
PACKAGING
SOLUTION
CENTER
ATLANTIC
PACKAGING
SOLUTION
CENTER
12201 Steele Creek Rd.
Charlotte, NC 28273

ATLANTIC PACKAGING'S

PACKAGING SOLUTION CENTER

Research & Design, Backed by Science and Driven by Innovation

- Testing Equipment & Capabilities
- Custom Design & Optimization
- Automation Equipment Showroom
- Sustainable E-Commerce Solutions
- Stretch Film Recycling
- Educational Seminars & Tours

The Packaging Solution Center is a state-of-the-art research and development facility that helps leading brands sustainably design, optimize, and validate their packaging.

Fortune 100 businesses rely on our design and testing capabilities while prototyping new, innovative materials and configurations before they enter the supply chain. When visiting us in Charlotte, North Carolina, you'll have access to the most sophisticated testing equipment in the industry, live demos at our automation equipment showroom, and our team of dedicated engineers and packaging consultants that are eager to help solve all of your packaging challenges. We are a member of the International Safe Transit Association (ISTA), and all our research and education programs are tailored to improving product protection, circularity, and customer experience.

If you are interested in optimizing your packaging or learning more about the industry, schedule a visit.

TESTING EQUIPMENT & CAPABILITIES

A scientific, data-driven approach optimizes, standardizes, and validates packaging for transit — minimizing product damage and reducing packaging costs. Our testing complies with industry standards, including ISTA and ASTM, and is conducted at our ISTA-Certified Testing Laboratory, where we've developed proven stretch film standards for load containment.

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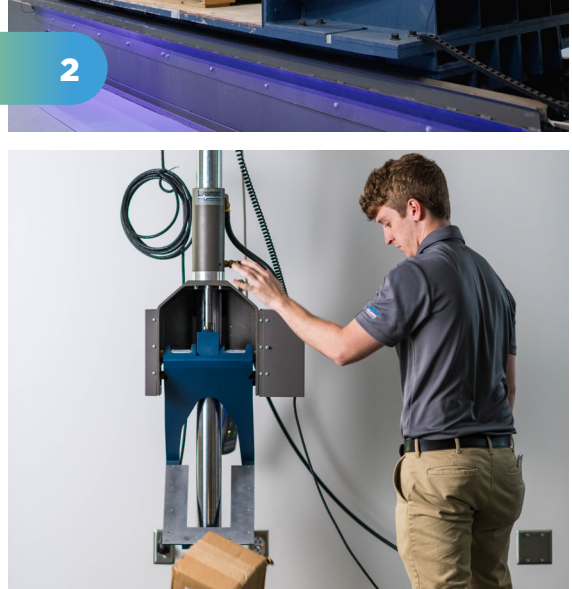

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PACKAGING TESTING LAB

1. Multi-Axis Vibration Table

Recreates real-world transit conditions experienced by unitized loads or single parcels, with an emphasis on truck and train transportation, to test and validate packaging performance

- 8,500-pound capacity with customizable attachments to simulate a trailer's cross-sectional width
- Vibration magnitude, frequency range, and duration are adjusted to ensure consistent load containment
- Simulates motion in multiple directions, standard vibration equipment only tests in the vertical direction

Vibration Direction Combinations:

- Roll: Rotation around the front-to-back (X) axis
- Pitch: Rotation around the side-to-side (Y) axis
- Vertical: Movement up and down the Z axis

2. Horizontal Impact Sled

Simulates acceleration, braking, truck docking, rail switching, and railcar coupling on unitized loads or single parcels during transit

- Impact velocity and acceleration levels are adjusted to ensure your product and packaging meet protection standards
- Sensors and cameras capture data to analyze where a load shifts or fails during stability and shock events

Acceleration & Impact Events:

- Simulates low-g-force, long-duration braking
- Configurable for high-g-force, short-duration shock impacts

