on the size and weight of the product.
- Must provide a test report, and documentation of **passed** package test for the item, to Seventh Avenue Packaging contacts via e-mail.
- Be certain that the packaging materials being supplied by your supplier are the same quality as that tested under the provisions of this standard and applied in the same manner as the test sample that passed the test.
- Retest the packaged product whenever a change is made to the product, the manufacturing process or the package materials.
- Repeat the test procedure using a random sample from each production run of merchandise if necessary.
- All tests are to be conducted with samples that have been conditioned to ambient temperature and humidity.

Vibration Test with Top Load

(In addition to the drop, impact test and rotational drops, using the same specimens)



1. This test consists of fixed or controlled displacement. Rotary or vertical linear motion is acceptable. We recommend vertical linear or random motion.
2. Inspect the package and product prior to performing the test to ensure there is no damage.
3. Place the test package on the vibration table so the largest surface rests on the platform. Place a top load of 50 pounds (22.6 kg) on top of the test package. Fixtures can be used during the test to prevent the package from moving off the platform or maintain the correct orientation. The fixtures shall not restrict vertical motion of the package.

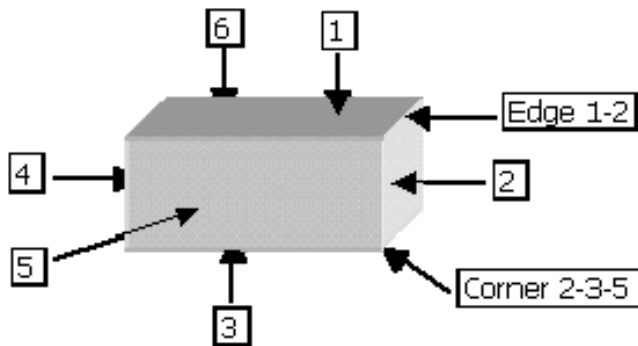
4. Set the machine for a fixed displacement of 1 inch and slowly increase the frequency until the package momentarily leaves the platform.
5. Test for correct frequency using a shim (metal) .0625 inch (1.5 mm) thick and 2 inch (50 mm). If the shim can be moved between the bottom of the longest dimension and the platform, maintain this frequency for the duration of the test. If not, increase the frequency until the shim can be moved and hold at that frequency.
6. Stop the vibration test after at the midpoint of the minutes, turn the package 90 degrees on its face and start the vibration machine for the remaining minutes.
7. The test duration is determined after the input frequency is determined. It is calculated using this formula;

$$\text{Minutes} = \frac{14,200 \text{ impacts}}{\text{Cycles per second (Hz)} \times 60 \text{ or Cycles per minute}}$$

Drop Test

(In addition to the vibration, impact tests and rotational drops, using the same specimens)

1. This test consists of a series of drops, using a free-fall drop tester (see picture below), on various surfaces and corners of the package. Number the surfaces on the container as shown below.
2. Inspect the package for any damage. If noticeable damage exists, stop the test and document the results.
3. Identify edges and corners by the numbers of the surfaces that meet to form them.
4. Drop the package in the Drop Order listed. Use the Drop Height parameters, listed depending on the weight of the package.



Drop Order

- 1) 2-3-5 corner (most fragile)
- 2) 2-5 edge
- 3) 3-5 edge
- 4) 2-3 edge
- 5) Five face
- 6) Six face
- 7) Two face
- 8) Four face
- 9) One face (top)
- 10) Three face (bottom)

Drop Height

- 1 through 50 lbs. drop at 30 inch (760 mm)
- 51 through 100 lbs. drop at 24 inch (610 mm)
- Over 100 lbs. drop at 18 inch (460 mm)

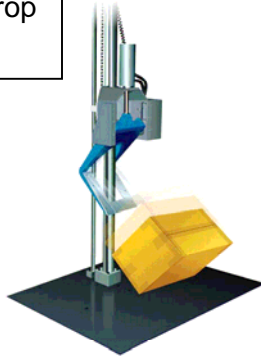
Bridge or Hazard Impact Test

(In addition to the drop, vibration and rotational drops, using the same specimens)

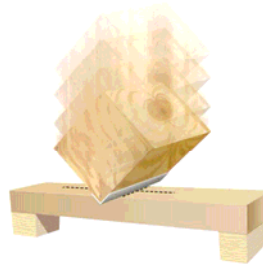
The Bridge Impact is to be performed on packages where the longest dimensions is at least 36 inches and the other two dimensions are 20% or less than the longest dimension.

