

ISTA 4 Series  
Enhanced  
Simulation  
Performance  
Test Project

January 2009  
Program  
Version:  
1.0.5

Initial Release:  
October 2006

This web-based  
Application is  
subject to  
frequent  
revision.  
For the  
current version,  
go to the  
4AB webpage at  
[www.ista.org](http://www.ista.org)

## ISTA, Distributing Confidence, Worldwide™

### **NOTE:**

ISTA Project 4AB is a web-based software application that generates Enhanced Simulation Test Plans. Released in October of 2006 as version 1.0.0, it is available free to ISTA Members via a link on the "Members Login" page of the ISTA website at [www.ista.org](http://www.ista.org). Non-members may contact ISTA members to have them demonstrate the program and/or produce a 4AB Test Plan.

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### **Preface**

Enhanced Simulation is defined as an extension of General Simulation, covering all typical distribution hazards in a realistic way, and in addition incorporating one or more elements of Focused Simulation. Project 4AB closely ties the tests and sequence to a user-defined pattern of distribution, and includes a broad range of current and quantitative information on distribution environment hazards.

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### **Scope**

Project 4AB covers testing of 12 different package types, 4 handling types, and 7 types of load-carrying materials or combinations; any hazard (test) element may be assigned one of three intensities. Program inputs and test plans may be in English or metric units.

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### **Product Damage Tolerance and Package 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 Projects and Procedures*.

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### **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.
- When multiple tests are conducted all specimens must pass.

### **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 test sequence is tailored to individual situations with usage of up-to-date and specific hazard profiles and parameters. Unlike Focused Simulation, 4AB does not require the user to make quantitative field measurements and translate those into laboratory tests. Measurement-derived test protocols are included as part of the simulation. Once the item to be shipped and the distribution system, means, and configurations are defined, a test plan is generated without further input.

The tests shall be performed on each test sample in the sequence indicated in the 4AB Test Plan generated. The following table provides a general idea of the variables for each hazard type:

Test Category	Test Type	Test Level	For ISTA Certification
Atmospheric Conditioning	Controlled Temperature and Humidity	Temperature and Humidity Table	If Required
Shock	Handling	More than 50 handling tables	Required
Vibration	Random Vibration with and/or without a Top Load	17 vibration spectra with more being added Vibration test time is related to user-specified transit time Vibration tests are accelerated (time-compressed)	Required
Compression	Machine Apply and Release Force Apply and 12-Hour Hold	Calculated Test Force Compression test compensation for time, temperature, humidity and stacking pattern is calculated from data-based formulas Compression tests can accommodate load-sharing packages	If Required

## Equipment Required

Enhanced Simulation and Project 4AB test plans may require relatively sophisticated laboratory testing equipment. As a maximum, the required equipment may include several types of appropriate drop test apparatus, a random vibration test system, an inclined impact tester, compression test apparatus (fixed-platen), conditioning chambers, a lift truck, and – if rail transport is involved – a horizontal impact test machine.

# OVERVIEW OF PROJECT 4AB PROGRAM

## Project 4AB Sponsorship Program

The creation of Project 4AB and the Data Depot (see below) involved considerable effort and the commitment of significant resources. A Sponsorship program was created to support this important work; ISTA gratefully acknowledges below the organizations that generously provided both economic and technical assistance. Special thanks to Lansmont Corporation, which provided the expertise of Dale Root, their Software Development Manager, for programming and technical collaboration.

### Founding Sponsors



### Charter Sponsors



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### The "Data Depot"

Part of Project 4AB is the commitment to a continuing effort of data collection. If the 4AB distribution hazard parameters are to be kept current and meaningful, latest information must be continuously available. For some time, technology has supported the accurate and appropriate measurement of distribution shock, vibration, compression, and atmospheric data. Efforts are continuously underway to obtain as much of that information as possible, analyze and compile it appropriately, and use it within 4AB. These efforts are called ISTA's "Data Depot". Individual records will be leveraged by combination with similar data to increase statistical significance and confidence. Persons and organizations willing to contribute distribution environment information to the Data Depot are encouraged to contact ISTA Headquarters.