

ISTA 3 Series
General
Simulation
Performance
Test
Procedure

VERSION
DATE
Last

TECHNICAL
Change:
MARCH
2017

Last
EDITORIAL
Change:
MARCH
2017

For complete
listing of
Procedure
Changes and
Version Dates
go to
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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 3F

Test Procedure 3F is a general simulation test for packaged-products that are shipped as an individual package from a distribution center to a retail outlet in a mixed pallet configuration.

- 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.
- The test levels are based on general data and may not represent any specific retail 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 unitized loads of this packaged-product being transported to the distribution center, use ISTA Test Procedure 3E.
- To test individual cases where floor load mixed loads are common, use ISTA Test Procedure 3A.

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

Scope

Test Procedure 3F covers testing of individual packaged-products weighing 100 lb (45 kg) or less shipped as part of a mixed pallet load for regional shipment; typically from a distribution center (DC) to a retail facility.

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:

Six (6) samples are 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.

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 TEST BLOCK 1 | Temperature and Humidity | Ambient | Required |
| 2 | Atmospheric Conditioning TEST BLOCK 1 | Controlled Temperature and Humidity | Temperature and Humidity chosen from chart | Optional |
| 3 | Compression (Alternative methods allowed – select one test type) TEST BLOCK 2 | 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 | |
| 4 | Shock TEST BLOCK 3 | Drop | 12 and 30 in (310 and 760 mm) | Required |
| 5 | Vibration TEST BLOCK 4 | Random | Overall G_{rms} level of 0.54 | Required |
| 6 | Shock TEST BLOCK 5 | Drop | 18 and 24 in (460 and 610 mm) | Required |

3F

EQUIPMENT REQUIRED FOR PROCEDURE 3F

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

Free Fall Drop Test:

- Free Fall Drop Test System complying with of the apparatus section of ASTM D 5276.
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Equipment Required Compression

| Type of Compression Test | Equipment | In compliance with the apparatus section of: |
|--------------------------|--------------------------|----------------------------------------------|
| Apply and Release Test | Compression test system | ASTM D 642 |
| Apply and Hold Test | Compression test system | Fixed or Floating platen acceptable |
| 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.