

RFID PLAYBOOK

Lowe's Home Improvement



General Overview

What industry standards to follow?

Lowe's expects its vendors to following all industry standards set forth by GS1 RFID serialized encoding standard, Auburn University RFID Lab tag placement standards and ARC inlay standards. All tagging requirements must meet these standards prior to RFID tagged items arriving in our stores.

What carries RFID tagging?

All brands that are being shipped into and sold at any of our stores. This includes all national and private brands.

Departments In Scope:

Merchandise Division	Product Groups
Appliances	Select PGs (see below)
Paint	Paint Sprayers & Accessories
Plumbing	Water Heaters
Hardware	Locksets
Hardware	Workwear
Hardware	Casual Apparel

- All seasonal program items
- All Basic/Replenishable SKU's
- DSV (direct ship from vendor)
- PBS/Vendor Managed Inventory
- All Omni Channel and Dot com items (Sold In-Stores and/or online)

Out of Scope:

- Items not yet approved and/or tested by Lowe's Home Improvement

Getting Started

The following outlines a standard framework to integrate RFID into packaging. This includes major points and areas that should be considered; However, all vendors must tailor these steps to fit the needs of their business and supply chains.

- Identify the ways that RFID can help improve your operations. Refer to the "RFID Use Cases for Suppliers" section for details.
- Develop an internal team.
- Engage with your packaging provider and if needed you will also need to engage with an approved RFID Inlay Manufacturer.
- Begin procurement discussions and provide forecasts to your packaging and RFID Inlay provider.
- Begin data management and serialization discussions with your RFID packaging provider. Refer to the "RFID Encoding & Serialization Requirements" section for details.
- Develop quality check process to ensure all items are tagged according to all requirements in this Playbook.

Select Lowe's Approved RFID Inlay Spec

- Lowe's Home Improvement has a set of ARC inlay specifications that are performance-approved by the Auburn University RFID Lab. The Auburn University ARC standard ensures RFID tags meet or exceed the levels of performance and quality necessary to provide benefits in a consistent and cost-effective manner.
- Refer to the chart below to see what spec has been assigned to each category. You can only use an approved inlay from an item's associated approved inlay list.

Merch. Division	Product Group	ARC Spec	Approved Inlay List
Appliances	Dishwashers	Y2	Spec Y2 Inlays
Appliances	Freestanding Ranges	Y2	Spec Y2 Inlays
Appliances	Freezers	Y2	Spec Y2 Inlays
Appliances	Laundry	Y2	Spec Y2 Inlays
Appliances	Microwaves (including OTR)	Y2	Spec Y2 Inlays
Appliances	Range Hoods	Y2	Spec Y2 Inlays
Appliances	Refrigerators	Y2	Spec Y2 Inlays
Appliances	Small Appliances	Y2	Spec Y2 Inlays
Appliances	Stock Built-In Cooking	Y2	Spec Y2 Inlays
Appliances	Floor Care & Rentals	Y2	Spec Y2 Inlays
Paint	Paint Sprayers & Accessories	Y2	Spec Y2 Inlays
Plumbing	Water Heaters	Y2	Spec Y2 Inlays
Hardware	Locksets	Y2	Spec Y2 Inlays
Hardware	Workwear	R	Spec R Inlays
Hardware	Casual Apparel	R	Spec R Inlays

Determine Inlay Manufacturer

- Vendors may only select from the approved list provided on the Auburn University RFID Lab's Website from the appropriate Spec for the item/category.
- Any inlay manufacturer not listed on the appropriate Spec cannot produce inlays for packaging being shipped to Lowe's Home Improvement.
- Even if using an approved inlay provider, you must still submit the final production samples to the Auburn University RFID Lab for ALEC approval.
- The latest version of the ARC-approved RFID inlay manufacturer and contact information is available at <https://rfidlab.org/inlaycontacts/>.

RFID Inlay Providers	Contact Information
Arizon	business@arizonrfid.com
Avery Dennison / Smartrac	https://avydn.co/AD-RFID
Checkpoint	https://checkpointsystems.com/contact
Hana	info@hanarfid.com
LabID - Beontag	arc@beontag.com
Paragon ID	retailrfid@paragon-id.com
SML	smlrfid@sml.com
Tageos	Contact@tageos.com

Determine Packaging Resource, RFID Encoder/Service Bureau

- Vendors can utilize their own RFID packaging resources to develop and print their RFID inlays but must adhere to the GS1 standards and ARC standards and obtain approvals from the Auburn University RFID Lab.
- A list of RFID packaging resources is available at <https://rfidpackagingresources.org/>. These are packaging providers that have supplied packaging for at least five RFID Retail Programs. This is NOT an endorsement or list of nominated suppliers.
- Vendors can also utilize other RFID packaging providers that are not listed. All label providers or packaging resources will need to source an Auburn University ARC-approved RFID inlay.
- A typical turnaround time for sourcing of encoded tags can take up to 3-4 weeks.

