Avery Dennison Corporation

Founded in 1935
Fortune 500 Company with Current Turnover of $6 Billion +

Avery Dennison Corporation
A materials science and process technology company that creates materials and solutions to enhance brands, improve product performance, and deliver innovative information by designing, developing and manufacturing:

> Labeling, packaging and branding materials
> Integrated Apparel, Food, General Retail, Logistics and Manufacturing Solutions that elevates brand appeal/value and accelerates performance throughout the global supply chain
> Information management materials, products and solutions
> Graphic imaging media
> Specialized adhesive and labeling packaging

Avery Dennison part of Fortune 500 list of the largest U.S. industrial and service companies.
AVERY DENNISON RFID PROGRAMMES

- Avery Dennison has been involved in many of the item level RFID deployments around the world.
- Many of those retailers selected Avery Dennison as the primary, and many times sole, supplier of tags and labels for their pilots and rollouts.
- Avery Dennison was selected by retailers because of the company’s vertical integration and high quality standards.
- The importance of quality cannot be overstated and Avery Dennison has implemented processes and reporting to ensure quality in everything from inlay manufacturing to converting to data management and serialization.
RFID ACTIVE VS PASSIVE

• Active RFID and Passive RFID technologies, while often looked at together they are fundamentally distinct technologies with different capabilities.

• Applicability of Active and Passive RFID to Supply Chain is based on the functionality provided by each technology.

• Active and Passive RFID can address different aspects of supply chain visibility.

• Passive RFID is best suited where the movement of items is process related ie only tracking.

• Active RFID is best suited where business processes are adhoc, dynamic, movement of tagged assets is variable, what may also require security, sensing, and/or data storage capabilities.

• Both technologies play a key role and work together to provide end-to-end, top-to-bottom supply chain visibility.

In Short

• Passive RFID systems use tags with no internal power source

• Active RFID systems use battery-powered RFID tags that continuously broadcast their own signal.

• The big difference is essences in price.
THE PROCESS

1. Passive tags are activated by the reader; (tag antenna draws power) talks back limited information in a limited zone.

**Advantages**
- Smaller tags
- Much cheaper tags
- Thinner/more flexible tags
- Higher range of tag options
- Tags can last a lifetime without a battery (depending on the wear and tear)

2. The internal battery that enables them to have long read ranges as well as large data storage. Generally, active RFID tags that will last between 3 – 5 years.

**Advantages**
- Extremely Long Read Range
- Increased tag abilities with partnered technologies (GPS, sensors, etc.)
- Extremely Rugged tag options
**BASE APPLICATION SUMMARY**

<table>
<thead>
<tr>
<th>Item</th>
<th>Characteristics</th>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boxes Cartons Individual Items</td>
<td>Structured, orderly process for loading -- dedicated loading stations, conveyors</td>
<td>Passive RFID, Bar code</td>
</tr>
<tr>
<td>Pallet</td>
<td>Structured or unstructured movement, depending on situation</td>
<td>Passive RFID or Active RFID</td>
</tr>
<tr>
<td>Intermodal Container</td>
<td>Security requirements&lt;br&gt;Area monitoring within ports, terminals&lt;br&gt;Roadside monitoring</td>
<td>Active RFID</td>
</tr>
<tr>
<td>Chassis, rail car, other conveyance</td>
<td>Area monitoring within ports, terminals&lt;br&gt;Roadside monitoring&lt;br&gt;Intransit visibility</td>
<td>Active RFID GPS (wide area)</td>
</tr>
</tbody>
</table>

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## Summary of functional capabilities of Active and Passive RFID technologies

<table>
<thead>
<tr>
<th></th>
<th>Active RFID</th>
<th>Passive RFID</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Communication Range</strong></td>
<td>Long range (100m or more)</td>
<td>Short or very short range (3m or less)</td>
</tr>
<tr>
<td><strong>Multi-Tag Collection</strong></td>
<td>- Collects 1000s of tags over a 7 acre region from a single reader  &lt;br&gt; - Collects 20 tags moving at more than 100 mph</td>
<td>- Collects hundreds of tags within 3 meters from a single reader  &lt;br&gt; - Collects 20 tags moving at 3 mph² or slower.</td>
</tr>
<tr>
<td><strong>Sensor Capability</strong></td>
<td>Ability to continuously monitor and record sensor input; data/time stamp for sensor events</td>
<td>Ability to read and transfer sensor values only when tag is powered by reader; no date/time stamp</td>
</tr>
<tr>
<td><strong>Data Storage</strong></td>
<td>Large read/write data storage (128KB) with sophisticated data search and access capabilities available</td>
<td>Small read/write data storage (e.g. 128 bytes)</td>
</tr>
</tbody>
</table>
OVERALL BUSINESS BENEFITS OF RFID – in the apparel category

