TRANSPORT TESTING LABORATORY
CERTIFICATION PROCEDURE

Updated May 2020

I. INTRODUCTION

Utilization of the ISTA® Transit Tested Program has established the effectiveness of ISTA® Pre-shipment Testing procedures as a deterrent to in-transit damage. The Transit Tested Program is based upon the concept that industry shall continue to progressively improve its performance packaging through pre-shipment testing so that an economic balance between overall packaging costs and physical distribution adequacy can be attained.

The purpose of the Laboratory Certification from ISTA® is to confirm all facilities are properly equipped to perform pre-shipment testing of packaged-products in accordance with ISTA® Pre-shipment Test Projects and Procedures, and the generated outputs and results are within the same range as other ISTA Certified Laboratories.

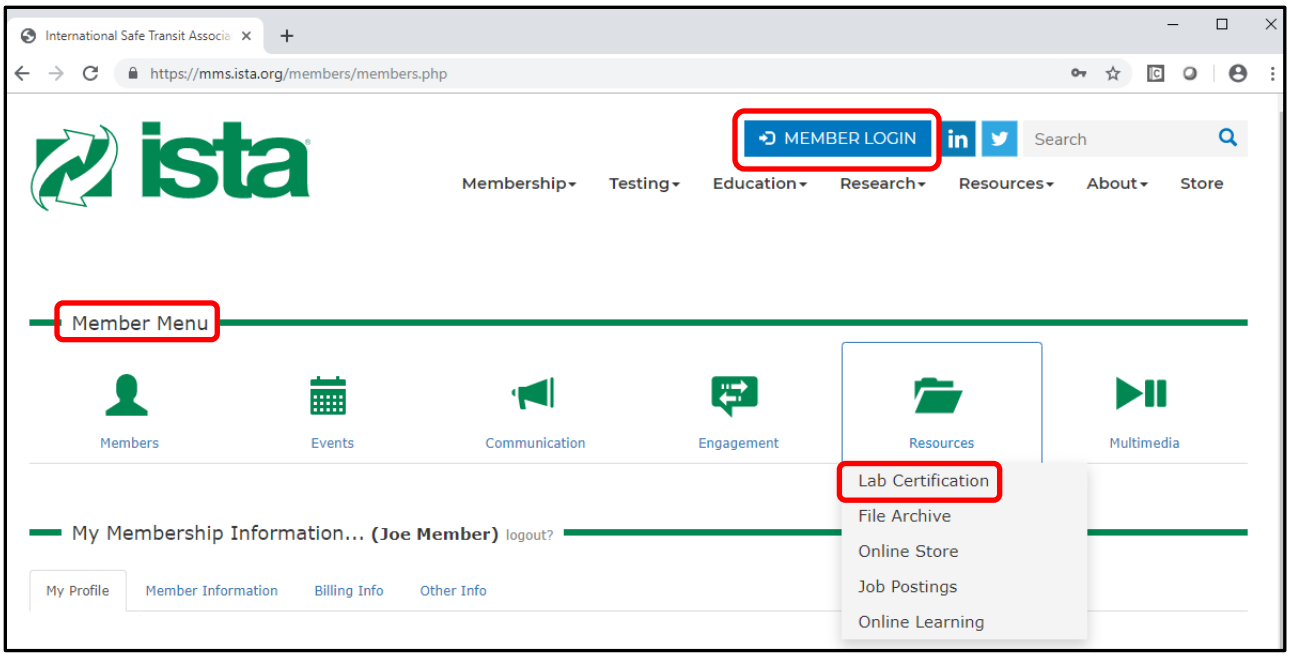
II. SCOPE

The Laboratory Certification Procedure is designed to help standardize test results between package testing laboratories that wish to obtain and/or continue their membership as a Certified Laboratory of ISTA.

