ISTA 2 Series
Partial-Simulation
Performance
Test Procedure

ISTA, Your Alliance in Transport Packaging, is the world leader in Performance Tests for Packaged-Products.

ISTA 2 Series tests are a combination of basic test elements from ISTA 1 Series (Non-Simulation Integrity Performance Testing) **and** advanced test elements from ISTA 3 Series (General Simulation Performance Testing).
- They challenge the capability of the package and product to withstand transport hazards, **but**
- They only simulate some 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 2C

Preface

Test Procedure 2C is a partial simulation test for individual packaged furniture products (Case Goods). Although the traditional furniture definition of case goods is for hard goods and not upholstered furniture, it can be used for any furniture transported in a container.

- 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.

- It should be considered for the evaluation of packaged-products intended for international distribution.

- 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:
- Consider ISTA General Simulation Performance Test Procedure 3A or 3E.
- Refer to *Guidelines for Selecting and Using ISTA Procedures and Projects* for additional information.

OVERVIEW OF PROCEDURE 2C

Scope

Test Procedure 2C covers testing of individual packaged-products of furniture (Case Goods) for shipment.

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 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.

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	Vibration	Random Under Dynamic Load	Calculated Top Load differs for Distribution Channel, package size and configuration. Random vibration spectrum differs for Distribution Channel.	Required
4	Shock (Alternative methods allowed – select one test type)	Drop	Height varies with packaged-product weight and Distribution Channel	Required
		Exception One and Two Incline-Impact (Conbur)	Impact Velocity varies with packaged-product weight	
		Horizontal Impact	Impact Velocity varies with packaged-product weight	

EQUIPMENT REQUIRED FOR PROCEDURE 2C

Atmospheric Preconditioning:

- Temperature recording apparatus complying with the apparatus section of ASTM D 4332-01.
- Humidity recording apparatus complying with the apparatus section of ASTM D 4332-01.

Equipment required for **Optional** Atmospheric Conditioning
- Chamber and Control apparatus complying with the apparatus section of ASTM D 4332-01.

Vibration Under Dynamic Load Test:

- Random Vibration Test System complying with the apparatus section of ASTM D 4728-01.
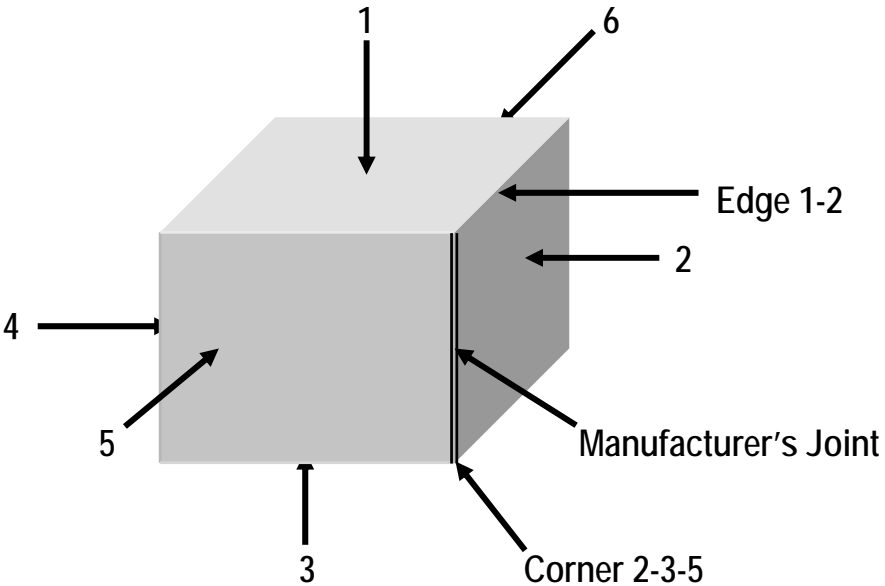- Top-Load apparatus of one, two or four separate loading systems

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

Type of Shock Test	Equipment	In compliance with the apparatus section of:
Drop Test	Free fall drop tester	ASTM D 5276-98
Vertical Shock Test	Shock test machine	ASTM D 5487-98
Incline Test	Incline-impact tester (conbur)	ASTM D 880-92(02)
Horizontal Test	Horizontal impact test system	ASTM D 4003-98
Rotational Edge Test	Rotational drop	ASTM D 6179-97

BEFORE YOU BEGIN PROCEDURE 2C

Prior to beginning the tests identify the faces, edges and corners according to the procedure below.

