gh Package & Product Testing and Consulting, Inc.
ISO17025 accredited
4090 Thunderbird Lane
Fairfield, OH 45014
Phone (513) 870-0080
Fax (513) 870-0017
335 W. Melinda Lane
Phoenix, AZ 85027
Phone (623) 869-8008
Fax (623) 869-8003

Samtec Inc. Test Report

New Medium Stack Package
July 11, 2007
(J060807C3)

Client

Samtec Inc.
520 Park East Blvd.
New Albany, IN 47150
Test Per: Mr. Henry Sipes

Testing Location

gh Package/Product Testing & Consulting, Inc.
Fairfield, Ohio 45014

Testing Date (s) - June 12 through June 19, 2007

Test Laboratory Conditions: 72° Fahrenheit at 50% Relative Humidity

Test Purpose

The purpose of the testing was to determine if the packaging was capable of withstanding the rigors of ISTA 3A test protocol combined with customized testing procedures.

Personnel Present During Testing

Carol Metz, Materials Testing Supervisor, gh Package & Product Testing and Consulting, Inc.
D. Kevin Dayton, Laboratory Manager, gh Package & Product Testing and Consulting, Inc.
Timothy Glasmeier, Test Engineer, gh Package & Product Testing and Consulting, Inc.
Michael Smith. Laboratory Technician, gh Package & Product Testing and Consulting, Inc.

Test Equipment

Norlake Environmental Chamber	Calibration Date: 7-12-06
Tinius Olsen 30,000 lb. Compression Tester	Calibration Date: 7-24-06
Lansmont Servo Hydraulic Vibration Table	Calibration Date: 5-2-07
LAB 8000 lb. Oscillatory Vibration Table	Calibration Date: 7-26-06
LAB 160 lb. Drop Tester	Calibration Date: 7-26-06

Test Procedure

ISTA 3A Test Procedure, Version 2006 – For Parcel Delivery System Shipments Less Than 150 lbs.

Conditioning

Tropical Conditions: 100ºF @ 85% Relative Humidity for 72 Hours.

Drop Series 1

The packs are dropped in the following sequence from the required drop height:

Drop #	Drop Height	Drop Orientation
1	18”	Edge 3-4
2	18”	Edge 3-6
3	18”	Edge 4-6
4	18”	Corner 3-4-6
5	18”	Corner 2-3-5
6	18”	Edges 2-3
7	18”	Edges 1-2
8	36“	Face 3
9	18”	Face 3

Vibration

Following the first sequence of drop testing, the pack is subjected to random vibration while under a dead load. ISTA Procedure 3A specified breakpoints are entered into the vibration controller. The specimen is fitted with a stacked load of 12 lbs. of weight per cubic foot of area above the product in a 108” container. The vibration is broken down into four (4) segments. Vibration testing is performed for 60 minutes while face side 3 is down. The second segment, the pack is oriented with face side 4 down. This segment endures 30 minutes of vibration. For the third segment, the pack is oriented with face side 6 down. This segment is then vibrated for 30 minutes. The fourth segment is with side 3 down and no top load. This segment is vibration tested for 30 minutes.

Rotational Edge Drop

Following the random vibration segments, perform three (3) rotational edge drops according to the following sequence: longest face 3 edge, next longest edge radiating 90˚ from the edge just tested and opposite edge from the 2nd drop. Place the package with face 3 down onto a flat, rigid surface. Support the face 3 edge that is opposite the test face 3 edge with a 3.5 – 4.0 inch timber or support. Lift the face 3 edge that is to be tested 8 in off of the surface. Release the edge to be tested so that it falls freely onto the flat, rigid surface. Repeat for the additional selected drops.

Full Rotational Flat Drop

Place the product so that the smallest face rests on a flat rigid surface and in a position that when pushed over face 3 will impact the surface. Using any method to apply enough force to the upper half of face 1 to push the product over onto the rigid surface. Place one of the next largest faces on a flat rigid surface and when pushed over face 3 will impact the surface. Again, using any method to apply enough force to the upper half of face 1 to push the product over onto the rigid surface.

Concentrated Impact

Place the product so that face 3 rest on two separate support blocks, which are on opposite ends of the longest dimension parallel to each other and the shortest edges. Set the platen of the drop machine to drop the hazard box from a height that is 16 inches above face 1. Hold the hazard box on the drop test platen so the angle iron bottom edge is parallel to the length of the platen and parallel to the shortest dimension of face 1. Drop the hazard box parallel to the shortest dimension of face 1 and impact the midpoint across the longest dimension of face 1.

Units under Test

Product: Medium Tray Package

Outside Dimensions: 13 ½" X 11" X 6"
Weight: 4.5 lbs.

