

UN/US DOT/IATA/ICAO/IMDG, ASTM D4919 HazMat Testing for:

- Boxes (All Types)
- Plastic, Metal and Fiber Drums
- Plastic & Metal Jerricans
- Plastic Bags (All Types)
- Composite Packagings (All Types)
- Infectious Substance Packagings
- Biological Substance Packagings
- Radioactive Material 7A Packagings
- Large Fibreboard Packagings
- Large Wooden Packagings
 - ✓ Drop Testing
 - ✓ Vibration Testing
 - ✓ Leakproofness Testing
 - ✓ Pressure Differential (Hydraulic & Vacuum) Testing
 - ✓ Cobb (Water Absorptiveness) Testing on Fibreboard Samples
 - ✓ ECT, Burst, Basis Weight & Beach Puncture Testing on Fibreboard Samples
 - ✓ Dart Penetration Test

ISTA Testing Procedures

ISTA 1 Series: Non-Simulation Integrity Performance Tests.

- ✓ Procedure 1A: Packaged-Products weighing 150 lb (68 kg) or Less
- ✓ Procedure 1B: Packaged-Products weighing Over 150 lb (68 kg)
- ✓ Procedure 1C: Extended Testing for Individual Packaged-Products weighing 150 lb (68 kg) or Less
- ✓ Procedure 1D: Extended Testing for Individual Packaged-Products weighing Over 150 lb (68 kg)
- ✓ Procedure 1E: Unitized Loads
- ✓ Procedure 1G: Packaged-Products weighing 150 lb (68 kg) or Less (Random Vibration)
- ✓ Procedure 1H: Packaged-Products weighing Over 150 lb (68 kg) (Random Vibration)

ISTA 2 Series: Partial Simulation Performance Tests

- ✓ Procedure 2A: Packaged-Products weighing 150 lb (68 kg) or Less
- ✓ Procedure 2B: Packaged-Products weighing over 150 lb (68 kg)
- ✓ Procedure 2C: Furniture Packages

ISTA 3 Series: General Simulation Performance Tests

- ✓ Procedure 3A: Packaged-Products for Parcel Delivery System Shipments 70kg (150 lb) or Less (standard, small, flat or elongated)
- ✓ Procedure 3B: Packaged-Products for Less-Than-Truckload (LTL) Shipment
- ✓ Procedure 3E: Similar Packaged-Products in Unitized Loads for Truckload Shipment
- ✓ Procedure 3F: Packaged Products for Distribution Center to Retail Outlet Shipment 100 lb (45 kg)
- ✓ Project 3K: Fast Moving Consumer Goods for the European Retail Supply Chain

ISTA 4 Series: Enhanced Simulation Performance Tests

ISTA 6 Series: Member Performance Tests

- ✓ Project 6-AMAZON.COM-SIOC, Ships in Own Container (SIOC) for Amazon.com Distribution System Shipment
- ✓ Project 6-AMAZON.COM-Over Boxing, e-Commerce Fulfillment for Parcel Delivery Shipment
- ✓ 6-FEDEX-A: FedEx Procedures for Testing Packaged Products Weighing Up to 150 lbs.
- ✓ 6-FEDEX-B: FedEx Procedures for Testing Packaged Products Weighing Over 150 lbs.
- ✓ Project 6-SAMSCLUB, Packaged-Products for Sam's Club® Distribution System Shipment

ISTA 7 Series: Development Tests

- ✓ Procedure 7D: Temperature Test for Transport Packaging

Less than Truck Load (LTL) Shipments Testing Procedures

- ✓ NMFC Rule 180 - Performance Testing of Shipping Containers
- ✓ NMFC Rule 181 - Furniture Package Performance Testing