3. Drop Tester

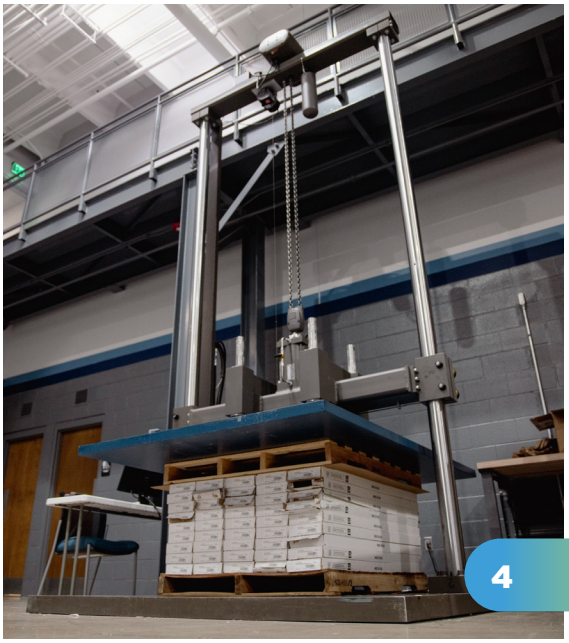
Determines how a product and package react to flat, edge, and corner impacts of varying amplitude, frequency, and height

- The drop leaf quickly moves down and away, allowing for free fall.
- Drop height range: 12 to 72 inches
- Product weight limit: Up to 177 pounds
- Baseplate width: 36 inches
- Baseplate length: 55.5 inches

4. Compression Tester

Evaluates the performance of unitized loads or single parcels under compressive force applied from above

- Simulates the compression packaging experiences when stacked during transit or storage
- Load height capability: 110 inches
- Compression capability: 30,000 pounds



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5. Field Data Recorders

Collects shock, vibration, temperature, and humidity data from real-world delivery routes to simulate transit conditions

- Attach to any vehicle or vessel to replicate transportation conditions
- In partnership with Lansmont, we create a transportation profile with three degrees of freedom, which can be simulated on our Multi-Axis Vibration Table
- Capable of recording up to 90 days of transit data

5

6. Climate Chambers

Conditions products and packaging to varying temperatures and replicates any humidity level

- Temperature range: -80 to 350 degrees Fahrenheit
- Chamber dimensions: 40 x 36 x 36 inches and 24 x 24 x 24 inches

6

INTERNATIONAL SAFE TRANSIT ASSOCIATION (ISTA) TESTING PROCEDURES

ISTA 1 Series | Non-simulation Integrity Performance Tests

These tests determine the integrity of a product and package combination without simulating transit conditions. Results help screen the feasibility of packaging types and set benchmark standards for quality.

- 1A, 1B, 1C, 1E, 1G, 1H

Most Common:

- ISTA 1A – Packaged products 150 pounds (68 kilograms) or less
- Determines the capability of a package and product to withstand imagined transit hazards using vibration and shock profiles

ISTA 2 Series | Partial Simulation Performance Tests

These tests partially simulate transit conditions and are intended to help refine preliminary packaging designs.

- 2A, 2B, 2C

Most Common:

- ISTA 2A – Furniture packages
- Partially simulates transit conditions for furniture using vibration and shock profiles

ISTA 3 Series | General Simulation Performance Tests

These tests fully simulate real-world transit conditions and help predict the risk of damage to your product and packaging.

- 3A, 3B, 3E, 3F, 3H, 3K

Most Common:

- ISTA 3A – Packaged products for parcel delivery system shipment, 150 pounds (70 kilograms) or less
- Simulates transit conditions for standard, small, flat, or elongated packages using various shock and vibration profiles
- ISTA 3E – Similar packaged products in unitized loads for truckload shipment (modified to focus on load stability)
- Simulates full truckload (FTL) conditions on a unitized load, as if traveling from a manufacturing location to a distribution center, using shock, compression, and vibration profiles

ISTA 3 Series | General Simulation Performance Tests

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- Simulates full truckload (FTL) conditions on a unitized load, as if traveling from a manufacturing location to a distribution center, using shock, compression, and vibration profiles

ISTA 6 Series | Custom ISTA Member Performance Tests

These tests simulate the unique distribution conditions of specific ISTA member companies.

- 6-Amazon.com, 6-SamsClub

Most Common:

- ISTA – 6-Amazon.com – Over-boxing
- Simulates e-commerce fulfillment conditions with shocks and vibrations based on Amazon standards

ISTA 6 Series | Custom ISTA Member Performance Tests

ISTA 7E provides standardized thermal profiles based on real-world temperature data collected from parcel delivery environments. These profiles are designed to evaluate the thermal performance of insulated shipping containers (ISCs) during transit. .

- Used to simulate parcel shipment temperature conditions over 72 and 144 hours
- Profiles represent seasonal maximum and minimum temperatures for realistic thermal testing

FLEXIBLE PACKAGING RESEARCH LAB

We are on the cutting-edge of flexible packaging research and development and have the in-house expertise and capabilities to optimize your unique product's packaging with in-depth analysis, research, testing and consulting.

