

UPS Professional Services

Package Design and Test Lab
108 South Lombard Road
Addison, IL 60101
Phone: (877) 877-7229
Web Page: www.ups-psi.com



Package Laboratory Report

Customer: Protective Packaging Solutions

10345 South Medallion Drive
Cincinnati, OH 45241

Test Control Number: 20423604

Date Tested: 12/21/2004

Shipper Number: 470645

Previous Test Number: N/A

Previous Test Date: N/A

Requested By: Jeff Kling

District: Kentucky

Region: North Central

Product: Dell Laptop Computer

Package Weight: 11.1 pounds

Factory Package: Yes

Number of Items: 1

Capacity: N/A

Container Style: Roll End Tray w/ Locking Cover

Certification: 32 Pounds/Linear Inch ECT

Corrugation: Vertical C-flute

Mfg's Joint: N/A

Closure: 2" Pressure Sensitive Poly Tape

Application: Single Strip

Dimensions: 19.75 x 17.25 x 5.75 (LxWxD, inches, OD)

Other: Length of 9"

Packaging Description

Internal Cushioning: The product is placed inside a poly bag. There are 1.5" thick polyurethane foam pads placed above and below the product. Low density polyethylene foam pads are placed around the sides of the product providing a minimum clearance of 2.5". Please see attached photos for a better understanding.

Shipping Container: The product and internal packaging components are placed inside a roll end tray with a locking cover fabricated from vertical C-flute corrugated board with an edge crush test (ECT) of 32 lbs/linear inch.

Basis Weight: 69.0 lbs/1000 sq. ft.

Sealing Material and Methods: The front tuck flap is sealed using a 9" long single strip of 2" pressure sensitive poly tape.

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Testing Information and Results

Test Control Number: 20423604

ISTA Test Procedure 3A - Standard

Performance Test for Individual Packaged-Products - 150 lbs or Less for Parcel Delivery System Shipment

ISTA Test Procedure 3A is a general simulation test for individual packaged-product designed to offer a laboratory simulation of the handling conditions (such as shock, vibration and compression) that exist within the single package distribution environment.

Standard Package-Products shall be defined where: The L x W x H is greater than 12 x 12 x 3 and the weight is 150 lbs or less, but not 10 lbs or less.

ISTA 3A requires one packaged-product for testing, which consist of the following:

Atmospheric Preconditioning: Preconditions the test specimen to the ambient laboratory conditions prior to testing.

Shock: Designed to simulate the impacts a package may experience during loading, unloading and sorting.

Random Vibration With and Without Top Load: Designed to simulate the dynamic vibration forces a package may experience while loaded in a pick-up/delivery vehicle and in a trailer traveling over the road.

Acceptance Criteria:

No visible damage
Product intact
Packaging components able to provide further protection

Details of each sequence are as follows:

Sequence 1 - Atmospheric Preconditioning:

Packages conditioned to lab conditions for 24-hours before testing.
Lab conditions at time of testing were 73 degrees F and 18% RH.

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Sequence 2 - Shock:

Drop Order	Drop Height	Drop Orientation
1	18 in	Edge 3-4
2	18 in	Edge 3-6
3	18 in	Edge 4-6
4	18 in	Corner 3-4-6
5	18 in	Corner 2-3-5
6	18 in	Edge 2-3
7	18 in	Edge 1-2
8	36 in	Face 3
9	18 in	Face 3

Sequence 3 - Vibration under Dynamic Load

- (A) Test specimen is vibrated under a compressive load following the ISTA 3A Over-the-Road Trailer Spectrum (acceleration versus frequency profile) with an overall Grms of 0.53. If the calculated top load is less than 25 lbs. then no top load is used. If the load is between 25 lbs. and 300 lbs., then the load is rounded to the next closest increment of 25 lbs. If the load is greater than 300 lbs., then the load shall be 300 lbs.

Top Load (TL-H) with Face 3 Down = $(108 - H) \times L \times W \times 0.0035 = 125$ lbs For 60 Minutes

Top Load (TL-L) with Face 4 Down = $(108 - L) \times H \times W \times 0.0035 = 50$ lbs For 30 Minutes

Top Load (TL-W) with Face 6 Down = $(108 - W) \times H \times L \times 0.0035 = 50$ lbs For 30 Minutes

Where:

- TL = total load in pounds
- H = height of individual package
- L = length of individual package
- W = width of individual package
- 108 in. = Height of typical trailer
- 0.0035 lbs/cubic in. = Loading Factor - 50% of the average density

- (B) Test specimen is vibrated without compressive load following the ISTA 3A Pick-Up and Delivery Vehicle Spectrum (acceleration versus frequency profile) with an overall Grms. of 0.46. Oriented on Face 3 for 30 minutes

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Sequence 4 - Shock:

Drop Order	Drop Height	Drop Orientation
10	18 in	Edge 3-4
11	18 in	Edge 3-6
12	18 in	Edge 1-5
13	18 in	Corner 3-4-6
14	18 in	Corner 1-2-6
15	18 in	Corner 1-4-5
16	36 in	Face 1
17	18 in	Face 3 (this drop onto hazard)

This concludes the required testing sequences for the ISTA Procedure 3A.

A Basis Weight calculation was conducted to determine the Combined Weight of Facings of the corrugated board. This is the ideal way to determine the strength of the corrugated. This is done by separating the liners from the flutes and weighing the liners. The amount is stated as pounds per 1000 square feet (lbs/1000 sq. ft). The liners of the board equaled 69.0 lbs/1000 sq. ft.

The Mullen test was performed to evaluate the burst strength of the shipping container's constituent corrugated board. The Mullen Tester pushes a 1-inch diameter diaphragm through the corrugated board, yielding a force value in pounds per square inch (PSI). Six bursts yielded an average burst strength of 188.5 PSI.

RESULTS:

Met requirements.

Upon completion of the testing protocol specified in this report, no visible physical damage could be found. The unit was returned to the customer for further evaluation and no internal damage was discovered. Based on these results, the packaged-product has met the requirements of the test protocol based on the acceptance criteria.

CONCLUSION:

Thank you for providing the UPS Professional Services Package Lab the opportunity to meet your package testing needs. If you have any questions please call me, Bryan Page at (630) 628-3706.

Packaging Engineer Signature: _____

Protective Packaging Solutions Laptop Computer



December 22, 2004