Step	Action
1	Place the packaged-product in its intended shipping position as determined by shipper. If the shipping position can be variable, place the packaged-product so that the primary shipping label location is on the top face.
2	Does the packaged-product have only six faces (2 sides, 2 ends, top and bottom)? • If **Yes**, then go to Step 5. • If **No**, continue to next Step.
3	Develop a method to identify each face, edge and corner and document with a diagram.
4	Go to the next Block.
5	Is the package a corrugated container? • If **Yes**, continue to next Step. • If **No**, then go to Step 8.
6	Does the package have a manufacturer's joint connecting a side and an end face? • If **Yes**, continue to next Step. • If **No**, then go to Step 8.
7	Turn the packaged-product so that you are looking directly at a face with the manufacturer's joint on the observer's right and go to Step 9.
8	Position one of the smallest width faces of the packaged-product directly in front of you.
9	**Identify faces** according to the diagram below.
10	**Identify edges** using the numbers of the two faces forming that edge. Example: Edge 1-2 is the edge formed by face 1 and face 2 of the packaged-product.
11	**Identify corners** using the numbers of the three faces that meet to form that corner. Example: Corner 2-3-5 is the corner formed by face 2, face 3, and face 5 of the packaged-product.
12	Go to next Block.

You shall know the packaged-product's:
- gross weight in pounds (kg), **and**
- outside dimensions of Length, Width and Height (L x W x H) in inches (mm or m)

TEST LEVELS VARY
There are different hazard levels for case good furniture packages associated with various channels of distribution. You shall select a level of testing from one of the following three levels and follow that level throughout the entire test:
- **LEVEL ONE** for product-packages shipped via small parcel delivery systems.
- **LEVEL TWO** for product-packages shipped via general commodity motor carrier.
- **LEVEL THREE** for product-packages shipped via specialized furniture carrier.

NOTE:
Level One shall be used if the channels of distribution are not known. If more than one channel is possible, the lowest level number of those possible channels shall be used.

Required Preconditioning:
The packaged-product should be stored prior to climate conditioning at laboratory ambient temperature and humidity for twelve (12) hours.

Optional Conditioning Recommended (to be performed after the required preconditioning):
To permit an adequate determination of packaged-product performance at anticipated atmospheric limits and where it is known that the atmospheric extremes are detrimental to the product, ISTA:
- **Requires** the highest temperature and humidity limits of the product be used, **but**
- **Recommends** that both the highest and lowest atmospheric conditions be used.

Condition packaged-products according to one or more of the conditions listed in the table below.
- Remaining test requirements should be performed as soon as possible after removing the packaged-product from environmental conditioning apparatus.
- If more than one conditioning sequence is selected, a new and complete test should be performed following each sequence.

Anticipated Conditions	Time in Hours	Temperature in °C ±2°C (°F ±4°F)		Humidity in %
Frozen or winter ambient	72	-29°C	(-20°F)	uncontrolled RH
Refrigerated packages	72	5°C	(40°F)	85% RH ±5%
Controlled temperature	72	23°C	(72°F)	50% RH ±5%
Tropical (Wet) climate	72	38°C	(100°F)	85% RH ±5%
Tropical (Wet) then desert (Dry):	72 then 6	38°C then 60°C	(100°F) (140°F)	85% RH ±5% then 30% RH ±5%
Desert or summer ambient	72	50°C	(120°F)	uncontrolled RH
User Defined High Limit	72	Based upon known conditions		Known conditions
User Defined Low Limit	72	Based upon known conditions		Known conditions
User Defined Cycle	72	Based upon known conditions		Known conditions

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CAUTION:

When using a Top-Load apparatus use extreme care to prevent injury.

