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OVERVIEW ONLY

To access the Full Procedure:

ISTA Members:
Login to the **MEMBER CENTER** and choose the **Resources Folder** and then **File Archive** to download the full procedures.

Non-Members:
You may purchase the full procedure by visiting our **STORE**.

www.ista.org

Similar Packaged-Products in Unitized Loads for Truckload Shipment

3E 2017

ISTA 3 Series General Simulation Performance Test Procedure

VERSION DATE Last TECHNICAL Change: APRIL 2017

Last EDITORIAL Change: APRIL 2017

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

Procedure 3E is a general simulation test for unitized loads of similar retail or institutional packaged-products shipped from a manufacturing location to a distribution center. The unitized loads of packaged-products are shipped through a motor carrier (truck) delivery system, where an entire trailer-load is filled with unitized packaged-products, often of similar retail packaged-products, intended for one destination. This type of shipment is called Full Truckload (FTL).

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.
- To test packaged-products prepared for shipment via a Less-Than-Truckload (LTL) delivery system carrier. LTL is defined as a motor carrier (truck) shipment, where different types of packaged-products, often from different shippers and intended for different ultimate destinations, are mixed in the same load then use ISTA Test Procedure 3B.

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

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3E

OVERVIEW OF PROCEDURE 3E

Scope

Procedure 3E covers the testing of unitized loads, made up of either single or multiple products or packages of similar products prepared for shipment via a Full Truckload (FTL) delivery system carrier. FTL is defined as motor carrier shipment, where an entire trailer-load is filled with unitized packaged-products, often of similar retail packaged-products, intended for one destination.

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 (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
Δ 3	Shock (Alternative methods allowed – select one test type)	Incline Impact (Conbur)	48 in per second (1.2 m per second)	Required
		Horizontal Impact	48 in per second (1.2 m per second)	
Δ 4	Shock	Rotational Edge Drop	Height varies with packaged-product weight	Required
Δ 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
Δ 7	Shock	Rotational Edge Drop	Height varies with packaged-product weight	Required

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3E

EQUIPMENT REQUIRED FOR PROCEDURE 3E

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

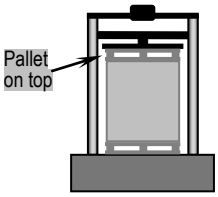
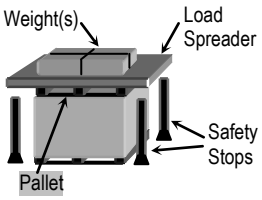
The following alternatives are acceptable for the equipment required for the Impact Test:

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

Equipment Required Compression

O

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:	Additional Required Equipment
Apply and Release Test Apply and Hold Test	Compression Test Machine 	ASTM D 642 Fixed or Floating platen acceptable	Use an identical pallet on top as what the test item is shipped on.
Apply and Hold Test	Weight and load spreader 	NA	See above for description of the pallet. Safety stops are recommended to support the load spreader and weight(s) to prevent damage or injury in the event of a rapid collapse of the test item.

Equipment Required Vibration

Random Vibration Test:

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

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