

The RFID Advantage

A new era of food supply chain operational efficiencies

Foodservice and Retail Grocery industry interest in EPC/RFID has increased significantly

Radio Frequency Identification (RFID) technology, when implemented with GS1 Standards, helps to support fast and accurate data capture and inventory tracking, adding visibility to your supply chain.

When tracking items and cases/cartons, added value is found in capturing attribute data in the RFID data carrier by enabling certain business processes to be performed without the need for manual labor, network connectivity, or systems integration. Therefore, RFID provides benefits in the form of improved supply chain management, recall management, and overall operational efficiencies.

Important: The practices outlined in this document are voluntary, not mandatory. It should be noted that use of the words “must” and “require” throughout this document relate exclusively to technical recommendations for the proper application of the guidelines and standards to support the integrity of your implementation.





Effectively tracking food products at the item and case level helps ensure accurate inventory management, food safety, recall readiness, and supply chain visibility. Electronic Product Code (EPC)/RFID technology can complement the value of the GS1-128 barcode by making the same attribute data available without the need for a barcode scan or line-of-sight data capture. The **GS1 EPC Tag Data Standard 2.0** defines how to encode and capture this information within the EPC/RFID data carrier.

The business processes described in this document leverage Key Data Elements important to food traceability.

The Value of EPC/RFID With Extended Attributes

Industry adoption of GS1 Standards provides a common language to help trading partners share product information in an increasingly complex food supply chain. This adoption drives standards-based, interoperable solutions that minimize inefficiency at an industry level.

The “Extended Attribute Value Matrix” for foodservice operators, retail grocers, manufacturers, distributors, and logistics providers will help you understand the value of EPC/RFID for your company and give you the information you need to begin realizing these benefits.

The Value Matrix outlines the steps for EPC/RFID implementation and defines the benefits that can be achieved when this is used throughout the food industry. To maximize these benefits, foodservice and retail grocery industry stakeholders across the supply chain should look to adopt and use the Extended Attribute guidance with their trade partners when implementing RFID.

Why EPC/RFID?

RFID offers an automated means of accurately capturing item, carton, and case data without having to scan each barcode. This means that a case/carton passing through a read point such as a receiving door can automatically be recorded. Including the Extended Attribute data (i.e., Batch/Lot, Date, or Net Weight) in the tag data provides an automated means of complementing barcodes such as the GS1-128. The same data encoded in the GS1-128 case/carton barcode can be made available wirelessly and captured automatically through RFID. This is a key building block in creating interoperable solutions that serve multiple business processes across multiple supply chain trade partners, automating the capture of key data elements such as Batch/Lot across the supply chain. Aggregate benefits

for all stakeholders could include regulatory compliance, increased customer safety and satisfaction, increased inventory visibility, supply and demand planning, inventory management, omni-channel fulfillment, promotion management, and brand protection.

Automatically capturing data helps to lower labor effort, increase data quality, and enable mistake-proof processes. For example, a dock door reader can help provide an immediate alert if cases/cartons that are past their vendor acceptance requirements are delivered. A forklift solution or conveyor system can immediately detect expiration data and respond in the moment, avoiding the cost and risk of expired or recalled products being delivered. Employees using hand-held RFID scanners to capture inventory in operator or retailer locations can simultaneously capture expiration data that can be used for fresh food management. Such data can be used for various inventory management purposes.





EPC/RFID provides unique identification of each item (such as an item, carton, or case), which unlocks precise insights into supply chain events. Just like the GS1-128 barcode, encoded data may be leveraged by supply chain partners wherever the product is found. The encoded data is unchanged and available wherever the product is.

RFID is a platform for driving ongoing innovation. Beyond the supply chain use cases served by the core technology, RFID offers a technical platform upon which innovation continues to occur. Such innovation includes the use of RFID for Electronic Article Surveillance (anti-theft), structured input for artificial intelligence processing, precision location detection and access control, and even temperature or structural fatigue detection. Furthermore, the automated real-time data capture that RFID technology provides can be the building block that enables new business models.

The same data encoded in the GS1-128 case/carton barcode can be made available wirelessly and captured automatically through RFID.