CAUTION:

A restraining device or devices shall be used with the vibration test system to:
- prevent the Top-Load from moving off the package being tested **and**
- prevent the test specimen from moving off the platform **and**
- maintain test orientation of the stack, **but**
- the device or devices shall not restrict the vertical motion of the test specimen during the test.

BEFORE YOU BEGIN PROCEDURE 2C

The packaged-product is tested
- in all three axes
- with a top-load calculated for each axis
- for 20 minutes in each axis

Exceptions to Vibration Under Dynamic Load:
You do not conduct a compression/vibration test, but run a vibration test as detailed in the compression/vibration test without any concentrated dead load, **if**:
- the packaged-product is 72 in (1.8 m) or taller in height **and**
- has a definite, outside of the package, skid or pallet

You test in only one axis for 60 minutes if:
- the packaged-product is 60 in (1.5 m) or taller in height **or**
- for any height packaged-product that has definite orientation markings **or**
- the packaged-product is on a visible skid or pallet

NOTE:
This vibration under dynamic load test requirement is:
- a performance test, **but not**
- a predictor of warehouse stacking capability.

Top-Load

Test Level…	Top-Load simulates assorted freight on top of a floor loaded shipping unit in a 108-in (2.7 m) trailer at….
One	12 lb/ft^3 (190 kg/m^3)
Two	10 lb/ft^3 (160 kg/m^3)
Three	8 lb/ft^3 (130 kg/m^3)

The Top-Load apparatus container(s) shall be
- Larger than the test specimen, **but**
- Shall not overhang the specimen by more than 1.5 in (40 mm) **and**
- Shall distribute the calculated Top-Load (TL) evenly over the test specimen.

To determine if more than one Top-Load apparatus is required, follow the instructions below:

If the packaged-product top surface exceeds 18 in (500 mm) in…	Then there **shall** be…
only one dimension	two Top-Load apparatus of equal sizes **and** weights along the long edge
both dimensions	four Top-Load apparatus of equal sizes **and** weights

- One possible system would be container(s) with the following specifications:
  - RSC – style corrugated container **and**
  - 33 lb/Msf (160 g/sqm) minimum basis weight corrugated facings **and**
  - 0.5 in (13 mm) minimum thickness plywood pieces covering the entire area of the bottom inside flaps of the container, **and**
  - Plastic bags of sand.

Continued

BEFORE YOU BEGIN PROCEDURE 2C

Familiarity with the following formulas is required:

Using the Test Level determined in the Test Level Selection Block and the packaged-product size and weight from the Packaged-Product Weight and Size Measurement Block calculate a Top-Load with the appropriate formula from the table below.

If the packaged-product is…		Then use the TL Formula corresponding to Test Level		
Small **and** Light : • 2 ft³ (0.06 m³) **or** less in size **and** • less than 30 lb (14 kg) in weight		TL	English Units (Pounds)	Metric Units (Kilograms)
		TL1=	$0.007 \times (108 - H) \times L \times W$	$190 \times (2.7 - H) \times L \times W$
		TL2=	$0.006 \times (54 - H) \times L \times W$	$160 \times (1.4 - H) \times L \times W$
		TL3=	$0.005 \times (54 - H) \times L \times W$	$130 \times (1.4 - H) \times L \times W$
Large **or** Heavy packaged-products: • Greater than 2 ft³ (0.06 m³) in size **or** • 30 lb (14 kg) or more) in weight		TL	English Units (Pounds)	Metric Units (Kilograms)
		TL1=	$0.007 \times (108 - H) \times L \times W$	$190 \times (2.7 - H) \times L \times W$
		TL2=	$0.006 \times (108 - H) \times L \times W$	$160 \times (2.7 - H) \times L \times W$
		TL3=	$0.005 \times (108 - H) \times L \times W$	$130 \times (2.7 - H) \times L \times W$
Where				
TL	Top-Load		Pounds (lb)	Kilograms (kg)
Level 1	Average density of freight		0.007 lb/in³	190 kg/m³
Level 2	Average density of freight		0.006 lb/in³	160 kg/m³
Level 3	Average density of freight		0.005 lb/in³	130 kg/m³
Half Height	Height stacked above shipping unit		54 in	1.4 m
Full Height	Height stacked above shipping unit		108 in	2.7 m
H	Height of shipping unit		Inches	Meters
L	Length of shipping unit		Inches	Meters
W	Width of shipping unit		Inches	Meters

| Maximum TL for a package in the face 3 down orientation:	English Units	Metric Units
60 in (1.5 m) or less in height	400 lb	180kg
over 60 in (1.5 m) in height	120 lb	55 kg
Maximum TL for a package in the face 4 down orientation:	120 lb	55 kg
Maximum TL for a package in the face 6 down orientation:	120 lb	55 kg