Key Application Drivers

1. Inventory Accuracy in Retail
   • 99%+ Inventory Accuracy
   • 60% to 80% reduction in OOS
   • 75% to 92% faster counts
   • 2%-8% Sales lift
   • GM Improvements

2. Loss Visibility
   • Improved visibility
   • Faster Replenishment
   • Increased internal control
   • Improve consumer experience
   • Shrink reduction

3. Customer Facing Applications
   • POS improvements
   • Increase in average ticket size
   • Improved returns processes
   • Interactive communication
   • Electronic payment & receipts

4. Supply Chain Benefits
   • 80% improvement shipping/packing accuracy
   • Authenticity checking
   • Reducing inspection costs
   • Improved loss prevention
   • 90% reduction in receiving time

Omnichannel
KEY COMPONENTS TO CONSIDER

GLOBAL EPC SERIALISATION RFID DATA MANAGEMENT

- Eliminate the risk of EPC serial number collision with automated quality control and visibility with no manual intervention needed
- Turn-key, integrated solution for garment suppliers who print on-site with full visibility
- Integrated printer auditing to catch potential operator error
- Full EPC locking features
WIDE RANGE OF RFID PRODUCTS FOR APPAREL

- Self Adhesive labels
- Integrated Tickets
- Printed Fabric Labels
CATEGORY ENABLEMENT

RFID Category Enablement – Basic Apparel

Paper tags and printed fabric labels for item level RFID tagging of core apparel categories.

RFID Category Enablement – Intimate Apparel

Rounded corners to protect fine fabrics.

RFID Category Enablement – Shoes

A wide variety of adhesives available based on varying shoe characteristics.

RFID Category Enablement – Childrenswear

Smaller tag size allows for a universal tag across all categories including smaller children’s apparel.
CATEGORY ENABLEMENT

RFID Category Enablement – Fashion Jewelry

Smaller label sizes to fit most common jewelry packaging

RFID Category Enablement – On-Metal

Unique design solves many direct-to-metal tagging challenges

RFID Category Enablement – Fine Jewelry

Least conspicuous design for use on jewelry with minimal packaging

RFID Category Enablement – Cosmetics

Unique label sizes to accommodate a wide variety of cosmetics packaging
The Key Drivers

Loss Prevention Opportunity

• Retail theft (shrink) totaled 1.0 to 1.6% of retail revenues across 16 countries researched.
• Fashion apparel & accessories remains one of the highest shrink rates of all product categories.
• Shoplifting accounts for the largest share of shrinkage, accounting for 34% to 59% of total shrinkage loss.
HOW ARE RETAILERS USING RFID TODAY?

1. Goods receiving: Adding EPC’s to store database

2. Sales floor check stock with handheld reader/Pick for Web Order

3. Checkout. After payment removal of EPC from store database

4. Shop exit. Automatic verification. Sounds alarm if EPC is still in store database

Men’s blue shirts, sizes 15 and 16 are not on the sales floor.
POTENTIAL FUTURE RETAILER BUSINESS PROCESSES

1. Automated RFID shipping
2. Work in Process progress tracking via RFID
3. Packing plans verified via RFID carton scans
4. RFID shipping labels generated
5. Automated RFID shipping
6. Automated Advance Ship Notice generation
7. Automated RFID receiving
8. RFID store destination labels generated
9. Pick and Pack cartons RFID verified
10. RFID inventory counts
11. Automated Advance Ship Notice generation
12. Automated RFID receiving
13. Exception reporting for immediate sales floor replenishment
14. Rapid RFID inventory scanning
15. RFID point of sale transaction
16. RFID tag scanning for loss prevention

RFID tags and labels delivered from Avery Dennison service bureau or in-plant solution