



ISTA 3 Series
General Simulation
Performance
Test Procedure

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Last TECHNICAL
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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 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 3E

Test Procedure 3E is a general simulation test for unitized loads of the same retail or institutional packaged-products. A unitized load is defined as one or more products or packaged-products usually on a skid or pallet, but always secured together or restrained for distribution as a single load. Examples would be a stretch wrapped pallet load of individual containers, a single non-packaged machine banded to a pallet or a pallet with a corrugated tray, tube and a cap.

- 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.
- It can be used to evaluate load stability.
- 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:

- To test the individual packaged-product that might be shipped non-unitized from a distribution center to a retail outlet, use ISTA Test Procedure 3F.

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

Scope

Test Procedure 3E covers testing of unitized loads, made up of either single or multiple products or packages of the same products.

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 (unitized load) 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.
- Refer to *Guidelines for Selecting and Using ISTA Procedures and Projects* for additional information on statistical sampling.

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.

It is important to thoroughly document the configuration, materials, and construction of the tested product and package. Significant variations in performance can sometimes be caused by seemingly insignificant differences. Photo documentation is strongly recommended to supplement detailed written descriptions.

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 (Alternative methods allowed – select one test type)	Incline Impact (Conbur)	42 in per second (1.1 m per second)	Required
		Horizontal Impact	42 in per second (1.1 m per second)	
4	Shock	Rotational Edge Drop	8 in (200 mm)	Required
5	Compression (Alternative methods allowed – select one test type)	Machine Apply and Release	Calculated Test Force x 1.4	Required
		Machine Apply and Hold	Calculated Test Force	
		Weight and Load Spreader	Calculated Test Load	
6	Vibration	Random	Overall G_{rms} level of 0.54	Required
7	Shock	Rotational Edge Drop	8 in (200 mm)	Required

Equipment
Required
Atmospheric
Conditioning

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

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

Type of Shock Test	Equipment	In compliance with the apparatus section of:
Incline Test	Incline impact tester (conbur)	ASTM D 880-92(02)
Horizontal Test	Horizontal impact test system	ASTM D 4003-98

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 D 642-00
Apply and Hold Test	Compression test system	ASTM D 642-00
Apply and Hold Test	Weight and load spreader	NA

Equipment
Required
Vibration

Random Vibration Test:

- Random Vibration Test System complying with the apparatus section of ASTM D 4728-01.