Continued

For Level One Random Vibration:

The following breakpoints shall be programmed into the vibration controller to produce the acceleration versus frequency profile (spectrum) below with an overall G_{rms} level of 0.51:

Frequency (Hz)	PSD Level, g²/Hz
2	0.00036
4	0.036
5	0.036
7	0.0016
11	0.013224
15	0.008004
21	0.008004
50	0.00032
100	0.00032
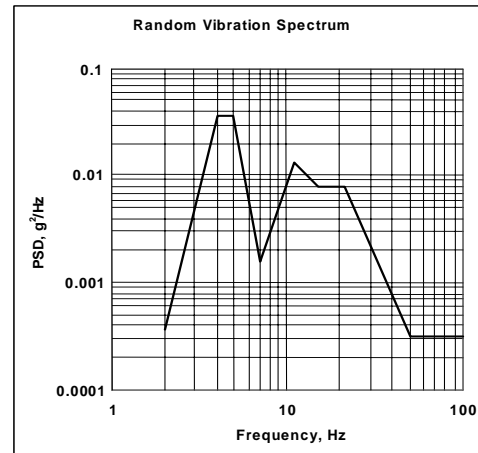
For Level Two Random Vibration:

The following breakpoints shall be programmed into the vibration controller to produce the acceleration versus frequency profile (spectrum) below with an overall G_{rms} level of 0.52:

| Frequency (HZ)	PSD Level, g²/Hz
1.0	0.00005
4.0	0.01
16.0	0.01
40.0	0.001
80.0	0.001
200.0	0.00001
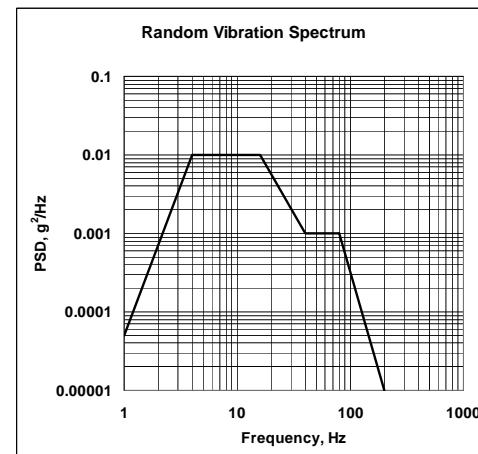
For Level Three Air-Ride Truck Random Vibration:

NOTE:
This Level assumes your carrier uses Air-Ride trucks, if this is incorrect use the Level Two Random Vibration.

The following breakpoints shall be programmed into the vibration controller to produce the acceleration versus frequency profile (spectrum) below with an overall G_{rms} level of 0.28:

Frequency (Hz)	PSD Level, g²/Hz
0.6	0.0009
2.0	0.009
3.0	0.0072
5.0	0.00036
10.0	0.00036
15.0	0.0018
30.0	0.00054
50.0	0.00108
100.0	0.00018

BEFORE YOU BEGIN PROCEDURE 2C
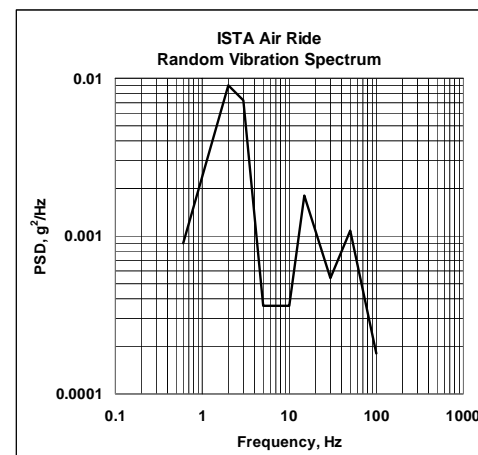
Shock testing is conducted using a drop tester unless the package-product qualifies for either Exception One or Two.