Data Carrier Comparison at a Glance

Industry stakeholders can choose among several standards-compliant approaches to mark product cases/cartons. Several of these options are compared below. The option outlined in blue is expanded upon in the following pages.

	 ITF-14	 GS1-128	 Basic EPC/RFID	 Extended EPC/RFID
Data Encoded	GTIN (product ID)	GTIN & Attributes	GTIN & Serial Only	GTIN, Serial & Attributes
Carries Batch/Lot, Weight, and/or Date	No	Yes	No	Yes
Embedded Knowledge Level	Very low	High	Low	High
Data Capacity	Low	High	Medium	High
Requires Production Encoding	No	Yes	No	Yes
Requires Integration to Get Attribute Data	N/A	No	Yes	No
Requires Line of Sight	Yes	Yes	No	No
Capture Rate	Slow	Slow	Fast	Fast
Requires Label	No	Recommended	Yes	Yes
Preparatory Up-Front Effort	Very low	Medium	Low	Medium
Operations Efficiency	None	Low	Medium	High
Workflow Error Proofing	None	Medium	Medium*	High

*High if Extended Attribute data is integrated

The following tables expand on the effort and value that the Extended EPC/RFID data carrier option offers.



Automated real-time data capture provided by EPC/RFID is a building block that enables new business models.



Manufacturers and Brand Owners

Value Matrix

Key Objective	Objective Details	Steps to Take	What Value Do You Get From This Action?
Enable Precision Recall	<ul style="list-style-type: none"> Manufacturer and downstream supply chain participants leverage RFID to automatically track cases with a specific Batch/Lot or Date Manufacturing systems or GS1-128 barcode printers encode Batch/Lot and Date data in EPC/RFID tags affixed to cases 	<ul style="list-style-type: none"> Encode case RFID tags on-site with attribute data included. This requires the addition of RFID equipment integrated into the production process. Ensure tag encoding processes include appropriate quality control measures 	<ul style="list-style-type: none"> Help enable trading partners to potentially comply with customer traceability requirements Product value add: product helps manage itself (RFID tag adds product features relating to inventory management: inventory accuracy, expiration management, cycle counting, etc.) Redundant case/carton identification (RFID and barcode) addresses label readability issues Precision recall can help reduce the risk of brand erosion
Enhance Traceability	<ul style="list-style-type: none"> Update outbound case data collection process to automatically capture outbound EPC/RFID tag values 	<ul style="list-style-type: none"> Install fixed readers to capture outbound case data Associate case movement to shipment 	<ul style="list-style-type: none"> Automated tracking of outbound case data Addresses requirement to track Batch/Lot to various trade partners and reduces effort to capture this information as well as compile it during a recall or withdrawal Less organizational effort required to reliably capture key data, such as Batch/Lot or Serial Numbers, required for recall response. RFID enables automatic capture of large groupings of RFID-tagged products within seconds, as line-of-site scanning is not required. The use of Extended Attributes makes traceability data a part of the RFID tag data instead of accessing via trade partner interface(s). Ability to respond to emerging legislation



Manufacturers and Brand Owners

Value Matrix

Key Objective	Objective Details	Steps to Take	What Value Do You Get From This Action?
Enhance Inventory Management	<ul style="list-style-type: none"> Leverage EPC/RFID tagging for internal warehousing processes Capture case-level data in Warehouse Management System (WMS) 	<ul style="list-style-type: none"> Install readers that leverage case tagging Integrate reader data into picking/warehousing processes Ensure systemic tracking of inventory at the case level 	<ul style="list-style-type: none"> Improved inventory accuracy Improved stock rotation/inventory circulation and freshness management Help enable trading partners, such as distributors, to better monitor fresh product deliveries to restaurants or stores Storage footprint optimization/asset utilization Better management
Achieve Operational Efficiencies	<ul style="list-style-type: none"> Leverage EPC/RFID tagging for operational efficiencies RFID-enabled key business processes 	<ul style="list-style-type: none"> Install readers that leverage case tagging Integrate reader data into picking/warehousing processes and warehouse management systems 	<ul style="list-style-type: none"> Reduced cycle-count time spent capturing inventory Labor savings with picking/locating Pick-and-load efficiencies and error reduction More accuracy managing purchase orders as well as capturing data for accurate Advanced Shipment Notices (ASNs) and Bills of Lading (BOLs) Stock rotation efficiencies Shipping error reduction Receiving quality process improvement