PCR MACHINE STRETCH FILM

We continually test the latest PCR films in our state-of-the-art lab and are also developing our own film formulations.

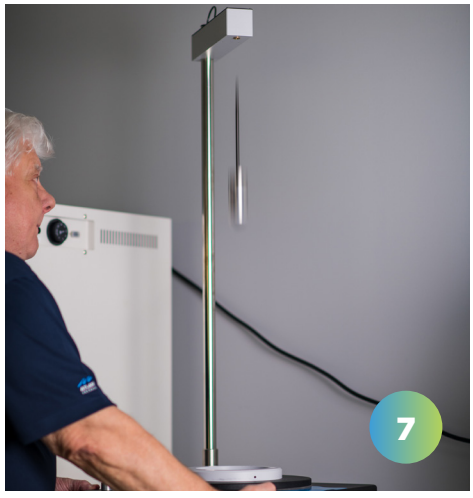
Our 57-gauge high-performance stretch film with 10% PCR content sourced from our closed-loop stretch film recycling program.

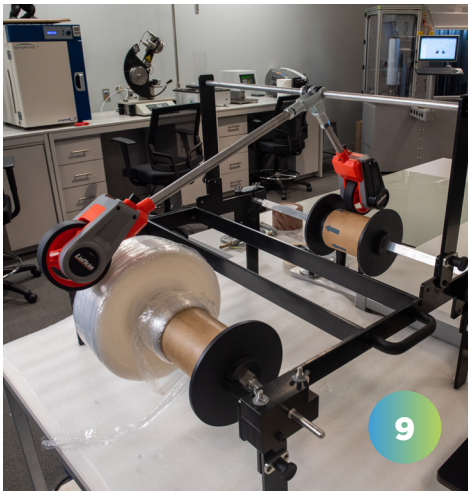
Compared to standard 80-gauge film with 25% PCR, our film:

- **Uses 44% less virgin resin**
- **Reduces weight by over 72%**
- **Maintains performance, saves money, and lowers emissions and waste**

Focus on minimizing gauge and maximizing PCR content while preserving film integrity is core to our philosophy for material efficiency. Additives and unnecessary thickness are avoided wherever possible.

FLEXIBLE PACKAGING TESTING EQUIPMENT & CAPABILITIES





1. FPT-750 | Film Performance Tester | ESTL

Simulates the stretch film application process and offers a variety of capabilities:

- Ultimate Stretch: Determines the stress-strain behavior of stretch film at a given line velocity by increasing pre-stretch in increments until the film reaches its failure point
- Film Consistency: Tests the quality of stretch film for any gels or defects that could cause premature breakage at any given pre-stretch level
- Wrapper Test & Wrapper Consistency: Measures the stress-strain of stretch film using a customer's pallet dimensions and the RPM of their equipment
- Puncture: Measures the force and energy required to puncture stretch film at designated pre-stretch and total stretch levels
- Relaxation: Measures how the winding force of stretch film changes over time based on total stretch level
- Cling: Determines the cling between two layers of stretch film at various levels of pre-stretch, film tension, and total stretch

2. Universal Testing Machine | Thwing-Albert

Tests the tensile strength, peel strength, coefficient of friction, adhesive strength, and seal strength of packaging materials

3. Magma 3 | Hot Tack & Seal Tester | Enepay

Measures the hot tack and heat seal properties of films and flexible packaging using a range of pressures, temperatures, dwell times, and peel rates

4. VHX-6000 Digital Microscope | Keyence

Provides and records high-quality imaging with magnification up to 2,000x

5. Progage Thickness Tester | Thwing-Albert

Measures the thickness of sheet materials up to 40 mils

6. Elmendorf Tear Tester with Spencer Impact Attachment | Thwing-Albert

Calculates a film's impact, puncture, and tear resistance in both the material flow direction and the perpendicular direction

7. Dart Drop Tester | Thwing-Albert

Measures the impact and puncture resistance of films and other packaging materials

8. Symphony Oven | VWR

Determines a film structure's free shrink or planar dimensional changes by heating the film above its melting point, then cooling it to room temperature

9. Film Footage Counter | Atlantic Packaging

Measures the footage of film dispensed from a sample roll


This bag is made with seaweed.

BIO-BASED PACKAGING INNOVATION

Eliminating traditional plastic from the supply chain demands next-generation functional coatings that match the performance of conventional plastics — without the environmental cost. These alternatives must meet rigorous mechanical, thermal, and barrier requirements, including oxygen (OTR), moisture (WVTR), and grease resistance — key to protecting perishable goods.