The height of the drop test varies for packaged-products that weigh:
- less than (<) 50 lb (23 kg),
- 50 lb (23 kg) to 100 lb (45 kg) and
- greater than (>) 100 lb (45 kg).

According to the selected Test Level, find the appropriate drop height from the following chart.

Drop Chart		Drop Heights					
Packaged-Product Weight		Level One		Level Two		Level Three	
lb	kg	in	mm	in	mm	in	mm
< 50	< 23	30	760	24	610	18	460
50-100	23-45	20	510	16	410	12	310
> 100	> 45	12	310	10	250	8	200

Exception One for Shock Testing - Individual packaged-products with a:
- Package configuration that makes dropping impractical **and**
- Mass of 100 lb (45 kg) or more **or**
- Height over 60 in (1.5 m) **or**
- Total dimensions (L + W + H) more than 108 in (2.7 m).

If Exception One for Shock Testing is applicable, the following chart may be used to find the appropriate impact velocity for an incline or horizontal test according to packaged-product weight:

EXCEPTION ONE FOR SHOCK TESTING		Impact Velocity					
Packaged-Product Weight		Level One		Level Two		Level Three	
lb	kg	ft/s	m/s	ft/s	m/s	ft/s	m/s
< 50 lb	< 23	13	3.9	11	3.5	10	3.0
50-100	23-45	10	3.2	9.3	2.8	8.0	2.5
> 100	> 45	8.0	2.5	7.3	2.2	6.6	2.0

Exception Two for Shock Testing - Individual packaged-products with a:
- Definite skid bottom on which the unit is intended to be shipped **and**
- With Markings that sufficiently identify the bottom **and**
- Mass of 150 lb (68 kg) or more **or**
- Height over 60 in (1.5 m) **or**
- With the total dimensions (L + W + H) more than 130 in (3.3 m).

If Exception Two for Shock Testing is applicable, 42 in per second (1.1 m per second) is the impact velocity used for the Incline or Horizontal Test Method.

NOTE:
Rotational Edge Drops will be used if:
- If either Exception One or Two for Shock Testing is used **and**
- If all six faces are not tested, **then**
- Rotational edge drops are performed.

TEST SEQUENCE FOR PROCEDURE 2C

The test blocks that follow contain tables that indicate the required steps for each test in the procedure.

Step	TEMPERATURE AND HUMIDITY
	Action
1	The packaged-product should be stored at laboratory ambient temperature and humidity for twelve (12) hours.
2	Is optional conditioning going to be performed? • If **Yes**, go to Step 6. • If **No**, go to the next Step.
3	Record the ambient laboratory temperature and humidity when testing starts.
4	At the end of all testing record temperature and humidity.
5	Go to the Compression/Vibration Test Block.
6	Select an anticipated condition from the Before You Begin Block.
7	Check the conditioning apparatus to insure that the temperature and humidity are at the required levels.
8	Place the packaged-product in the conditioning.
9	At the completion of the required conditioning time period remove the packaged-product from the conditioning apparatus.
10	Record the ambient laboratory temperature and humidity when testing starts. Go to the next Test Block and perform the remaining test sequence as quickly as possible.

Step	DYNAMIC LOAD AND RANDOM
	Action
1	Put the packaged-product on the vibration table so that face 3 rests on the platform.
2	Using some form of column stack fixturing, stack the Top-Load(s) from the Before You Begin Vibration Under Dynamic Load Testing Block on top of the test specimen.
3	Start the vibration machine to produce the random vibration spectrum indicated in the Before You Begin Block.
4	Does the packaged-product have definitive orientation markings **or** Is the packaged-product 60 ins (1.5 m) or greater in height **or** is the packaged-product on a visible skid or pallet? • If **Yes**, then continue with the next Step. • If **No**, then go to Step 7.
5	After the completion of 60 minutes, stop the vibration testing and remove the Top-Load(s).
6	Remove the packaged-product from the vibration table and go to Step 16.
7	After the completion of 20 minutes, stop the vibration testing and remove the Top-Load(s).
8	Turn the packaged-product so that either face 2 or 4 is in the down orientation in the center of the vibration table.
9	Using some form of column stack fixturing, stack the Top-Load(s) from the Before You Begin Vibration Under Dynamic Load Testing Block on top of the test specimen.
10	Start the vibration machine to produce the random vibration spectrum indicated in the Before You Begin Block.

