



# Packaging Performance Test & Validation Review Guidelines

## **OBJECTIVE**

To define the process for packaging performance testing for expendable packaging for new model launch parts used in any H-D manufacturing location. Harley-Davidson's packaging validation requirements using ISTA (International Safe Transit Association) testing protocols. It ensures packaging designs provide adequate protection for production components, service parts, and accessory products shipped to Harley-Davidson facilities, distribution centers, and dealerships. The goal is to: - Prevent damage, cosmetic defects, and deformation during transit and handling. - Standardize packaging verification across suppliers. - Reduce warranty costs and protect Harley-Davidson brand quality. - Ensure compliance with Harley-Davidson logistics and distribution environments.

## **SCOPE**

This standard applies to: - All inbound supplier shipments to Harley-Davidson manufacturing plants. - Shipments to Harley-Davidson Parts & Accessories (P&A) distribution centers. - Dealer-facing packaged products. - Domestic and international shipments. It covers expendable, semi-permanent, and retail packaging. Returnable packaging follows separate Rack & Dunnage Validation Guidelines but may reference select testing procedures.

## **DEFINITIONS**

**ISTA:** International Safe Transit Association – governing body for transit testing. **(Preferred Method)**

**ASTM:** American Society for Test and Materials

**Packaging System:** Complete set of materials protecting the part (carton, dunnage, foam, wrap, pallet, etc.).

**Class A Surface:** Chrome, painted, polished, or cosmetic surface requiring defect-free appearance.

**Fragility (G-Value):** Shock sensitivity rating of product or component.

**Critical-to-Quality Areas (CTQs):** Regions susceptible to cosmetic or functional damage.

## **PART CATEGORIES**

Parts shall be classified into the following categories prior to selecting an ISTA test protocol.

### **Category 1 – Premium Cosmetic Components**

Examples: - Chrome surfaces, painted tanks/fenders - Polished wheels - Mirror housings and decorative trim

Risk Profile: - High cosmetic sensitivity - Moderate-to-high abrasion risk - Failure mode: scratches, dents, coating defects

Required ISTA Tests: ISTA 3A or 3B depending on package type

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### **Category 2 – Electronic & Electrical Components**

Examples: - ECUs, BCMs, ABS modules - Sensors, displays, switches

Risk Profile: - Fragility < 50G - Electrostatic discharge (ESD) sensitivity - Susceptible to vibration and drop shock

Required ISTA Tests: ISTA 2A (baseline) or ISTA 3A (high-value or parcel-mode shipments)

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### **Category 3 – Structural & Mechanical Components**

Examples: - Frames, forks, bars - Engine covers, housings, castings - Brake components

Risk Profile: - High mass - Low fragility (>80G) - Packaging must prevent puncture or containment failure

Required ISTA Tests: ISTA 1C or ISTA 3B (palletized)

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### **Category 4 – Flexible & Soft Components**

Examples: - Seats, leather/vinyl panels - Rubber hoses, gaskets - Wire harnesses

Risk Profile: - Low fragility - High deformation risk - Susceptible to compression set

Required ISTA Tests: ISTA 1A or ISTA 2A

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### **Category 5 – Dealer-Facing Retail Products**

Examples: - Accessories in branded packaging - Helmets, visors, apparel items - Chrome kits for retail

Risk Profile: - Retail packaging must remain visually flawless - High parcel distribution frequency

Required ISTA Tests: ISTA 3A (mandatory)



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## ISTA TEST SELECTION MATRIX

<u>Packaging Type</u>	<u>Part Category</u>	<u>ISTA Test Requirement</u>
Small parcel / individual carton	1, 2, 5	ISTA 3A
Master pack (multiple small cartons)	1–5	ISTA 3A
Heavy/large individual pack	3	ISTA 2B or 3B
Palletized load	3, 4	ISTA 1C / ISTA 3B
Retail packaging	5	ISTA 3A

ISTA 3A is the Harley standard for high-value, cosmetic, or parcel-distributed goods.

## GENERAL REQUIREMENTS

### **Material Restrictions**

The following materials are not permitted unless approved by Harley-Davidson: - Loose fill (peanuts, shredded paper) - Abrasive kraft paper in contact with Class A surfaces - Recycled-content foam that sheds particles on chrome/paint

### **Corrugated Board Requirements**

Minimum board grade: - <20 lb: 32 ECT - 20–40 lb: 44 ECT - >40 lb: 48–51 ECT - Heavy-duty or export packaging may require tri-wall

### **Surface Protection Requirements**

Parts with Class A surfaces require: - Non-abrasive wraps (foam, microfiber, nonwoven) - Anti-static bags for electronics - Dunnage separation preventing metal-to-metal contact - No direct corrugated contact with polished or painted surfaces

### **Dunnage Requirements**

Dunnage must: - Prevent movement under vibration and shock - Provide cavities or compartments for multi-part packs - Withstand repeated handling without generating debris.

### **Labeling Requirements**

Labels must: - Remain adhered after ISTA testing - Be placed on flat surfaces - Avoid covering Class A surfaces.

## ISTA TEST REQUIREMENTS BY PACKAGE TYPE

### **ISTA 3A – Small Package Testing**

Required for: - Retail packaging - Chrome/cosmetic parts - Electronics - P&A network shipments

Includes: - Atmospheric conditioning - Vibration (random) - Shock/drop sequence - Compression testing

### **ISTA 2A – Partial Simulation Testing**

Used for moderate risk components where: - Shipping is controlled (FTL) - Low cosmetic sensitivity - Electronics with robust housing

### **ISTA 3B – Palletized Load Testing**

Required for: - Mixed pallet loads - Heavy or high-mass parts - Internal plant material flow when expendable packaging is used

Includes: - Vertical vibration under load - Rotational flat-drop tests - Unitized load compression

### **ISTA 1A/1C – Integrity Testing**

Used for: - Low-risk flexible components - Preliminary validation ahead of 3-series tests

## PASS/FAIL CRITERIA

A packaging system passes ISTA testing if:

### **Product Condition**

- No functional damage
- No structural deformation
- No Class A surface defects (scratches, dents, wear)
- Electronics must power on without error

### **Packaging Performance**

- No punctures or tears compromising protection
- No collapse during compression testing
- Labels remain readable and attached
- Dunnage remains intact and retains positioning

Any deviation constitutes a failure requiring redesign and retest.



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## DOCUMENTATION REQUIREMENTS

Suppliers must submit: - ISTA test report (PDF) - Photos of pre- and post-test conditions - Packaging specification sheet (with materials and part orientation) - CAD or drawings of dunnage (if applicable) - Bill of materials for packaging - Rev-controlled packaging instructions (PI sheets)

## RESPONSIBILITIES

### Supplier

- Responsible for selecting a certified test lab.
- Responsible for classifying part according to Category 1-5.
- Propose packaging and conduct packaging performance testing per the ISTA/ASTM protocol.
- Submit packaging test & validation check sheet for approval.
- Ensure consistency of protocols for all components sourced

### Harley-Davidson Packaging Engineering

- Communicate part classification and test procedures and protocols
- Review and approve Packaging Test & Validation Check Sheet
- Conduct audits when required.
- Communicate handling/storage requirements.

### Quick Reference Checklist

- Certified packaging test lab selected
- Test protocol selected per the requirement by package type
- Packaging testing performed and completed per the specification
- Test validation report submitted to H-D Packaging Engineer
- Submit packaging test & validation checklist
- Receive approved checklist back from H-D Packaging Engineer