This document is an overview only. To access the full procedure, please visit the ISTA store at www.ista.org.
Unitized Loads of Same Product

ISTA 1 Series
Non-Simulation
Integrity
Performance
Test
Procedure

OVERVIEW OF PROCEDURE 1E

Test Procedure 1E is an integrity 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 and a pallet with a corrugated tray, tube and a cap.

- It can be used to evaluate the performance of a packaged-product.
- It can be used to compare relative performance of package and product design alternatives.
- 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.
- Consider ISTA General Simulation Performance Test Procedure 3E.

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

VERY IMPORTANT:
The entire document shall be read and understood before proceeding with a test.
OVERVIEW OF PROCEDURE 1E

Test Procedure 1E covers testing of unitized loads, made up of either single or multiple products or packages of the same products.

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 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 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.

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

<table>
<thead>
<tr>
<th>Sequence #</th>
<th>Test Category</th>
<th>Test Type</th>
<th>Test Level</th>
<th>For ISTA Certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Atmospheric Preconditioning</td>
<td>Temperature and Humidity</td>
<td>Ambient</td>
<td>Required</td>
</tr>
<tr>
<td>2</td>
<td>Vibration (Alternative methods allowed – select one test type)</td>
<td>Vertical Linear Displacement</td>
<td>1 in (25mm) peak to peak at a frequency to be determined</td>
<td>Required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Random</td>
<td>Overall G_{r.m.s.} level of 1.15</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Shock (Alternative methods allowed – select one test type)</td>
<td>Incline Impact (Conbur)</td>
<td>69 in (1.7 m) per second impact velocity</td>
<td>Required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Horizontal Impact</td>
<td>69 in (1.7 m) per second velocity change</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Shock</td>
<td>Rotational Edge Drop</td>
<td>8 in (200 mm)</td>
<td>Required</td>
</tr>
</tbody>
</table>
EQUIPMENT REQUIRED FOR PROCEDURE 1E

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

**Fixed Displacement Vibration Test:**
- Vibration Test System with a 1 in (25 mm) fixed or controlled displacement complying with Method A1 or A2 of the apparatus section of ASTM D 999.
  
  *Only vertical linear motion of the platform is acceptable; rotary motion is not acceptable.*
- Metal shim 0.06 in (1.5 mm), thick approximately 2 in (50 mm) wide and at a convenient length.
- Tachometer or suitable indicator for determining vibration frequency in cycles per second (Hz) or cycles per minute (CPM).
- Automatic timer or stopwatch.

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

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

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

<table>
<thead>
<tr>
<th>Type of Shock Test</th>
<th>Equipment</th>
<th>In compliance with the apparatus section of:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incline Test</td>
<td>Incline impact tester (conbur)</td>
<td>ASTM D 880</td>
</tr>
<tr>
<td>Horizontal Test</td>
<td>Horizontal impact test system</td>
<td>ASTM D 4003</td>
</tr>
</tbody>
</table>