Continued

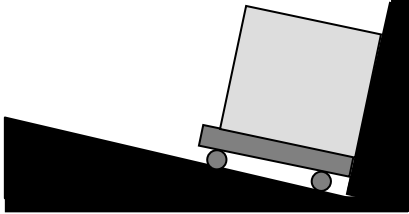| 11	After the completion of 20 minutes, stop the vibration testing and remove the Top-Load(s).
12	Turn the packaged-product so that either face 5 or 6 is in the down orientation in the center of the vibration table.
13	Using some form of column stack fixturing, stack the Top-Load(s) from the Before You Begin Vibration Under Dynamic Load Testing Block on top of the test specimen.
14	Start the vibration machine to produce the random vibration spectrum indicated in the Before You Begin Block.
15	After the completion of 20 minutes, stop the vibration testing and remove the Top-Load(s).
16	Inspection of the packaged-product for visible damage is allowed, provided inspection does not alter, in any way, the current condition of the package or the condition or position of the product(s).
17	Vibration Under Dynamic Load testing is now complete. Go to the Shock Test Block.

Shock Test Block

SHOCK	
Step	**Action**
1	Determine if shock testing is going to be by drop test or impact test according to the Before You Begin Shock Testing.

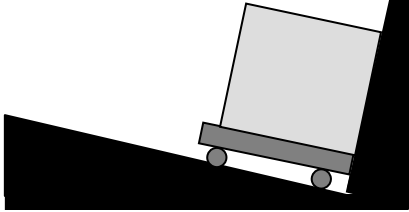| IF testing is going to be by …	THEN the Shock Test Block to use will be…
Drop Test	Test Block A.
Exception One for Shock Testing:	Test Block B.
Exception Two for Shock Testing:	Test Block C and D.

Shock Test Block A

DROP	
Step	**Action**
1	Test the packaged-product according to the level determined in the Drop Chart in the Before You Begin Shock Testing section. Follow the sequence in the table below.

Sequence #	Orientation	Specific face, edge or corner
1	Corner	most fragile face-3 corner, if not known, test 2-3-5
2	Edge	shortest edge radiating from the corner tested
3	Edge	next longest edge radiating from the corner tested
4	Edge	longest edge radiating from the corner tested
5	Face	one of the smallest faces
6	Face	opposite small face
7	Face	one of the medium faces
8	Face	opposite medium face
9	Face	one of the largest faces
10	Face	opposite large face

2	All testing is now complete. Go to the Test Report Block.

TEST SEQUENCE FOR PROCEDURE 2C

IMPACT	
Step	**Action**
1	Is the packaged-product 60 in (1.5 m) or greater in height or for any height packaged-product have definitive orientation markings or is the packaged-product on a definite skid or pallet? • If **Yes**, then go to Shock Test Block C. • If **No,** then continue with the next Step.
2	Center the packaged-product on the carriage with the vertical face of the packaged-product flat against the backstop or sail and parallel to the leading edge of the carriage.
3	Test the packaged-product according to the level determined in Exception One for Shock Testing Chart in the Before You Begin Shock Testing section. Follow the sequence in the table below.

Sequence #	Orientation	Specific face, edge or corner
1	Corner	most fragile face-3 corner, if not known, test 2-3-5
2	Edge	shortest edge radiating from the corner tested
3	Edge	next longest edge radiating from the corner tested
4	Edge	longest edge radiating from the corner tested
5	Face	one of the smallest faces
6	Face	opposite small face
7	Face	one of the medium faces
8	Face	opposite medium face
9	Face	one of the largest faces
10	Face	opposite large face

Step	Action
4	All testing is now complete. Go to the Test Report Block.