ASTM Testing of Shipping Containers & Systems

- ✓ **ASTM D4169** Standard Practice for Performance Testing of Shipping Containers and Systems Distribution Cycles 3 through 13
- ✓ **ASTM D7386** Standard Practice for Performance Testing of Packages for Single Parcel Delivery Systems
- ✓ **ASTM D5276** Test Method for Drop Test of Loaded Containers by Free Fall
- ✓ **ASTM D4728** Test Method for Random Vibration Testing of Shipping Containers
- ✓ **ASTM D3580** Standard Test Methods for Vibration (Vertical Linear Motion) Test of Products
- ✓ **ASTM D5112** Standard Test Method for Vibration (Horizontal Linear Sinusoidal Motion) Test of Products
- ✓ **ASTM D999** Test Methods for Vibration Testing of Shipping Containers
- ✓ **ASTM D642** Test Method for Determining Compressive Resistance of Shipping Containers, Components, and Unit Loads
- ✓ **ASTM D4577** Test Method for Compression Resistance of a Container Under Constant Load
- ✓ **ASTM D7030** Test Method for Short Term Creep Performance of Corrugated Fiberboard Containers Under Constant Load Using a Compression Test Machine
- ✓ **ASTM D880** Test Method for Impact Testing for Shipping Containers and Systems
- ✓ **ASTM D5277** Test Method for Performing Programmed Horizontal Impacts Using an Inclined Impact Tester
- ✓ **ASTM D6055** Fork lift handling
- ✓ **ASTM D6055** Test Methods for Mechanical Handling of Unitized Loads and Large Shipping Cases and Crates
- ✓ **ASTM D6179** Test Methods for Rough Handling of Unitized Loads and Large Shipping Cases and Crates
- ✓ **ASTM D6344** Test Method for Concentrated Impacts to Transport Packages
- ✓ **ASTM D6653** Test Methods for Determining the Effects of High Altitude on Packaging Systems by Vacuum Method
- ✓ **ASTM D4332** Practice for Conditioning Containers, Packages, or Packaging Components for Testing
- ✓ **ASTM D5265** Test Method for Bridge Impact Testing
- ✓ **ASTM D4919** Standard Guide for Testing of Hazardous Materials (Dangerous Goods) Packagings
- ✓ **ASTM D4991** Test Method for Leakage Testing of Empty Rigid Containers by Vacuum Method
- ✓ **ASTM D7760** Standard Guide for Conducting Internal Pressure Tests on United Nations (UN) Packagings

- ✓ **ASTM D3103** Standard Test Method for Thermal Insulation Performance of Distribution Packages
- ✓ **ASTM F2825** Standard Practice for Climatic Stressing of Packaging Systems for Single Parcel Delivery
- ✓ **ASTM D2741** Standard Test Method for Susceptibility of Polyethylene Bottles to Soot Accumulation
- ✓ **ASTM F2132** Standard Specification for Puncture Resistance of Materials Used in Containers for Discarded Medical Needles and Other Sharps
- ✓ **ASTM D951** Standard Test Method for Water Resistance of Shipping Containers by Spray Method
- ✓ **ASTM D1185** Standard Test Methods for Pallets and Related Structures Employed in Materials Handling and Shipping
- ✓ **MIL-STD-810F** - Environmental Test Methods
- ✓ **MIL-STD-810G** - METHOD 503.5 – Thermal Shock
- ✓ **MIL-STD-2073** - DOD Standard Practice for Military Packaging

Leak Testers and Flow Testers for:

Automotive Component Manufacturers
Food Packaging Applications
Medical Devices
Pharmaceutical Industry Use

- Designed to Test Porous or Non-porous Flexible Packaging
 - Provides both Seal Strength and Leak Integrity Testing in One Instrument
 - Seal Strength Tests (Burst, Creep and Creep-to-Failure)
 - Leak Integrity Testing on Non-porous Packages
 - Burst, Occlusion, Vacuum and Pressure Decay, Crack and Pressure Differential or Vacuum
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- ✓ **ASTM F2054** Standard Test Method for Burst Testing of Flexible Package Seals Using Internal Air Pressurization Within Restraining Plates
 - ✓ **ASTM F1140** Standard Test Methods for Internal Pressurization Failure Resistance of Unrestrained Packages
 - ✓ **ASTM F2095** Standard Test Methods for Pressure Decay Leak Test for Nonporous Flexible Packages With and Without Restraining Plates
 - ✓ **ASTM F88** Standard Test Method for Seal Strength Testing of Flexible Barrier Materials
 - ✓ **ASTM F1886** Determining integrity of seals for medical packaging by visual inspection
 - ✓ **ASTM F1585** Guide for Integrity Testing of Porous Medical Packages
 - ✓ **ASTM D3078** Standard Test Method for Detection of Leaks in Flexible Packaging (Bubble)
 - ✓ **ASTM F1140** Standard Test Methods for Internal Pressurization Failure Resistance of Unrestrained Packages
 - ✓ **ASTM F2097** Standard Guide for Design and Evaluation of Primary Flexible Packaging for Medical Products
 - ✓ **ISO 11607-1** Packaging for terminally sterilized medical devices -- Part 1: Requirements for materials, sterile barrier systems and packaging systems
 - ✓ **ISO 11607-2** Packaging for terminally sterilized medical devices -- Part 2: Validation for Forming, Sealing, and Assembly Processes

Pack-Vac Leak Detectors for:

- ✓ **ASTM D3078** Standard Test Method for Determination of Leaks in Flexible Packaging by Bubble Emission
- ✓ **ASTM D6653** Standard Test Methods for Determining the Effects of High Altitude on Packaging Systems by Vacuum Method
- ✓ **ASTM D6834** Standard Test Method for Determining Product Leakage from a Package with a Mechanical Pump Dispenser
- ✓ **ASTM D4169** Standard Practice for Performance Testing of Shipping Containers and Systems
- ✓ **ASTM D4991** Standard Test Method for Leakage Testing of Empty Rigid Containers by Vacuum Method
- ✓ **ASTM D5094** Standard Test Methods for Gross Leakage of Liquids from Containers with Threaded or Lug-Style Closures
- ✓ **ASTM F2096** Standard Test Method for Detecting Gross Leaks in Porous Medical Packaging by Internal Pressurization (Bubble Test)
- ✓ **ASTM F1929** Standard Test Method for Detecting Seal Strength in Porous Medical Packaging by Dye Penetration
- ✓ **ASTM F3039** Standard Test Method for Detecting Leaks in Nonporous Packaging or Flexible Barrier Materials by Dye Penetration
- ✓ **ASTM F2338** Standard Test Method for Nondestructive Detection of Leaks in Packages by Vacuum Decay Method

TAPPI Testing – Paper & Corrugated Board

- ✓ **T 400** Sampling and Accepting a Single Lot of Paper, Paperboard, Fiberboard, or Related Product (ASTM D 585)
- ✓ **T 401** Fiber Analysis of Paper and Paperboard (ASTM D 1030)
- ✓ **T 402** Standard Conditioning and Testing Atmospheres for Paper, Board, Pulp Handsheets, and Related Products 187 D 685
- ✓ **T 403** Bursting Strength of Paper (ASTM D 774)
- ✓ **T 404** Tensile Breaking Strength and Elongation of Paper and Paperboard (Using Pendulum Type Tester)
- ✓ **T 409** Machine Direction of Paper and Paperboard (ASTM D 528)
- ✓ **T 410** Grammage of Paper and Paperboard (Weight Per Unit Area) (ASTM D 646)
- ✓ **T 411** Thickness (Caliper) of Paper, Paperboard, and Combined Board (ASTM D 645)
- ✓ **T 412** Moisture in Paper and Paperboard (ASTM D 644)
- ✓ **T 414** Internal Tearing Resistance of Paper (Elmendorf Type Method) (ASTM D 689)
- ✓ **T 425** Opacity of Paper (15/d geometry, Illuminant A/2°, 89% Reflectance Backing and Paper Backing) (ASTM D 589)
- ✓ **T 431** Ink Absorbency of Blotting Paper (ASTM D 2177)
- ✓ **T 432** Water Absorbency of Bibulous Papers (ASTM D 824)
- ✓ **T 433** Water Resistance of Sized Paper and Paperboard (Dry Indicator Method) (ASTM D 779)
- ✓ **T 441** Water Absorptiveness of Sized (Non-bibulous) Paper, Paperboard, and Corrugated Fiberboard (Cobb Test) (ISO 535, ASTM D 3285)
- ✓ **T 448** Water Vapor Transmission Rate of Paper and Paperboard at 23°C and 50% RH (ASTM E 96, E 398)
- ✓ **T 452** Brightness of Pulp, Paper, and Paperboard (Directional Reflectance at 457 nm) (ASTM D 985)
- ✓ **T 453** Effect of Dry Heat on Properties of Paper and Board (ASTM D 776)
- ✓ **T 455** Identification of Wire Side of Paper (ASTM D 5039)
- ✓ **T 456** Wet Tensile Breaking Strength of Paper and Paperboard (“Wet Tensile Strength”) (ASTM D 829)
- ✓ **T 458** Surface Wettability of Paper (Angle of Contact Method) (ASTM D 724)
- ✓ **T 459** Surface Strength of Paper (Wax Pick Test) (ASTM D 2482)
- ✓ **T 460** Air Resistance of Paper (Gurley Method) (ASTM D 726)
- ✓ **T 464** Water Vapor Transmission Rate of Paper and Paperboard at High Temperature and Humidity (ASTM E 96, E 398)
- ✓ **T 465** Static Creasing of Paper for Water Vapor Transmission Tests
- ✓ **T 476** Abrasion Loss of Paper and Paperboard (Taber-Type Method)
- ✓ **T 480** Specular Gloss of Paper and Paperboard at (ASTM D 1223)
- ✓ **T 489** Bending Resistance (Stiffness) of Paper and Paperboard (Taber-type Tester in Basic Configuration) (ASTM D 5342)
- ✓ **T 491** Water Immersion Test of Paperboard
- ✓ **T 494** Tensile Properties of Paper and Paperboard (Using Constant Rate of Elongation Apparatus) (ASTM D 828)
- ✓ **T 496** Specimen Preparation for Cross Directional Internal Tearing Resistance for Paper, Paperboard and Related Materials
- ✓ **T 502** Equilibrium Relative Humidity of Paper and Paperboard
- ✓ **T 504** Glue in Paper (Qualitative and Quantitative Determination)
- ✓ **T 512** Creasing of Flexible Packaging Material Paper Specimens for Testing (ASTM F119)

