

ISTA, Your Alliance in Transport Packaging, is the world leader in Performance Tests for Packaged-Products.

ISTA 3 Series tests are advanced tests.

- They challenge the capability of the package and product to withstand transport hazards, but
- They use general simulation of actual transport hazards, and
- They do not necessarily comply with carrier packaging regulations.

When properly applied, ISTA procedures will provide tangible benefits of:

- Shortened packaged development time and confidence in product launch
- Protection of products and profits with reduced damage and product loss
- Economically balanced distribution costs
- Customer satisfaction and continued business.

There are three sections: Overview, Testing and Report

- Overview provides the general knowledge required before going into the testing laboratory and
- Testing presents the specific instructions to do the testing in the laboratory and
- Report indicates what data shall be recorded to submit a test report to ISTA.

Two systems of weights and measures are presented in ISTA test procedures. They are the English system (Inch-Pound) and the international system SI (Metric). Inch-Pound units are shown first with Metric units in brackets, except in some tables where they are shown separately.

- Either system may be used as the unit of measure (standard units), but
- The standard units chosen shall be used consistently throughout the procedure.
- Units are converted to two significant figures and
- Not exact equivalents.

VERY IMPORTANT:

The entire document shall be read and understood before proceeding with a test.

OVERVIEW OF PROCEDURE 3C

Preface

Test Procedure 3C is a general simulation test for individual packaged-products shipped through a parcel delivery system.

- It can be used to evaluate the protective performance of packaged-products related to vibrations, shocks and other stresses normally encountered during handling and transportation in a parcel delivery system.
- The test levels are based on general data and may not represent any specific distribution system.
- The package and product are considered together and not separately.
- Some conditions of transit, such as moisture, pressure or unusual handling, may not be covered.

Other ISTA Procedures may be appropriate for different conditions or to meet different objectives.

Specific suggestions:

- For small packaged-products 12 x 12 x 3 inches (310 x 310 x 80 mm) and/or 10 lb (4.5 kg) or less, use ISTA Test Procedure 3A or 3D and not 3C.
- For elongated packaged-products use ISTA Partial-Simulation Performance Test Procedure 2E or Procedure 3A and not 3C.

Elongated shall be defined any packaged-product where:

- The packages longest dimension is 36 inches (910 mm) or greater and
- both of the packages other dimensions are each 20 percent or less of that of the longest dimension.

- For flat packaged-products use ISTA Partial-Simulation Performance Test Procedure 2D or Procedure 3A and not 3C.

Flat shall be defined any packaged-product where:

- The packages shortest dimension is 8 inches (200 mm) or less and
- The packages next shortest dimension is four (4) or more times larger than the shortest dimensions.

- Refer to *Guidelines for Selecting and Using ISTA Procedures and Projects* for additional information.

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OVERVIEW OF PROCEDURE 3C

Scope

Test Procedure 3C covers testing of individual packaged-products weighing 150 pounds (68 kg) or less when prepared for shipment via a parcel delivery service.

Product Damage Tolerance and Degradation Allowance

The shipper shall determine the following prior to testing:

- What constitutes damage to the product and
- what damage tolerance level is allowable, if any, and
- the correct methodology to determine product condition at the conclusion of the test and
- the acceptable package condition at the conclusion of the test.

For additional information on this determination process refer to *Guidelines for Selecting and Using ISTA Procedures and Projects*.

Samples

Samples should be the untested actual package and product, but if one or both are not available, the substitutes shall be as identical as possible to actual items.

Number of samples required:

One sample is required for the tests in this procedure however it is strongly recommended to test three or more samples.

Replicate Testing Recommended:

To permit an adequate determination of representative performance of the packaged-product, ISTA:

- Requires the procedure to be performed one time, but
- Recommends performing the procedure five or more times using new samples with each test.