TEST SEQUENCE FOR PROCEDURE 2C

IMPACT	
Step	Action
1	Center the packaged-product on the carriage with the vertical face of the packaged-product flat against the backstop or sail and parallel to the leading edge of the carriage.
2	Test the packaged-product according to the level determined in the Exception Two for Shock Testing in the Before You Begin Impact Testing section. Follow the sequence in the table below: **Sequence #** / **Orientation** / **Specific face** 1 / Face / one of the smallest vertical faces 2 / Face / opposite small vertical face 3 / Face / opposite small vertical face not tested in Sequence 1 4 / Face / opposite large vertical face not tested in Sequence 2
3	Testing is now complete. Go to the next Shock Block.

Step 2 detail table:

Sequence #	Orientation	Specific face
1	Face	one of the smallest vertical faces
2	Face	opposite small vertical face
3	Face	opposite small vertical face not tested in Sequence 1
4	Face	opposite large vertical face not tested in Sequence 2

IMPACT	
Step	Action
1	Determine the drop height and support size according to the test level in the table below:
2	Place the package with face 3 down onto a flat, rigid surface such as steel or concrete
3	Test the packaged-product using a support and drop height determined in Step 1 by supporting one edge and dropping the opposite edge so that it falls freely onto the flat, rigid surface.
4	Follow the sequence in the table below.
5	*(see table below)*
6	All testing is now complete. Go to the Test Report Block.

Step 1 table:

IF the Test Level is…	Then the drop height is…	The support size is …
Level One	8 in (200 mm)	7.5 to 8.0 in (180 to 200 mm)
Level Two	8 in (200 mm)	3.5 to 4.0 in (90 to 100 mm)
Level Three	4 in (100 mm)	3.5 to 4.0 in (90 to 100 mm)

Step 5 table:

Edge Supported	Edge Dropped
3-4	2-3
2-3	3-4
3-6	3-5
3-5	3-6

TEST REPORT FOR PROCEDURE 2C

The packaged-product has satisfactorily passed the test if, upon examination, it meets the Product Damage Tolerance and Package Degradation Allowance.

ISTA Certified Testing Laboratories:
- Should file a test report on all ISTA Test Procedures or Projects conducted.
- Shall file a test report on all ISTA Test Procedures or Projects conducted to obtain Transit Tested Package Certification or Acknowledgement.

For additional information, refer to *Guidelines for Selecting and Using ISTA Test Procedures and Projects.*

ISTA Transit Tested Program

The ISTA Transit Tested Certification Mark as shown is a:
- registered certification mark **and**
- can only be printed on certified packages **and**
- can only be used by license agreement **and**
- by a member of the International Safe Transit Association.

When a member prints this certification mark on a packaged-product, with their license number, they are showing their customer and the carrier that it has passed the requirements of ISTA preshipment testing.

In order to maintain its certified status and eligibility for identification with the TRANSIT TESTED Certification Mark, each packaged-product must be re-tested whenever a change is made in the:
- Product or
- Process or
- Package.

Changes in the product can include changes in:
- Design (configuration, components, accessories, etc.) **or**
- Size / weight (dimensions, shape, mass, center of gravity, etc.) **or**
- Materials (type, construction, fabrication, gage, etc.)

Changes in the process can include changes in:
- Manufacturing / assembly (vendor, location, automation, etc.) **or**
- Filling (equipment, speed, automation, etc.) **or**
- Distribution system (parcel delivery, LTL, intermodal, etc.)

Changes in the package can include changes in:
- Configuration (individual package or unit load, container type and sub-type, style, design, interior packaging, etc.) **or**
- Size / weight (dimensions, shape, mass, caliper, gage etc.) **or**
- Materials (corrugated, plastic, metal, glass, etc.) **or**
- Components (closures, labels, straps, pallets, skids, wraps, etc.)

If corrugated packaging is used, it is recommended that the basis weights of the constituent papers/paperboards be determined after testing and documented to provide the best indicator of equivalence or change.

As a quality control procedure, packaged-products should be re-tested frequently, for example, yearly.

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