Identify Inlay Size

- Use the largest RFID inlay size available that fits your packaging.
- If your packaging does not fit the smallest inlay size available within the approved spec, add a generic embedded inlay hangtag or a separate paper-based sticker to your item.

Determine placement of RFID tag

- Please consult the Auburn University RFID Lab tag placement guideline for product specific placement and adhere to standards <https://rfid.auburn.edu/tagging-location-guide/>.
- If your item is not represented in the Placement Guideline, please contact at <https://rfidlab.org/aleccontactform/>

Tagging Requirements

- Make sure that there is only ONE RFID tag per product.
- RFID tags must be removable by the customer. If sewn in, they must be removable.
- RFID tags can be placed inside the packaging if the EPC symbol is placed outside.
- RFID tags cannot be integrated into product.
- RFID tags or inlays cannot cover any text or images.
- If an item is being stickered, the domicile with the country of origin should not be covered up - it needs to be visible to the customer. The supplier can print the country of origin on the RFID sticker if needed.
- The RFID tag should not fall off the product easily.
- No staples, perforations, Swiftachs, folding or die cuts through the inlay as it will make the inlay unreadable.
- When choosing the tagging location, RFID readability should be considered while product is in salesfloor, backroom, and case pack. For example, the RFID tag cannot be placed on bottom of product since the tag will most likely be in direct contact with metal.
- When implementing RFID tags, you may discontinue source tagging with EAS tags. Should you choose to continue EAS tagging, RFID tags can be used in parallel with EAS tags but **CANNOT** be used/placed on top of each other.
- If the product could be merchandised without the packaging, the RFID tag should be attached to the product. For example: Grills, Patio Furniture etc.
- If the product comes in multiple cases (example, patio furniture set where the items are boxed separately from one another), ensure that there is only one tag on one of the cases. Please contact Auburn RFID Lab to determine the case to be tagged.
- No metal foils, holograms or metallic inks should be used on any packaging containing the RFID inlay. If so, you MUST receive the RFID Lab approval prior to bulk production of the printed packaging.
- No RFID inlay placement on bottom of polybags, bottom of boxed items, on glass, on liquids, on Silvadur, or near metal/foil.
- The performance of the RFID inlays could be affected by metals, foils, liquids, and glass. Special consideration must be taken when choosing tagging format and location for such products. Please contact the RFID lab at <https://rfidlab.org/aleccontactform/>.

EPC Symbol

- The EPC logo example represents the bare minimum of information that should be shown on your packaging to identify RFID tagging
- Any packaging that has an RFID tag must have the Electronic Product Code (EPC) symbol displayed on the packaging for the customer and store associates to recognize
- The EPC symbol should not be shown on any packaging that does not contain an RFID inlay. The EPC logo is an industry standard to inform the customer and store employee that the tag contains RFID. Having tags with an EPC logo and/or inlay but not properly encoded can cause major confusion within the process
- See this link for the EPC Symbol image file and related documentation:
 - <https://www.gs1.org/standards/epc-rfid/guidelines>

RFID Encoding & Serialization Requirements

- All tags are to be encoded appropriately per EPC Tag Data Standards (TDS), resulting in unique serialization for each item. The SGTIN-96 tag encoding standard maintained by GS1 is to be used

$$\text{UPC} + \text{Unique Serial Number} = \text{EPC (RFID)}$$

- Please keep in mind that each serial number must be unique to that item and can run a risk of having duplicate numbers if not managed properly throughout the development process.
- Please ensure unique serialization is managed when using multiple packaging providers for the same SKU. See the link below for more information.
<https://www.gs1us.org/DesktopModules/Bring2mind/DMX/Download.aspx?EntryId=1946>
- Tags must be permalocked to prevent tampering.
- All tags must undergo quality and data integrity checks prior to entering the supply chain.
- The EPC Encoder/Decoder Tool may be found here: <https://www.gs1.org/services/epc-encoderdecoder>

ALEC - Approval of Production RFID Packaging Samples

Auburn University RFID Lab's ALEC program is to help vendors ensure that their RFID tagged items meet all Lowe's and other major retailer requirements.