Using a free-fall drop tester, drop a dense wooden box measuring 12 x 12 x 12 inch (300 x 300 x 300 mm), with one bottom edge covered by an angle iron, onto the test package. The box should have a total weight of 15 lbs (6.8 kg). To achieve the weight use a sand bag and void fill to hold it in place inside the box.

Free-fall drop tester



Bridge Impact wooden box



Hazard Impact wooden box



To perform this test:

1. Inspect the package for any damage. If noticeable damage exists, stop the test and document the results.
2. Conduct the test on a nonyielding steel or concrete base.
 - For the Bridge Impact place the package on two 4" (100 mm) high blocks at each of the longest dimension of the package.
 - For the Hazard Impact place the package with its largest surface area on the test surface.
3. Measure and mark the center of the test package in both directions. Raise the drop tester platen to 30 inch (750 mm).
4. Position the wooden box on the drop platen so that the angle-iron edge is pointed toward the package and is parallel to the shortest dimension of the largest package face. Mark the midpoint of the wooden box impact edge and ensure that it is lined up with the marked test-package midpoint.
5. Allow the box to fall freely and impact the package at the marked midpoints evenly.

Full Rotational Flat Drop

The Full Rotational Flat Drop test is to be performed on all packages.

To perform this test:



1. Inspect the package for any damage. If noticeable damage exists, stop the test and document the results.
2. Conduct the test on a nonyielding steel or concrete base.
3. Place the package so one of the smallest faces rests on the rigid surface so when pushed over the largest face will impact the rigid surface.
4. Apply force to the upper portion of the package to allow the package to fall freely and impact the rigid surface.
5. Place the package so the next largest face rests on the rigid surface so when pushed over the largest face will impact the rigid surface.
6. Apply force to the upper portion of the package to allow the package to fall freely and impact the rigid surface.

Rotational Edge Drop

The Rotational Edge Drop test is to be performed on all packages.



To perform this test:

1. Inspect the package for any damage. If noticeable damage exists, stop the test and document the results.
2. Conduct the test on a nonyielding steel or concrete base.
3. Place the package with the largest face on the test surface.
4. Support one end of the largest face so it is 4 inch (100 mm) off the test surface.
5. Lift the opposite edge that is being tested so it is 12 inch (300 mm) off the surface and release it so it falls freely onto the rigid surface.
6. Repeat the test following steps 3 through 5 above testing the next longest edge.

Analysis of Results

After performing all of the segments, review the package and product for damage. Please note the package test is to be terminated if damage occurs at any point during the test.

1. Open the tested package and inspect the merchandise for damage.
2. If the merchandise is electrical or mechanical, operate it to determine whether it functions properly.
3. Any damage, broken parts, scratches or inability of the item to function properly is considered a failure and may be due to insufficient protective packaging or substandard product quality.
4. Have your packaging department or packaging material supplier and your quality control department investigate the failure.
5. Make appropriate corrections and retest the revised packaging or product using the same procedure.
6. A test report is to be completed for all products that pass this test. The report is to include;
 - Product number (our internal PLN number is available) with description.
 - Test date, where performed and conducted by.
 - Detail of packaging including, material specifications, package size and weight.
 - Detail of the test procedure performed and order carried out.
 - Test results.
 - Include pictures to support the above information.
7. Test results of **passed** items **must** be sent to Seventh Avenue Packaging via e-mail.