- ✓ **T 515** Visual Grading and Color Matching of Paper (ASTM D1729)
- ✓ **T 516** Envelope Seal, Seam, and Window Patch Testing
- ✓ **T 519** Diffuse Opacity of Paper (d/0 paper backing)
- ✓ **T 520** Curl of Gummed Flat Papers
- ✓ **T 523** Dynamic Measurement of Water Vapor Transfer Through Sheet Materials (ASTM E 96, F 372)
- ✓ **T 529** Surface pH Measurement of Paper
- ✓ **T 536** Resistance of Paper to Passage of Air (High Pressure Gurley Method) (ASTM D 726)
- ✓ **T 541** Internal Bond Strength of Paperboard (Z-Direction Tensile)
- ✓ **T 543** Bending Resistance of Paper (Gurley-Type Tester) (ASTM D 6125)
- ✓ **T 546** Machine Direction Grammage Variation Measurement (Gravimetric Method)
- ✓ **T 549** Coefficients of Static and Kinetic Friction of Uncoated Writing and Printing Paper by Use of the Horizontal Plane Method (ASTM D 4917)
- ✓ **T 550** Determination of Equilibrium Moisture in Pulp, Paper and Paperboard for Chemical Analysis 287 D 644
- ✓ **T 551** Thickness of Paper and Paperboard (Soft Platen Method) 534 D 645
- ✓ **T 558** Surface Wettability and Absorbency of Sheeted Materials Using an Automated Contact Angle Tester (ASTM D 724)
- ✓ **T 559** Grease Resistance Test for Paper and Paperboard (ASTM D 722)
- ✓ **T 566** Bending Resistance (Stiffness) of Paper (Taber-type Tester in 0 to 10 Taber Stiffness Unit Configuration) (ASTM D 5650)
- ✓ **T 571** Diffuse Brightness of Paper and Paperboard
- ✓ **T 573** Accelerated Temperature Aging of Printing and Writing Paper by Dry Oven Exposure Apparatus (ASTM D 6819)
- ✓ **T 574** Wax in Pulp, Paper and Paperboard (ASTM D 590)
- ✓ **T 576** Tensile Properties of Towel and Tissue Products (Using Constant Rate of Elongation Apparatus)
- ✓ **T 577** Score Bend Test Non-fibrous Materials Testing
- ✓ **T 653** Specular Gloss of Paper and Paperboard at 20° D 523
- ✓ **T 807** Bursting Strength of Paperboard and Linerboard
- ✓ **T 808** Flat Crush Test of Corrugated Board (Flexible Beam Method)
- ✓ **T 809** Flat Crush of Corrugated Medium (CMT Test)
- ✓ **T 810** Bursting Strength of Corrugated and Solid Fiberboard
- ✓ **T 811** Edgewise Compressive Strength of Corrugated Fiberboard (Short Column Test)
- ✓ **T 812** Ply Separation of Solid and Corrugated Fiberboard (Wet)
- ✓ **T 813** Tensile Test for the Manufacturer's Joint of Fiberboard Shipping Containers
- ✓ **T 815** Coefficient of Static Friction (Slide Angle) of Packaging and Packaging Materials (Including Shipping Sack Papers, Corrugated and Solid Fiberboard) (Inclined Plane Method) (ASTM D 4918)
- ✓ **T 818** Ring Crush of Paperboard (ASTM D 1164)
- ✓ **T 819** Water Absorption of Corrugating Medium: Boat Method
- ✓ **T 820** Flexural Stiffness of Corrugated Board
- ✓ **T 821** Pin Adhesion of Corrugated Board by Selective Separation
- ✓ **T 822** Ring Crush of Paperboard (Rigid Support Method)
- ✓ **T 824** Fluted Edge Crush of Corrugating Medium (Flexible Beam Method)
- ✓ **T 825** Flat Crush Test of Corrugated Board (Rigid Support Method)
- ✓ **T 826** Short Span Compressive Strength of Paperboard
- ✓ **T 829** Score Quality Test
- ✓ **T 830** Ink Rub Test of Container board
- ✓ **T 831** Water Absorption of Corrugating Medium: Water Drop Penetration Test