The certification of any testing laboratory is dependent upon its possession of the necessary equipment to perform the specified test procedures, and to ensure equipment is properly installed and maintained. Operating personnel must be capable of performing pre-shipment tests on packaged-products in accordance with ISTA® Test Projects and Procedures, evaluating results and completing and submitting Certified Laboratory Test Report forms.

Laboratory Certification must be performed initially, upon application, and then biennially or as called for by the Certification Council by the member laboratory under responsible supervision. Additionally, the laboratory must submit the proper certification documents when new equipment is added or when existing equipment is discontinued or moved to a new location.

Equipment capabilities along with a video as outlined in this document should be recorded on the ISTA® Equipment Verification forms using the Lab Certification Portal (located within the Resources folder of the ISTA Member Menu). The Lab Certification portal is only accessible to ISTA Laboratory members using their company login (issued to the Delegate). An instructional video on how to use the Lab Certification Portal can be found on ISTA.org under Resources then On-Demand Webinars & Videos.



An evaluation of the data, with appropriate comments, will be provided to the laboratory within thirty (30) days after receipt of the completed Equipment Verification forms and video. In the event that the evaluation discloses a need for the adjustment of laboratory equipment, appropriate suggestions regarding remedial action will be made by ISTA Staff and or ISTA Certification Council.

III. EQUIPMENT REQUIRED

1. Vibration Test System
    i. A substantial wood box **(corrugated containers will not be accepted)** filled with sand or equivalent to a gross weight of 100 lb (45 kg). In order to maintain uniform data, it is required that this test box be a Style 2 Nailed Wooden Box (end cleats INSIDE), measuring approximately 24" x 18" x 10", OD (Fig. 1). It is recommended that it be retained and kept continuously available for periodic equipment calibration.
    ii. Carpenter's level
    iii. Calibrated tachometer or speed indicator for determining shaft RPM
    iv. Metal shim $^{1}/_{16}$ inch thick, approximately two (2) inches wide.
    v. A solid surface to perform the Phase Relationship test (as described in A1.5, below).
    vi. Blank copy paper and pencil/pen.
2. Compression Tester
    i. Stop watch or watch with seconds hand.
    ii. Measuring Tape
3. Drop Tester
    i. Measuring Tape

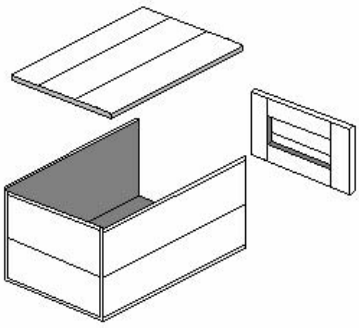


Figure 1: Style 2 Nailed Wooden test box

IV. ADDITIONAL EQUIPMENT REQUIRED (when applying for listed Projects or Procedures)

1. Top Load apparatus (Procedure 3A)
2. 2 – Hazard Blocks (Procedure 3A)
3. 2 – Consolidation Bags (Procedure 3A-small)
4. Dunnage materials (Procedure 3A-small)
5. Fork Truck Handling Course (Procedure 3B)

V. VIDEO PROCEDURE

This section of the ISTA Laboratory Certification procedure involves creating video(s) of the equipment and methods involved in certification, in lieu of an on-site inspection. This procedure is used for existing laboratories needing re-certification and by new laboratory members submitting their initial certification. **This procedure is required on a biennial basis, regardless of changes to equipment since the last re-certification.**

The video must include all parts of the video procedure (please note the checklist on the last page of this procedure - that will help you generate the video). Your video will be kept on file with ISTA, and therefore will become ISTA property. For this reason, please consider making a back up of your video to keep at your facility. If you need your video returned or deleted for any reason, please contact ISTA.

MATERIALS REQUIRED

See previous documentation for calibration equipment required. In addition, the following will be needed for the video:

1 A digital camera with video capability

2 Blank sheets of paper and black pen for making titles.

STEPS FOR VIDEO (a checklist is included on the last page for your convenience)

1 A camera tripod, special lighting, batteries or electrical service or other accessories may be required according to the situation.