Manufacturers and Brand Owners

Value Matrix

Key Objective	Objective Details	Steps to Take	What Value Do You Get From This Action?
Improve Business Planning	<ul style="list-style-type: none"> Leverage enhanced case/carton/item visibility data in business-planning systems 	<ul style="list-style-type: none"> Ensure sufficient Inbound/Outbound RFID readers and RFID product tagging (full product line or full whole warehouse) to enable actionable visibility for planning purposes Integrate case-level data with relevant data sources in relevant reports and business-intelligence systems Adapt business-planning processes to account for increased visibility 	<ul style="list-style-type: none"> Better insight into business-process metrics More robust data-driven KPIs Reduces data cleansing Better decisions regarding shelf life, storage utilization, waste, and safety stock, which results in improved working capital Forecasting benefits: higher-quality data drives more informed decisions More insight into accurate demand data to be able to plan short-term and long-term supply More responsive and insightful promotion management (quickly react if a promotion is selling more in one area than another)



Distributors and Logistics Providers

Value Matrix

Key Objective	Objective Details	Steps to Take	What Value Do You Get From This Action?
Enhance Traceability	<ul style="list-style-type: none"> Leverage RFID-tagged cases/cartons to automatically capture attribute data inbound and outbound Update case/carton data collection process to automatically capture EPC/RFID tag values, which contain traceability data Record captured data for traceability reporting 	<p><i>Assumption that manufacturer has provided case/carton RFID tags with attribute data</i></p> <ul style="list-style-type: none"> Install reader solution at inbound and outbound locations Record data in WMS Associate case/carton movement to shipment Persist captured data for traceability reporting purposes (capturing this data inbound, at pick, and at delivery enables full benefits) 	<ul style="list-style-type: none"> Automate validation of received and delivered RFID-tagged products; ensure they meet agreed-upon requirements (in date and not recalled) Addresses requirement to track Batch/Lot to various trade partners and eliminates labor to capture this information as well as compile it during a recall or withdrawal. This helps enable more productive and efficient recall actions, lowering organizational stress. Ability to help provide expedited inbound and outbound case-movement data relating to traceability requirements Ability to help react in a matter of seconds instead of hours to recalls/withdrawals and put product on hold to minimize risk to customers Ability to more easily collect and share traceability data



Distributors and Logistics Providers

Value Matrix

Key Objective	Objective Details	Steps to Take	What Value Do You Get From This Action?
Enhance Inventory Management	<ul style="list-style-type: none"> • Leverage EPC/RFID tagging for internal warehousing processes • Capture case/carton-level data in WMS 	<ul style="list-style-type: none"> • Install readers that leverage case/carton tagging • Integrate reader data into picking/warehousing processes • Ensure core systems track inventory at the case/carton level 	<ul style="list-style-type: none"> • Improved inventory accuracy • Improved stock rotation/inventory circulation and freshness management (FEFO vs. FIFO) • Shrink reduction due to lost items, spoilage, seasonal use, and theft • Better manage and identify product obsolescence • Storage footprint optimization/asset utilization • Monitor product freshness deliveries to better manage quality complaints
Achieve Operational Efficiencies	<ul style="list-style-type: none"> • Leverage tagged products for operational efficiencies • RFID-enabled key business processes 	<ul style="list-style-type: none"> • Install readers that leverage case/carton tagging • Assess tag readability with varied case/carton palletization configurations • Integrate reader data into picking/warehousing processes upon WMS architecture review (IT systems and business process review) • Address partial tagging in business processes (similar to variability in ITF-14 vs. GS1-128) 	<ul style="list-style-type: none"> • Reduced cycle-count time spent capturing inventory • Labor savings with receiving (i.e., no longer need to depalletize and repalletize to capture case/carton barcode data), shipping, counting, and picking/locating • Foundation for future phase delivering pick-and-load efficiencies and error reduction • Foundation for future phase delivering put away and shipping process automation • Foundation for improved related KPIs: time-to-fulfill, order accuracy, on-time-delivery, clean order (order is accurate) • Helps lead to acceptance into “Trusted Supplier Program” (audits show reliability, removes need for further ongoing audits) • Returnable asset tracking