To achieve widespread adoption, solutions must be scalable, cost-effective, and compatible with existing manufacturing infrastructure. Our work centers on sustainability-first materials that are bio-based and either curbside recyclable or home compostable — critical components of a truly circular packaging system.

Petroleum-based materials still dominate due to their scalability and cost advantages — but they fall short on sustainability. While bio-based alternatives offer clear environmental benefits, they continue to face challenges in performance, price, and supply chain consistency. Hybrid, dual-source materials present a promising bridge as biomanufacturing technologies mature.

Current bio-based options show promise for short-term use but often underperform in high-humidity or extended shelf-life applications. Meanwhile, fragmented supply chains and limited production capacity continue to slow progress — barriers that must be overcome to realize the full potential of sustainable barrier coatings.

We're actively advancing the development of innovative biomaterials through testing and collaboration with companies developing:

- Foam derived from chitin and food waste
- Compostable films made with seaweed
- Scalable systems for bio-based chemicals and food alternatives
- Silk-based edible coatings that reduce packaging and food waste
- Lignin-based coatings that deliver high-performance barrier properties on paper substrates

Our mission is to accelerate the shift toward scalable, high-performance, bio-based packaging—powering the future of sustainable supply chains.

CUSTOM DESIGN & OPTIMIZATION

Our approach to custom design and optimization centers on creating sustainable, high-performance packaging solutions that meet the needs of both brands and consumers.

We focus on three key areas:

1

Product Protection

Ensuring that packaging safeguards contents throughout the supply chain is critical not only for product integrity but also for sustainability and cost efficiency. Damaged products result in waste — from lost inventory and unsellable goods to the emissions and energy used in their production and transportation. Optimized protection minimizes returns, reduces environmental impact, and saves businesses money by preserving product value.

2

Material Reduction

We strategically engineer packaging to use less material without compromising performance. This reduces raw material consumption, lowers shipping weight, and supports sustainability goals — all while maintaining durability and functionality that protect the product inside.

3

Unboxing Experience

Thoughtfully designed packaging enhances the end-user experience while improving ease of access for businesses and consumers alike. A product that arrives undamaged in frustration-free packaging delivers greater satisfaction, reinforces brand trust, and reduces customer service issues — all while aligning with environmental responsibility.

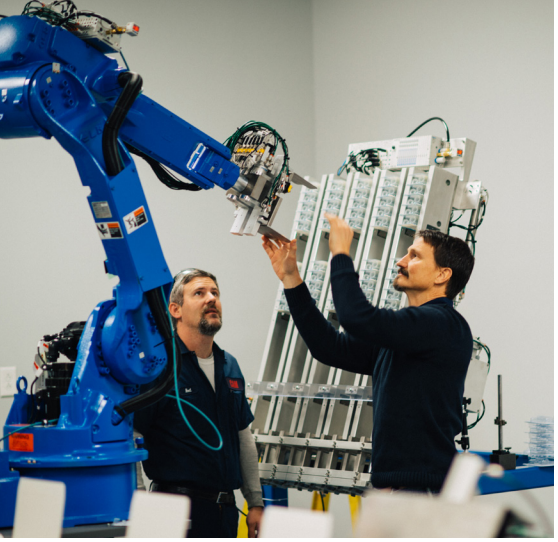
We prioritize materials that are curbside recyclable, renewable, and harmless to wildlife and ecosystems. When materials fall short of these standards, they should only be used when essential — specifically in cases where product protection is critical to preventing waste and upholding broader sustainability goals.

As a leader in scientific packaging innovation, we engineer the intersection of functional coatings and precisely matched paperboard substrates to meet the rigorous demands of high-speed manufacturing environments. This precision pairing ensures both technical performance and environmental integrity.

Our vertically integrated operations are a key differentiator. With in-house coating, printing, and manufacturing capabilities, along with technical teams skilled in equipment installation and retrofitting, we deliver scalable solutions that support the rapid transition to next-generation sustainable materials.

Through collaboration, research, and real-world testing, we create tailored packaging systems that integrate effortlessly into existing lines — minimizing disruption and reducing the need for capital investment.

Whether advancing circular packaging systems or pioneering cutting-edge materials, our end-to-end approach is built to accelerate innovation, minimize environmental impact, and future-proof your packaging operations.



AUTOMATION EQUIPMENT SHOWROOM

Step into the future of packaging at our Automation Equipment Showroom — a dynamic space where businesses can explore, test, and see live demonstrations of the most advanced end-of-line automation technologies available.