2 Prepare a title on a sheet of paper and videotape for approximately 10 seconds. Include the applicant laboratory name and address, Member ID number if applicable, and the date of taping. Additional titles may be used throughout the taping to identify equipment but are not required.

3 Progress through the steps for each piece of equipment, below. Video each step in the Procedure that applies to your laboratory (required steps are labeled with an *. For each piece of equipment also show an overall view of the equipment, followed by the procedure as defined. When possible, zoom in to show details of the process. (Tip: having an assistant run the video equipment is easier than doing everything with one person.)

A1. FIXED DISPLACEMENT VIBRATION (rotary or vertical linear motion)

1 Inspect the table surface. Rough, worn or painted surfaces should be replaced or cleaned.

2 Check the mounting bolts for tightness.

3 ***(Video Required)** Operate the machine through its entire frequency range to determine smoothness of operation.

4 ***(Video Required)** Show that the table surface is level: With the machine turned off, place a carpenter's level on the center of the table, parallel with the direction of motion. Manually rotate the **carpenter's level** slowly through one complete revolution. Should the bubble deviate from its original position, the table surface is not level and adjustment is required before certification will be approved.

5 ***(Video Required)** Verify phase relationship of the primary and secondary shafts (“Circle Test”; for rotary motion only):

Clamp a wooden pencil at a corner of the table, parallel to the shafts, with the point extending beyond the edge. With the table operating at about 250 CPM, slowly bring a blank sheet of paper mounted on a stable surface (i.e., clip board attached to a hand truck) into steady contact with the pencil point for several revolutions. Repeat at each corner. If the resultant figures appear as 1-inch diameter circles at all four (4) corners then the shafts are operating in phase. Should any of the resultant figures appear as an ellipse, or outside of the tolerance of +/- $^{1}/_{16}$ inch, then the shafts are out-of-phase and adjustment is required before certification will be approved. Document the corner for each circle produced. The circles must be submitted to ISTA with certification materials.

6 ***(Video Required)** Sample Testing: Center the 100 lb wooden test box on the vibration table with one end panel against a fence (as applicable). Start the table at a low frequency and slowly increase the vibration frequency until the metal shim may be slipped along under the bottom edge of the box. You should be able to move the shim intermittently (at the top of each cycle) along one entire edge of the box in a direction parallel to the motion of the vibration tester.

7 Complete **FIXED DISPLACEMENT VIBRATION Equipment Verification Form** in the Lab Certification Portal (located within the Resources folder of the ISTA Member Menu) along with circles requested in A1.5 above and applicable outside calibration documentation.

A2. RANDOM VIBRATION

1 Inspect the table surface. Rough, worn or painted surfaces should be replaced or cleaned.

2 Check the mounting bolts for tightness.

3 ***(Video Required)** Operate the machine through its entire frequency range to determine smoothness of operation.

Continued on the next page.

4 ***(Video Required)** Place the wooden test box on the unit and perform sample testing using the table below. Adjust any discrepancies in accordance with the manufacturer's service manual. PSD breakpoints are available in the current ISTA Projects and Procedures listed, or contact ISTA for PSD breakpoints.:

