The Role of Bar Codes in Food Safety

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Other EFR Reports

Enabling Profitable Growth in the Food-Prepared-Away-From-Home Industries (1997)

The Executive Committee believes that companies should understand certain key EFR enablers. The documents that discuss these enablers have been prioritized in the following order. The Committee recommends that you read and understand the concepts of each document in the order they are presented:

Standard Product Identification and Bar Codes: The Cornerstones of EFR (1998)

Getting Started In Electronic Commerce: Item, Price & Promotion Transactions (1998)

Electronic Commerce Phase II: Revenue Cycle Transactions (1998)

Activity Based Management for Foodservice: Getting Started (1999)

EFR Roadmap for Small and Medium Foodservice Businesses (1999)

Assessing Pallet Cost in Foodservice (2000)

Logistics Optimization: Profile of an Industry (2000)

Standard Product ID and Bar Coding: Foodservice Case Studies and Practical Applications (2000)

The Role of Bar Codes in Food Safety (2000)

A Roadmap for success: Activity Based Management for Foodservice Professionals (2001)

Foodservice Category Management: A Systematic Approach to Balancing Product Variety & Duplication in the Supply Chain (2001)

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EFR *Initiative Sponsors*

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About Efficient Foodservice Response

In late 1994, the International Foodservice Manufacturers Association (IFMA) and the International Foodservice Distributors Association (IFDA) provided the catalyst for the formation of an ad hoc group comprised of representatives from foodservice manufacturers, brokers, distributors, operators and key industry trade associations. The group was formed to examine Efficient Consumer Response (ECR), a grocery industry initiative, and its relevance to the foodservice supply chain. Group members also explored ways to work with ECR pioneers.

After weathering a severe snowstorm during its first meeting, which was hosted by Rich Products Corporation in Buffalo, N.Y., in January 1995, the team became known as the Buffalo Blizzard Group. Several members had been involved with ECR, and all – directly or indirectly – had observed its implementation in the grocery supply chain. All had seen ECR's impact since its introduction in 1993. To date, its results include increased supply chain efficiency and improved competitive dynamics – both facilitated by more cooperative channel-trading relationships.

While grocery represents the "food-prepared-at-home" half of the food supply chain, foodservice represents the other half, or "food-prepared-away-from-home." Since one complements the other, the Buffalo Blizzard Group questioned whether an ECR-like initiative in the foodservice supply chain made sense. Although many ECR principles are relevant to the foodservice supply chain, the difference between foodservice and the grocery industry is significant enough that total ECR adoption is not appropriate.

The group also recognized that motives for change in the foodservice supply chain differ from those in the grocery industry and that the foodservice industry would require its own economic case for action. The motives for launching ECR – as well as the Quick Response movement in the general merchandise channel before it – included heightened competition from alternate trade channels. Dramatic increases in imports from countries with drastically lower labor costs in the mid-1980s had given rise to Quick Response; the growth of grocery sales in the alternative format store sector was the catalyst for ECR.

In contrast, the foodservice supply chain of the mid-1990s faces no such outside threats. Conditions are ripe, however, for development of such threats. The foodservice supply chain features many of the characteristics other supply chains displayed before they lost market share to alternative competition. They include:

- Mistrust and lack of cooperation between supply chain trading partners.
- Pervasive lack of focus on providing value to the consumer.
- Archaic business practices that complicate trade between buyers and sellers.

- Poor penetration of modern supply chain practices and information technologies that could enable quantum leaps in effectiveness and efficiency.

After adopting "EFR" as the name of the initiative and developing a logo, the group commissioned a study to accomplish three objectives:

- Quantify the cost of inefficiencies to the foodservice industry.
- Define the strategies that comprise EFR and remove non-value-adding costs.
- Educate the industry about EFR.

In August 1995, the group selected Computer Sciences Corporation (CSC) to fulfill these objectives because it possesses a core competency in supply chain management consulting and had helped develop ECR. CSC proposed a collaborative effort with the Stanford Supply Chain Forum at Stanford University, which has a record of bringing academic credibility, objectivity and relevant research into supply chain economics and modeling.

The EFR study shows that there are $14.3 billion in non-value-adding costs accruing throughout the foodservice supply chain. This figure represents the potential benefit of EFR to the total supply chain, and applies almost equally to operators, distributors and manufacturers/brokers. It should be noted that this figure is extremely conservative and based on today's technology. Nothing needs to be invented to capture these benefits – they represent an attainable goal, not a theoretical maximum in an ideal world. In reality, $14.3 billion is the tip of the iceberg. Actual cost savings opportunities are much higher.

EFR is intended to align efforts throughout the foodservice supply chain to build a solid platform for profitable growth. The $14.3 billion figure simply represents the benefit of this platform. Foodservice supply chain professionals, after establishing a foundation, should be able to focus on a slice of the $800 billion in incremental industry growth potential. EFR is not a destination; it is a pathway to a new era of renewed prosperity for the foodservice industry.