- ✓ **T 832** Water Absorption of Corrugating Medium: Float Curl Method
- ✓ **T 835** Water Absorption of Corrugating Medium: Water Drop Absorption Test
- ✓ **T 836** Bending Stiffness, Four Point Method
- ✓ **T 838** Edge Crush Test Using Neck-down
- ✓ **T 839** Edgewise Compressive Strength of Corrugated Fiberboard Using the Clamp Method (Short Column Test) 3037
- ✓ **T 840** Testing Adhesives Used in Glued Lap Joints of Corrugated Fiberboard Containers
- ✓ **T 841** Edgewise Compressive Strength of Corrugated Fiberboard Using the Morris Method (Short Column Test)
- ✓ **T 843** Fluted Edge Crush of Corrugating Medium (Rigid Support Method)

Adhesive Testing:

- **ASTM D903** Peel or Stripping Strength of Adhesive Bonds (180 degree peel)
- **ASTM F904** Bond Strength / Ply Adhesion
- **ASTM 41781** Climbing Drum Peel of Adhesives
- **ASTM D3330** Peel Adhesion
- **ASTM D429** Rubber Property - Peel Adhesion to Rigid Substrates
- **ASTM D1876** T-Peel of Adhesives
- **ASTM D3167** Floating Roller Peel of Adhesives
- **ASTM D1002** Lap Shear Metals
- **ASTM D3163** Lap Shear Adhesively Bonded Plastics
- **ASTM D3164** Lap Shear Sandwich Joints
- **ASTM D3528** Lap Shear Adhesive Joints
- **ASTM D5656** Lap Shear Thick Adherend Metal
- **ASTM D5868** Lap Shear Adhesion for Fiber Reinforced Plastics
- **ASTM D1623** Tensile Adhesion Properties
- **ASTM C297** Tensile Strength of Sandwich Constructions (Flatwise Tensile)

Additional Adhesive Tests:

- **ASTM D904** Exposure of Adhesives to Artificial Light (QUV)
- **ASTM D4339** Determination of Odor of Adhesives
- **ASTM D5229** Moisture Conditioning

Plastic Film Tests:

- **ASTM D1894** Static and Kinetic Coefficients of Friction of Plastic Film and Sheeting
- **ASTM D1922** Standard Test Method for Propagation Tear Resistance of Plastic Film and Thin Sheeting by Pendulum Method
- **ASTM D1709** Impact resistance of plastic film by free-falling dart method
- **ASTM D903, D1876, D3167** Peel Test
- **ASTM F1249** Water Vapor Transmission Rate (WVTR)
- **ASTM D543** Chemical Compatibility
- **ASTM D1894** Coefficient Of Friction
- **ASTM D5264** Standard Practice for Abrasion Resistance of Printed Materials
- **ASTM D882**; Tensile Properties of Thin Plastic Sheeting
- **ASTM D3330** Standard Test Method for Peel Adhesion of Pressure-Sensitive Tape
- **ASTM D3654** Standard Test Methods for Shear Adhesion of Pressure-Sensitive Tapes
- **ASTM D3759** Standard Test Method for Tensile Strength and Elongation of Pressure-Sensitive Tapes
- **ASTM D2221** Standard Test Method for Creep Properties of Package Cushioning Materials
- **ASTM D6252** Peel Adhesion of Pressure-Sensitive Label Stocks at a 90° Angle
- **ASTM D6862** 90 Degree Peel Resistance of Adhesives
- **ASTM D2979** Pressure-Sensitive Tack of Adhesives Using an Inverted Probe Machine
- **ASTM D6195** Standard Test Method for Loop Tack
- **ASTM D5264** Abrasion Resistance of Printed Materials by the Sutherland Rub Tester
- **ASTM D3420** Pendulum impact resistance of plastic film
- **ASTM F1980** - Standard Guide for Accelerated Aging of Sterile Barrier Systems for Medical Devices

Accelerated Aging

- Climatic chamber – Humidity, temperature cycling -78°C to +150°C, 10 – 95% RH
- UV testing – ASTM G155, ASTM G154, ISO 4892
- Heat aging testing
- Laboratory simulations of field failures
- Thermal shock testing (-78°C to +200°C)
- High & low temperature tensile & compression testing
- Weathering - Xenon Arc ASTM D2565, D4459, G155, SAE J1885, J1960, J2527
- Weight Gain/Loss Studies ASTM D471
- Chemical Compatibility ASTM D543
- QUV Accelerated Weathering - ASTM D4329, D4587, ISO 4892