Perform the following vibration profiles as shown in the applicable ISTA Procedure. **(Submit control plots with Equipment Verification Forms and video):**	**Applicable ISTA Procedure**
Random vibration spectrum, overall Grms: 1.15 Theoretical stroke: 0.884 in (22.45 mm) peak-to-peak.	1G,1H, 2A, or 2B
Random vibration spectrum, overall Grms: 0.51 Theoretical stroke: 0.950 in (24.13 mm) peak-to-peak.	2C
Steel Spring Truck spectrum, overall Grms 0.54 Theoretical stroke: 1.777 in (45.13 mm) peak-to-peak.	2C,3B,3E,3H, or 6-Amazon.com-SIOC
Air ride truck spectrum, overall Grms: 0.28 Theoretical stroke 2.14 in (54 mm) peak-to-peak	2C, or 3H
Over-the-Road Trailer spectrum, overall Grms: 0.53 Theoretical stroke: 1.855 in (47.12 mm) peak-to-peak.	3A, 6-Amazon.com-Over Boxing, or 6-Amazon.com-SIOC
Pick-up and Delivery Vehicle spectrum, overall Grms: 0.46 Theoretical stroke: 2.312 in (58.72 mm) peak-to-peak.	3A, or 6-Amazon.com-SIOC
Rail spectrum, overall Grms: 0.13 Theoretical stroke: 0.837 in (21.26 mm) peak-to-peak	3H
Vibration under low pressure spectrum, overall Grms: 1.05 Theoretical stroke: 0.296 in (7.52 mm) peak-to-peak.	3A (optional)
Random vibration spectrum, overall Grms: 0.464 Theoretical stroke: 1.556 in (39.5 mm) peak-to-peak	6-SAMSCLUB
Random vibration spectrum, overall Grms: 0.552 Theoretical stroke: 1.649 in (41.9 mm) peak-to-peak	6-SAMSCLUB

5 Complete **RANDOM VIBRATION Form** in the Lab Certification Portal (located within the Resources folder of the ISTA Member Menu) along with applicable control plots and applicable outside calibration documentation.

B1. INCLINE IMPACT TESTER

1 Inspect the dolly surface. Rough, worn or painted surfaces should be replaced or cleaned.

2 Check the mounting bolts for tightness.

3 ***(Video Required)** Perform the verification test from the Equipment Verification Form: Perform 5 empty dolly impacts from the top of the incline to assure free running of the wheels and smoothness of operation.

4 ***(Video Required)** Record velocimeter readings and calculate inches per second on Page 2 of Equipment Verification Form.

5 Complete both pages of the **INCLINE IMPACT TESTER Form** in the Lab Certification Portal (located within the Resources folder of the ISTA Member Menu) along with applicable outside calibration documentation.

B2. HORIZONTAL SLED IMPACT TESTER

1 Inspect impact surface. Rough, worn or painted surfaces should be replaced or cleaned.

2 Check mounting bolts for tightness and rails for alignment and smoothness of surface.

3 ***(Video Required)** Make five impacts to assure free running and smoothness of operation.

4 Complete **HORIZONTAL IMPACT SLED Form** in the Lab Certification Portal (located within the Resources folder of the ISTA Member Menu) along with applicable outside calibration documentation.

C1. FREE FALL DROP TESTER

1 Inspect the surface of the drop table leaves, swing arm platform or other surface on which the packaged-product being tested may rest. Rough, worn or painted surfaces should be replaced or cleaned.

2 Check the surface upon which packaged-products are dropped. Rough, worn or warped areas should be replaced.

3 ***(Video Required)** Determine that dropping surface is an unyielding (solid) base by tapping on it with a hammer or similar device.

4 ***(Video Required)** Operate release mechanism to determine that packaged-products will fall without restraint.

5 ***(Video Required)** Sample Testing: Determine that release mechanism allows the packaged-product to strike base properly (i.e., that base is horizontal and that packages dropped impact the base with no deviation from the horizontal). This is accomplished by doing sample drops on a corner, edge, side and end, using a 5-25 lb actual or simulated packaged-product.

6 Complete **FREE FALL DROP TESTER Form** in the Lab Certification Portal (located within the Resources folder of the ISTA Member Menu) along with applicable outside calibration documentation.

C2. SHOCK TEST SYSTEM

1 Inspect any surface on which the packaged-product being tested may rest. Rough, worn or painted surfaces should be replaced or cleaned.

2 Check the mounting bolts for tightness. Determine that unit is anchored in accordance with manufacturer's recommendations to an unyielding (solid) base.

3 ***(Video Required)** Operate release mechanism to determine if packaged-product receives indicated shock accurately.