- Before any shipment of goods can begin, you must receive RFID lab Approval.
- Refer to the ALEC submission guide at <https://rfidlab.org/wp-content/uploads/General-Form-Submission-Guide.pdf> for detailed instruction before starting this process.
- **If you have an item that has already received approval from ALEC, you can add Lowe's as a retailer to the existing approval using the following form:** <https://rfidlab.org/submissionupdate/>
- When creating a new submission, send five (5) EPC tag samples only (no product or packaging) to the RFID Lab for performance testing prior to bulk production. These may be branded hangtags, generic hangtags, or stickers.
- Submit one UPC per Submission Form.
- Not all UPCs supplied by a vendor requires a validation. Select one representative UPC (SKU) per product supplier per brand per packaging type per packaging agency per RFID Inlay model per tagging location. Send 5 inlay samples of the one representative UPC.
- RFID Tags MUST be production quality.
- Complete and submit the online submission form at <https://rfidlab.org/alecsubmissionform/>. Print the PDF confirmation and include it along with the samples.
- The RFID Lab's shipping information will be provided in the confirmation that you will receive after submitting the online submission form.
- Testing will not begin until the printed confirmation form has arrived at the lab.
- Actual product or packaging will only need to be sent when specifically requested by the RFID Lab.
 - **Note:** Any product sent to the RFID Lab will NOT be returned to the product vendor.
- Product Vendors are responsible for submitting their own samples to the RFID Lab. Packaging/tagging providers CANNOT submit samples on behalf the Product Vendors to the RFID Lab.
- Product Vendors who decide to switch inlay models and/or inlay providers and/or Service Bureau AFTER receiving validation from the RFID Lab, will need to re-submit tag samples again for validation.
- Product Vendors who decide to change/add new packaging with materials that may interfere with readability, will need to re-submit tag samples again for validation.
- The typical turn-around time of this process can take up to 10-14 days once the lab receives the tag samples.
 - **Note:** The online submission must be completed AND samples mailed into the lab before the ALEC team can start the review process.
- Once you receive an email approval from the RFID Lab, no further action is needed, and you are approved to move into bulk ordering and production.

Supplier Accountability

- Product vendors are required to have a process in place to ensure all tags leaving your facility are completely unique.
- Quality checking includes ensuring there are no duplicate serial numbers and that each tag is properly encoded for the item it is on.
- Any errors arriving at the stores will be the responsibility of product vendors.

RFID Use Case & Technology Options for Suppliers

Please refer to the following research paper published by Auburn University for potential uses of RFID in your operations and supply chain.

<https://rfid.auburn.edu/papers/rfid-item-level-quantity-auditing-for-apparel-supplier-distribution-centers-12/>

https://rfid.auburn.edu/wp-content/uploads/2021/02/Empirical_Study_of_RFID_in_Supply_Chain.pdf

<https://rfid.auburn.edu/wp-content/uploads/2021/02/CHIP-Proof-of-Concept-Results-Auburn-RFID-Lab.pdf>

RFID is being used by vendors to automate inbound audit processes, improve Inventory accuracy, and outbound validation.

RFID Shipper Case Markings

- For the stores to easily identify on cases which items have packaging with RFID labels. The Shipper Case Markings must include the word RFID.



- Carton or carton labels do not carry any RFID inlays. Only the selling unit packaging carries the RFID inlay.
- The RFID marking is in addition to all other case markings and should not interfere with any other printed case markings, case labels, federal and state laws, or any other compliance related markings.
- If the product inside the case is not RFID labeled, do NOT use the updated RFID marking.

Resource Contacts

General questions for the Lowe's RFID team need to be submitted via **Ticket Management** in the **Vendor Gateway > Knowledge Center**.

Auburn University RFID Lab

- General Questions: alec@rfidlab.org
- Item Questions: <https://rfidlab.org/aleccontactform/>
- ALEC Submission Form: <https://rfidlab.org/alec-submissionform>

GS1 US

- Website: www.gs1us.org
- Supplier-oriented introduction to RFID: <https://site.gs1us.org/RFID-success.html>
- Serialization Guide: <https://www.gs1us.org/DesktopModules/Bring2mind/DMX/Download.aspx?EntryId=1946>
- Tag Data Standard: <https://www.gs1.org/standards/tds>