ista | OVERVIEW

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ISTA 3 Series General Simulation Performance Test Procedure

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For complete listing of Procedure Changes and Version Dates go to www.ista.org

Preface

ISTA, Distributing Confidence, Worldwide™

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 two sections: Overview and Testing

- **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.

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 3H

Test Procedure 3H is a general simulation test for mechanically handled bulk loads.

- It is intended for bulk loads of the same product but it can also be considered for mixed loads.
- It can be used to evaluate the protective performance of bulk transport systems related to vibrations, shocks and other stresses normally encountered during handling and transportation.
- It can be used to evaluate interior dunnage.
- 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.
- Non-equivalent alternatives are available. It must be recognized that in many cases, these alternative methods are not equivalent. They will not necessarily produce the same results. The alternative chosen for a particular Procedure should be carefully documented in the Test Report.

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

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

OVERVIEW OF PROCEDURE 3H

Scope

Test Procedure 3H covers testing of bulk loads made up of one transport container or system consisting of the same product that because of their size and/or weight must be handled by mechanical means, for example, automotive parts in reusable racks.

Product Damage Tolerance and Package 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.

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 ensure 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.

OVERVIEW OF PROCEDURE 3H

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 (Non-equivalent alternative method allowed – select one test type)	Short Duration Incline Impact (Conbur)*	35 in per second (0.89 m per second)	Required
		Short Duration Horizontal Impact	35 in per second (0.89 m per second)	
4	Shock	Rotational Drop (Flat and Edge)	4 in (100 mm)	Required
5	Vibration	Random	Overall G_{rms} level varies with Mode of Transport	Required
6	Shock (Non-equivalent alternative method allowed – select one test type)	Short Duration Incline Impact (Conbur)*	35 in per second (0.89 m per second)	Required
		Short Duration Horizontal Impact	35 in per second (0.89 m per second)	
7	Shock	Rotational Drop (Flat and Edge)	4 in (100 mm)	Required
8	Compression (Non-equivalent alternative method allowed – select one test type)	Machine Apply and Release	Calculated Test Force x 1.4	Optional
		Machine Apply and Hold	Calculated Test Force	
		Weight and load Spreader	Calculated Test Load	
9	Shock	Long Duration Horizontal Impact	6 mph (2.7 m/s) 300 ms Trapezoidal	Required for Rail Shipments Only

* This non-equivalent alternative may not be appropriate for samples that are susceptible to rocking out of position. The inclined position of the test sample may create false negative test results.

EQUIPMENT REQUIRED FOR PROCEDURE 3H

Equipment Required Atmospheric Conditioning

Atmospheric Conditioning:

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

Optional Atmospheric Conditioning:

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

Equipment Required Shock

Short Duration Incline Impact Test:

- Inclined Impact Tester (Conbur) complying with the apparatus section of ASTM D880, or
- Horizontal Impact Test System complying with the apparatus section of ASTM D 4003.

Long Duration Horizontal Impact Test:

- Horizontal Impact Test System complying with the apparatus section of ASTM D 4003.

Rotational Drop Test:

- Rotational Drop Test System complying with of the apparatus section of ASTM D 6179.

Equipment Required Vibration

Random Vibration Test:

- Random Vibration Test System complying with the apparatus section of ASTM D 4728.

Equipment Required Compression

The following alternatives are acceptable for the equipment required for the Compression Test:

Type of Compression Test	Equipment	In compliance with the apparatus section of:
Apply and Release Test	Compression test system	ASTM D642 Fixed or Floating platen acceptable
Apply and Hold Test		
Apply and Hold Test	Weight and load spreader	NA