Designed to be hands-on and solution-focused, our showroom showcases real-world automation in action, helping you identify systems that can boost efficiency, cut costs, and increase accuracy across your operations. Whether you're looking to streamline e-commerce fulfillment, optimize stretch wrapping, integrate robotics, or improve case forming and sealing, our lineup is engineered to address the evolving needs of modern packaging — no matter your industry.

Solutions on Display Include:

- Fiber-Based Flexible Packaging Replacements
- Case & Tray Erecting and Sealing
- Stretch Wrapping
  - Turntable, Rotary Arm, Ring, Horizontal, Autonomous
- E-Commerce Fulfillment Automation
  - Void Fill, Bagging, Right-Sizing
- Shrink Packaging
  - L-Sealers, Side Sealers, Bundlers, Sleevers
- Robotics
  - Case Packing, Palletizing
- Bagging Equipment
  - VFFS, HFFS, Fiber-Based
- Custom Material Handling Systems
  - Conveyors, Infeeds, Accumulation
- Coding, Marking, & Labeling Solutions
- Strapping & Banding (Product-Level & Pallet-Level)

WHAT SETS US APART

Our vertically integrated approach means we handle every aspect — from equipment installation and operator training, to retrofitting systems for sustainable materials and in-house printing and coating – at our manufacturing facilities. Our engineers work closely with you to create fully integrated systems that support your packaging goals today — and evolve for tomorrow.

END-TO-END SUPPORT

Our commitment doesn't end after installation. Atlantic offers:

- On-demand service from factory-trained technicians
- Preventive maintenance programs
- Remote troubleshooting and emergency support
- A nationwide technician network and robust parts inventory

OPTIMIZE YOUR PACKAGING.

AUTOMATE YOUR FUTURE.

Our showroom demonstrations give your team the clarity to make informed decisions on packaging system upgrades or automation investments.

SUSTAINABLE E-COMMERCE SOLUTIONS

Curbside Recyclability, Cost Savings, & Efficiency

Manufacturing Materials for Your Equipment

- Atlantic's In-House Printing, Converting, & Coating
- Matching Functional Coating & Paperboard for Maximum Efficiency
- Collaboration, Testing, Research, & Design

Technical Service & Support

- Nationwide Coverage with Expert Technicians
- Installation & Operator Training
- On-Demand Service & Preventive Maintenance
- Comprehensive Parts Inventory

AUTOMATED EQUIPMENT FOR FIBER-BASED PACKAGING:

- **New Earth Approved Automated Mailer System —** Horizontal High-Speed Fiber Mailer Automation (Substrate Versatile)
- **Right-Sized Cartoning Automation —** Reduces Void & Lowers Dimensional Weight
- **Fiber Mailer Bagging —** Vertical Mail Bagging Options (Substrate Versatile)
- **Fiber Banding —** Designed to Band Multis for Feeding Baggers or Packaging Directly into Shipping Cases

SUSTAINABLE PRODUCT PROTECTION DISPENSERS: RANPAK SYSTEMS

VOID FILL:

Prevents Items from Shifting Inside Cases

- **FillPak Trident™ –** high-speed dispenser of unique triangular-stitched tubes designed for maximum void fill at the lowest cost
- **FillPak Trident Mini™ –** a compact solution for the pack station
- **FillPak® TTC –** high-speed, small footprint void fill machine for pack station use

CUSHIONING:

Protects Items from Impacts During Transit

- **PadPak® Sr. Auto-Coiler –** unique dispenser designed to produce taped coils of padded paper for extremely heavy and fragile products (great foam-in-place replacement)
- **PadPak Guardian® –** compact dispensing solution for robust cushioning pads

WRAPPING:

Provides Protection & Defends Against Surface Abrasion for Safe Delivery

- **WrapPak® Protector –** convoluted paper pad for box lining and other cushioning applications (great bubble cushioning replacement)
- **Geami® HV –** extensible die-cut kraft paper lined with tissue paper for surface protection, designed for wrapping fragile goods