Testing Sequence

The pack receives the required ambient pre-test conditioning.
72 Hour Tropical Conditioning was performed.
The pack is then dropped according to the ISTA 3A procedure sequence one.
Vibration testing was performed per the standards briefly restated above.
The rotational drops, full rotational drops and concentrated impacts were performed per the standards briefly restated above.

*Note: Environmental Conditioning and Vibration Was Performed In Addition To 3A Protocol: Low Temperature Conditioning to -40ºF for a minimum of 12 Hours Followed By Random Truck/Air Vibration at 1.15 Grms for 1 Hour was performed.

*Note: Environmental Conditioning and Vibration Was Performed In Addition To 3A Protocol: High Temperature Conditioning to 160ºF for a minimum of 12 Hours Followed By Random Truck/Air Vibration at 1.15 Grms for 1 Hour was performed.

Testing Results and Inspection

Results:

Conditioning: No packaging compromise was evident following the Tropical Conditioning.

Drops:	1 – Orientation: Edge 3-4	Height: 18 inches
	2 – Orientation: Edge 3-6	Height: 18 inches
	3 – Orientation: Edge 4-6	Height: 18 inches
	4 – Orientation: Corner 3-4-6	Height: 18 inches
	5 – Orientation: Corner 2-3-5	Height: 18 inches
	6 – Orientation: Edge 2-3	Height: 18 inches
	7 – Orientation: Edge 1-2	Height: 18 inches
	8 – Orientation: Face 3	Height: 36 inches
	9 – Orientation: Face 3	Height: 18 inches

Vibration: Over-the-Road Trailer

Orientation 1: Face 3 – 75 lbs. top load	Time: 60 min
Orientation 2: Face 4 – 50 lbs. top load	Time: 30 min
Orientation 3: Face 6 – 50 lbs. top load	Time: 30 min

Vibration: Pick up and Delivery Vehicle
Orientation 1: Face 3 Time: 30 min

Drops:
Rotational edge drops and Full rotational drops performed allowing the selected edges and face 3 to impact the flat, rigid surface.

Concentrated Impact:

Hazard box dropped from a height of 16" above the surface of face 1 on the test pack. The hazard box was dropped at the midpoint across the longest dimension of face 1.

ISTA Procedure 3A Final Results: No damage to the packaging system or the product was evident. The packaging and the product remain in condition suitable to be re-introduced into the shipping environment.

Additional Conditioning & Vibration:
Environmental Conditioning and Vibration Was Performed In Addition To 3A Protocol:
Low Temperature Conditioning to -40ºF for 24 Hours Followed By Random Truck/Air Vibration at 1.15 Grms for 1 Hour was performed. Following the Random Vibration the internal temperature of the packaging was recorded: **61.8ºF**.

Environmental Conditioning and Vibration Was Performed In Addition To 3A Protocol:
High Temperature Conditioning to 148ºF for 20 Hours Followed By Random Truck/Air Vibration at 1.15 Grms for 1 Hour was performed.

Overall Final Inspection Data: The packaging and product remained free of damage.

Testing Compliance and Accreditation

Unless otherwise noted, the testing stated above complies with the ISTA 3A procedure.

The completed testing above was in compliance with ISO/IEC 17025 and was in compliance with the customer requested test(s) and requirements. All reference and data logging materials used in the above testing are traceable to NIST. The testing performed above was performed at gh Package & Product Testing and Consulting, Inc., in Cincinnati. This test report cannot be reproduced, except in full, without written permission from gh Package & Product Testing and Consulting, Inc. If the measurement uncertainty calculations are listed in the report, the measurement uncertainties represent an expanded uncertainties expressed at approximately 95% confidence level using a coverage factor of K=2.

The expanded uncertainty (K=2) for Compression on the Tinius Olsen, 3000 lb. scale, S/N 67620 is 1.709 lbs.

Test Criteria, Understanding and Product Disposition

Test Criteria and Understanding

All reasonable efforts have been exercised to provide accurate data from resultant tests or consultation. Test methods utilized and followed in conducting various tests involve standards established by A.S.T.M., T.A.P.P.I., D.O.T., Federal Spec. and Mil-Spec., I.S.T.A. as well as private company test standards and procedures. gh Testing assumes no responsibility or guarantees/warranties regarding (specifically stated or implied) performance and only assumes responsibility for the test data presented by it. Responsibilities involving alterations and/or changes to the packages and/or product beyond item(s) originally tested are those of the user/supplier/client, of which, gh testing assumes no responsibility.

Post Package/Product Disposition

gh Testing will hold material for a period of one (1) week after testing is completed (unless otherwise instructed by the client). After this time, gh Testing will dispose of the material or equipment to their discretion or a storage charge at a rate of $3.25 per square foot per month will be charged.

Please contact me should you have questions regarding this testing.

This report respectfully submitted by:

Mr. Kevin Dayton
Laboratory Manager
gh Package/Product Testing & Consulting, Inc.

Attachments