Distributors and Logistics Providers

Value Matrix

Key Objective	Objective Details	Steps to Take	What Value Do You Get From This Action?
Improve Business Planning	<ul style="list-style-type: none">Leverage enhanced case/carton-level visibility data in business-planning systems	<ul style="list-style-type: none">Integrate case/carton-level data with relevant data sources in relevant reports and business-intelligence systemsAdapt business-planning processes to account for increased visibility	<ul style="list-style-type: none">Better insight into business-process metricsMore robust data-driven KPIsEliminates data cleansing: better decisions regarding shelf life, storage utilization, waste, safety stockReduce working capitalForecasting benefits: better data drives better decisionsBetter promotion management



Operators and Retail Stores Value Matrix

Key Objective	Objective Details	Steps to Take	What Value Do You Get From This Action?
Enhance Traceability	<ul style="list-style-type: none"> Leverage RFID-tagged cases/cartons to capture attribute data Record captured data for traceability compliance 	<p><i>Assumption that manufacturer/supplier is providing case/carton RFID tags with attribute data</i></p> <ul style="list-style-type: none"> RFID reader at inbound location Persist captured data for traceability reporting purposes 	<ul style="list-style-type: none"> Automated collection of compliance data Recall time reduction Increased customer safety and brand protection Ability to respond to emerging legislation
Enhance Receiving Process	<ul style="list-style-type: none"> Automate and auto-detect delivery errors in real time Claims management Contactless receipt 	<ul style="list-style-type: none"> Same as above: reader solution at inbound location Update receiving process and system to leverage RFID data 	<ul style="list-style-type: none"> Validated receiving (e.g., excess product not ordered) Receiving process time savings, data quality, error detection, and improved inventory accuracy Automate validation of received products; ensure they meet agreed-upon requirements Leads to mistake-proof and automatic receiving and reconciliation process Returnable container tracking Stop unknown products from entering your facilities/stores/restaurants



Operators and Retail Stores

Value Matrix

Key Objective	Objective Details	Steps to Take	What Value Do You Get From This Action?
Enhance Inventory Management	<ul style="list-style-type: none"> • Manage freshness • Inventory-count time savings and data accuracy • Picking assist with item locator 	<ul style="list-style-type: none"> • Install mobile readers • Integrate reader data into inventory-management processes • Train personnel 	<ul style="list-style-type: none"> • Stock rotation/inventory circulation/FEFO vs. FIFO • Operational efficiencies, cycle-count accuracy and time savings, waste reduction, reduce out-of-stocks • Smart limited-time offers to drive demand on excess inventory • Reduce shrink • Better management of product obsolescence • Streamline inventory processes at the food establishment level; implement predictive ordering/demand planning based on data • Have greater real-time insight into consumer preferences



Get Started With Extended Attributes

To learn more about the business and technical details behind Extended Attributes [contact GS1 US](#).

To learn more visit:

- ▶ [Cross-Industry RFID web page](#)
- ▶ [GS1 US Supply Chain Visibility](#)

Join a GS1 US Initiative

- Engage with peers and trading partners in a collaborative working environment
- Provide leadership and help shape the future of the industry
- Gain insight into each part of the supply chain
- Help define solutions for potential federal or state regulations regarding food safety and product traceability
- Offer industry leadership in defining recommended solutions for critical business needs
- Learn firsthand how standards are implemented for process improvement

Whether you join the initiative or proceed on your own—get started today!

Visit the **GS1 US** website to access:

- Scorecards
- Information about GS1 Standards
- Tools and resources
- Educational programs
- List of members and testimonials
- Events calendar

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