4 ***(Video Required)** Sample Testing: Determine that release mechanism allows the packaged-product to be impacted solidly. This is accomplished by doing a sample test on a corner, edge, side and end, using a 5-25 lb actual or simulated packaged-product.

5 Complete **SHOCK TEST SYSTEM Form** in the Lab Certification Portal (located within the Resources folder of the ISTA Member Menu) along with applicable outside calibration documentation.

D. COMPRESSION TESTER (VERITCAL COMPRESSION)

1 Inspect all surfaces to be certain that they are smooth and horizontal when at rest.

2 ***(Video Required)** Sample Testing: Operate unit to assure that compression rate is constant and within limits (use a measuring tape and run the machine, showing that the platen moves at the required rate).

3 ***(Video Required)** Sample Testing: Load and operate unit to show that platens do not deflect at a maximum rated load (do not use maximum force if it will damage the machine).

4 Complete **COMPRESSION TESTER Form** in the Lab Certification Portal (located within the Resources folder of the ISTA Member Menu) along with applicable outside calibration documentation.

E. ENVIRONMENTAL CONDITION CHAMBER

1 Inspect unit to see that seals are tight and not worn.

2 ***(Video Required)** Operate unit and verify that temperature can be maintained within +/- 4 degrees Celsius (show instrumentation).

3 ***(Video Required)** Operate unit to verify that relative humidity can be maintained within +/- 5% (show instrumentation).

4 Complete **ENVIRONMENTAL CONDITIONING CHAMBER Form** in the Lab Certification Portal (located within the Resources folder of the ISTA Member Menu) along with charts or graphs showing temperature and humidity function and applicable outside calibration documentation.

F. CLAMP TESTER (HORIZONTAL COMPRESSION)

1 Inspect all surfaces to be certain that they are smooth and vertical when at rest.

2 ***(Video Required)** Sample Testing: Operate unit to assure that clamping rate is constant through the full clamping range (use a measuring tape and run the machine, showing that the platens move at a consistent rate).

3 ***(Video Required)** Sample Testing: Operate unit to assure that the platen force is accurate within limits (using accepted calibration means show that the force rating of the platens is accurate +/- 5%).

4 ***(Video Required)** Sample Testing: Load and operate unit to show that mechanism allows the packaged-product to be clamped and lifted off the ground. This is accomplished by doing a sample test on a 5-25 lb actual or simulated packaged-product.

5 Complete **CLAMP TESTER Form** in the Lab Certification Portal (located within the Resources folder of the ISTA Member Menu) along with applicable outside calibration documentation.

COMPLETING THE EQUIPMENT VERIFICATION FORMS

Equipment Verification Forms are required for new labs seeking certification and must be completed in full and submitted for approval in the **Lab Certification Portal (located within the Resources folder of the ISTA Member Menu)**. These forms are vital to documenting your laboratory's capabilities and capacities. A form must be filled out completely for each piece of equipment used for ISTA testing. If your equipment does not utilize listed instrumentation, leave those fields blank as well. Leave blank those forms that represent equipment you don't have.

LABELING YOUR VIDEO(S)

Please name your files and electronic media with the **Company Name and ISTA Member ID** (if applicable).

SUBMITTING YOUR MATERIALS

All lab certification materials should be in a digital format. Materials should be submitted online through the Lab Certification Portal (located within the Resources folder of the ISTA Member Menu).

Please compress the video files and attach them to the appropriate Equipment Form within the Lab Certification Portal. The video(s) can be submitted in one of the following file types:
.mpg, .avi, .mov, .wmv, .mod, .mp4, .rm, .rar, .zip

Calibration and Control Plots must be submitted with your lab certification. These should be uploaded with each equipment form. The documentation required is listed below:

- Calibration certificates to a traceable source (calibration is required on an annual basis)
- Control plots if certifying to Procedures 3A or 3E, and/or to Project 3B and 6-SAMSCLUB
- Circles for rotary motion fixed displacement vibration – Only applicable if you are submitting for approval Rotary Motion Fixed Displacement vibration equipment.