NOTE:

Packages that have already been subjected to the rigors of transportation cannot be assumed to represent standard conditions. In order to insure testing in perfect condition, products and packages shipped to certified laboratories for testing must be:

- over-packaged for shipment to the laboratory or
- repackaged in new packaging at the laboratory.

Test Sequence

The tests shall be performed on each test sample in the sequence indicated in the following table:

Sequence #	Test Category	Test Type	Test Level	For ISTA Certification
1	Atmospheric Preconditioning	Temperature and Humidity	Ambient	Required
2	Atmospheric Conditioning	Controlled Temperature and Humidity	Temperature and Humidity Chosen from chart	Optional
3	Shock	Drop	Height varies with packaged-product weight	Required
4	Vibration	Under Dynamic Load Random	Calculated or maximum Top-Load and overall G_{rms} level of .53	Required
5	Shock	Drop	Height varies with packaged-product weight. Includes drop on hazard	Required

EQUIPMENT REQUIRED FOR PROCEDURE 3C

Equipment
Required
Atmospheric

Atmospheric Conditioning:

- Humidity recording apparatus complying with of the apparatus section of ASTM D 4332-01.
- Temperature recording apparatus complying with the apparatus section of ASTM D 4332-01.

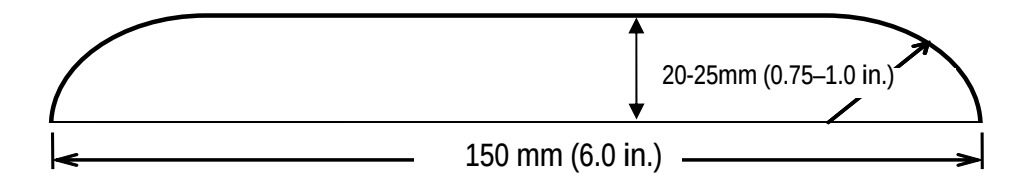
Optional Atmospheric Conditioning

- Chamber and Control apparatus complying with the apparatus section of ASTM D 4332-01.

Equipment
Required
Shock

Free Fall Drop Test:

- Free Fall Drop Test System complying with of the apparatus section of ASTM D 5276-98.
- **Hazard Block:** The block shall be made of hardwood or metal. The height shall be 20 to 25 mm (0.75 to 1.0 in.) and the width 150 mm (6.0 in.). The length shall be at least 200 mm (8.0 in.) longer than the second shortest package dimension of the length, width and height. The long top edges of the block shall be rounded to a radius equal to the height of the block ± 0.02 mm (0.0625 in.).

Equipment
Required
Vibration

Random Vibration Test:

- Random Vibration Test System complying with the apparatus section of ASTM D 4728-01.
- Top-Load apparatus of one, two or three separate loading systems.

BEFORE YOU BEGIN PROCEDURE 3C

Prior to beginning the tests identify the faces, edges and corners according to the procedure below.

Step	Action
1	Place the packaged-product so the package is in its most stable orientation (largest face down) with the label facing up or toward you.
2	Does the packaged-product have only six faces (2 sides, 2 ends, top and bottom)? - If Yes, then go to Step 5. - If No, continue to next Step.
3	Develop a method to identify each face, edge and corner and document with a diagram.
4	Go to the next Block.
5	Is the package a corrugated container? - If Yes, continue to next Step. - If No, then go to Step 8.
6	Does the package have a manufacturer's joint connecting a side and an end face? - If Yes, continue to next Step. - If No, then go to Step 8.
7	Turn the packaged-product so that you are looking directly at a face with the manufacturer's joint on the observer's right and go to Step 9.
8	Position one of the smallest width faces of the packaged-product directly in front of you.
9	Identify faces according to the diagram below.
10	Identify edges using the numbers of the two faces forming that edge. Example: Edge 1-2 is the edge formed by face 1 and face 2 of the packaged-product.
11	Identify corners using the numbers of the three faces that meet to form that corner. Example: Corner 2-3-5 is the corner formed by face 2, face 3, and face 5 of the packaged-product.
12	Go to next Block.