CLOSING THE LOOP

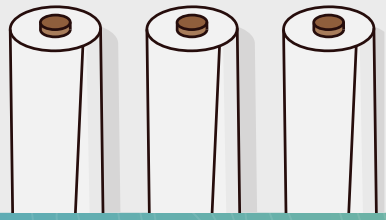
A Sustainable Approach to Stretch Film

6 COMPLETE

Customer uses Atlantic's premium PCR stretch film, completing the circle

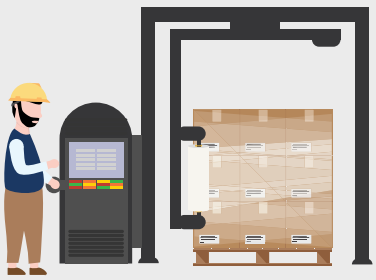
5 CREATE

Atlantic's film partners create high-performance PCR stretch film



1 REDUCE

Optimize stretch film usage with MUST



2 CONSOLIDATE

Customer bales clean, used stretch film at their collection site

3 TRANSPORT

Send full truckload of bales to Atlantic Recycling

4 RECYCLE

Atlantic creates high- quality PCR resin

STRETCH FILM RECYCLING

Closed-Loop Stretch Film Recycling

We're turning performance stretch film used by our customers into high-quality PCR resin for recycling.

What are closed-loop systems?

Closed-loop systems circulate materials through the economy instead of sending them to waste streams to keep materials serving their highest value purpose.

What is PCR?

Post-consumer recycled (PCR) content refers to materials that have been used by end users, collected, recycled, and then repurposed into new products.

What are closed-loop systems?

Reusing and recycling resources reduces:

- Virgin material extraction
- Emissions and energy use
- Waste sent to landfills

THANK YOU

to our partners, both upstream and downstream in the supply chain, for helping us create a more circular economy!

THE STRETCH FILM RECYCLING PROCESS

How we transform used performance stretch film into high-quality PCR content

1. Stretch Film Sortation

Bales of used stretch film arrive at our facility and are searched for contaminates.

2. Shredding & Granulation

Stretch film moves along conveyors to be processed into small, fine pieces of plastic.

3. Extrusion & Filtration

Plastic flakes enter an extruder for additional size reduction, heating, homogenization, filtration, and degassing before exiting as melted plastic and going through a second filtration system.

4. Pelletization & Deodorization

Melted plastic is cut and processed into pellets before entering a machine that provides a continuous flush of hot gas to eliminate odors caused by residues and contaminants.

5. PCR Pellet Collection

High-quality PCR pellets, ready to be recycled into stretch film, exit the recycling installation.

6. New Stretch Film

Our extrusion partners manufacture new stretch film with PCR content for use in the market.

EDUCATIONAL SEMINARS & TOURS

Discover the Science Behind Smarter, More Sustainable Packaging

At Atlantic Packaging's **Packaging Solution Center** in Charlotte, North Carolina, we invite you to immerse yourself in the cutting edge of packaging research, automation, and sustainability through our **Educational Seminars & Facility Tours**.

Whether you're new to the industry or a packaging pro looking for next-gen solutions, our sessions are designed to **educate, inspire, and empower**. You'll gain firsthand insights into the science of **load containment**, explore our state-of-the-art **ISTA-certified testing lab**, and see live demonstrations in our **automation equipment showroom**.

WHAT YOU'LL EXPERIENCE

- **Guided Facility Tours** of our innovation hub, including:
  - Advanced packaging testing labs (vibration, impact, compression, climate simulation, and & more)
  - Flexible packaging film lab with in-depth performance analysis
  - Sustainable packaging solutions and closed-loop stretch film recycling
  - Full-scale automation equipment in action
- **Seminars & Training** led by packaging specialists covering:
  - Load containment best practices
  - Sustainable packaging design
  - Custom optimization strategies
  - Automation technologies
  - E-commerce packaging trends
- **Collaborative Consulting** on packaging challenges specific to your business
- **Interactive Demos** tailored to your product, industry, or application

WHY VISIT?

Our goal is simple: to help you optimize your packaging materials, equipment, and processes. By applying real-world data, we work with you to:

- **Cut costs** by minimizing waste and downtime
- **Improve sustainability** through responsible material use and closed-loop systems
- **Reduce damage** with validated, high-performance packaging
- **Increase efficiency** via automation and optimization
- **Enhance the customer experience** with better unboxing and branding

WHO SHOULD ATTEND?

These tours and seminars are ideal for:

- Packaging engineers and supply chain leaders
- Sustainability officers and brand managers
- Operations managers and facility directors
- Anyone looking to understand packaging through a **scientific, hands-on lens**

SCHEDULE A VISIT TODAY

Let's work together to optimize your packaging for the real world — and for the future. Whether you're exploring automation, redesigning for e-commerce, or refining your sustainability strategy, our team is here to support you every step of the way.

Contact us today to book your seminar or facility tour!

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