Equipment Forms should be filled out online via the Lab Certification Portal (located within the Resources folder of the ISTA Member Menu)

Electronic Submission: Use the Lab Certification Portal (located within the Resources folder of the ISTA Member Menu). **The Lab Certification portal is only accessible to ISTA Laboratory members using their company login (issued to the Delegate).** An instructional video on how to use the Lab Certification Portal can be found on ISTA.org under Resources then On-Demand Webinars & Videos.

RECERTIFICATION

Lab recertification is required every two years and helps ensure that labs are activity maintaining equipment. As a means of verifying equipment maintenance and annual calibration, a lab may elect one of the options below to complete the biannual recertification process. These alternative documents providing labs a more efficient process while maintaining the information needed to ensure the lab is within the working standards of ISTA. It should be noted that the initial certification process remains as an option for recertification.

Recertification Process Options		
Alternative Submission Methods (Select One)	**Method**	**Expectation**
ISO 17025 Certificate	Third party accreditation	• Submit current (most recent) ISO 17025 Certificate of Accreditation • Must demonstrate technical competence in Testing
Calibration Documents/Records	OEM or Third-Party Vendor	• OEM (NIST traceable) • 3rd party ISO 17025 accredited • Self-calibrate (equipment being used for calibration must be NIST Traceable) • Provide two (2) years of calibration documentation for each piece of equipment • Documents must be in English
Current New Lab Certification Process	Self-Certifying	• Equipment forms filled out on www.ISTA.org • Capture & upload videos of equipment in operations as required in ISTA Lab Certification Procedure

TESTING SURVEY

ISTA continues to look for ways to improve packaged-product testing and therefore we are seeking to understand how much testing is being conducted in laboratories world-wide. As part of the recertification process, please take this opportunity to improve testing within our industry and provide feedback in an anonymous 10 question survey. The survey is in the Lab Certification area within the Member Center of ISTA.org.

Your input is valued and imperative. As a member driven association with a mission to enhance the effectiveness of package design and testing, we are reliant on guidance from industry professionals to guide projects such as this.

TRANSPORT TESTING LABORATORY
CERTIFICATION PROCEDURE CHECKLIST

You may use the following **Checklist** to be sure that all pertinent information is included on your video. This form is for your use and does not need to be returned to ISTA.

CATEGORY	FUNCTION TO VIDEO	COMPLETE
A1/A2: Vibration	Overall View	☐
	Frequency run-through	☐
	Levelness of table	☐
	Phase Relationship (circles - Rotary Motion only)	☐
	Screen shot of PSD Plots	☐
	Sample Testing: Use of Test Box and metal shim	☐
B1/B2: Incline/Horizontal Impact	Overall view	☐
	Verification test (fill out worksheet on equipment form)	☐
	Controls view	☐
C1/C2: Drop/Shock	Overall view	☐
	Release mechanism shown	☐
	Sample Testing: drops on end, side, corner, edge	☐
D: Compression	Overall view	☐
	Sample Testing: Consistent compression rate	☐
	Sample Testing: Platen deflection	☐
	Controls view	☐
E: Environmental Chamber	Overall view	☐
	Controls view	☐
F: Clamp	Overall view	☐
	Sample Testing: Consistent clamping rate	☐
	Sample Testing: Force accuracy	☐
	Sample Testing: Clamp and lift	☐
G: Additional views	**Optional** Show outside of lab, any non-lab office space, etc.	☐
H. Additional Equipment (submit photos or drawings)	☐ 3B fork handling course (drawing or photo) ☐ 3A Top load apparatus (photo) ☐ 3A Hazard blocks (photo) ☐ 3A Small dunnage/bags (photo)	
Submission Materials (as applicable)	☐ Equipment Verification Forms Filled Out ☐ Video(s) ☐ Vibration Control Plots ☐ Calibration Documentation ☐ Atmospheric Chamber graphs ☐ Rotary Vibration Circles	