The EFR mission statement is presented below. While it contains many words, it may be summed up as a philosophy that can be shared by all supply chain participants. If all supply chain segments meet the primary objective – eliminating costs that do not add value to the consumer – EFR will create a stronger, more competitive and more profitable business environment and will provide lasting value for the consumer.

EFR Mission

Efficient Foodservice Response (EFR) is the voluntary undertaking of planned and directed activities among all the partners in the value chain to achieve a low-cost, high-performing value chain. The purpose is to eliminate inefficiencies and wasteful practices, thereby enhancing the ability of each party to compete fairly and vigorously. Each functional component in the chain works in unison with the others to increase value, while minimizing the cost burden on any other value chain component. Thus, the value chain is closely synchronized, highly flexible, reliable, and responsive to customer demands, with short cycle times and lower total value chain costs from raw material ingredient supplier to consumption.

This mission is accomplished via the study of five strategies that comprise a number of interrelated initiatives. The initiatives within each strategy progress from basic to advanced capabilities allowing diverse organizations to develop unique implementation paths within a common EFR framework. As an overview, the five EFR strategies are:

Equitable Alliances – These are the building blocks that support EFR implementation and the attainment of benefits. Initiatives included address the complex funds flows within the supply chain and how value is measured. A fundamental initiative is activity based costing, which builds the foundation for initiative bundling and value-based incentives. There is no economic benefit attributed to this strategy as it is a "cost-neutral" mechanism that enables shifts in the way costs and revenues accrue in the supply chain.

Supply Chain Demand Forecasting – This strategy encompasses initiatives that create a supply chain characterized by a common view among trading partners of end-consumer demand coupled with an integrated set of planning processes. The industry benefit reaped from implementation of initiatives within this strategy is estimated to be $2.9 billion.

Initiatives within supply chain demand forecasting integrate demand creation and demand fulfillment processes across all segments. These initiatives include standard product identification and bar coding, common product information databases, demand and planning information sharing, and market-level reporting and forecasting.

Electronic Commerce – This is the biggest EFR initiative in terms of

quantifiable benefits. The initiatives that comprise this strategy represent a $6.6 billion savings opportunity across all industry segments. Most of these benefits come from reduced administrative cost resulting from streamlining the revenue cycle processes between supply chain buyers and sellers. The five integrated initiatives include business process simplification, product maintenance EDI (electronic data interchange), revenue cycle EDI, electronic funds transfer and invoice less payment. An initiative originally identified as part of supply chain demand forecasting – common product information databases – is also being addressed by electronic commerce.

Logistics Optimization – This strategy aims to optimize end-to-end total supply chain costs across all segments. Initiatives dealing with physical flows from point –of supply to point –of consumption are represented within this strategy. These include direct shipment, consolidation, shared distribution, coordinated transportation and cross-docking. The industry benefit attributed to implementation of logistics optimization is $2.7 billion.

Foodservice Category Management – This strategy includes initiatives to profitably manage the inherent complexity of a supply chain that produces millions of end products in a variety of service configurations. Its industry benefit is estimated to be $2.1 billion. Initiatives within foodservice category management address the way the supply network is loaded with products against the marketplace's raw demand. They include balanced variety, product deletions, new products and centralized conversion.

The five EFR strategies are designed to create a more effective end-to-end supply chain. Only a view of the supply chain as a whole machine will create a truly effective supply chain that optimizes the value creation process from end to end. Consequently, the EFR studies can assist trading partners as they consider changing the way they conduct business. Achievement of EFR's mission rests with the senior executives from companies that make up the foodservice supply chain. Success requires these executives' vision and support.

Striving to improve business processes presents companies in the foodservice industry with a unique opportunity to become stronger. The Efficient Foodservice Response project provides important analytical tools to help our industry prepare for a tougher business environment.

The EFR Executive Committee encourages you to begin understanding the EFR strategies. The committee is making every effort to support the industry by providing these educational documents and creating an arena for industry-wide continuous improvement.

The Role of Bar Codes in Food Safety

Time-starved, convenience-craving American consumers are spending an increasing portion of their food dollar on prepared foods. This trend not only shifts where and how value is added to the food we eat, it also shifts risks and liabilities in the food chain. The risks associated with food-borne illness are increasingly being shifted from the consumers' own kitchens to the restaurant operators, deli counters, retailers, distributors and food-processing plants that supply prepared food products.

The continued marketplace success of the prepared foods industries will depend on consumers' continued confidence in the safeguards built into the food supply network to protect consumer health. Nationally, a number of efforts are underway to curtail both the incidence and impact of food-borne illness.

- In January 1998 a regulation took effect requiring the nation's 300 largest meat and poultry processing plants to implement Hazard Analysis and Critical Control Points (HACCP) inspection systems. In this program's first six months, incidences of salmonella in chickens have been cut by almost half.

- A new government computer network dubbed PulseNet enables investigators to identify outbreaks five times faster than was previously possible using DNA fingerprinting techniques. Vice President Al Gore said of PulseNet, "By saving crucial time, it will save lives."

- A voluntary industry initiative, Efficient Foodservice Response (EFR), has endorsed a set of product identification and bar code standards maintained by the Uniform Code Council for the foodservice value network.

While the first two efforts are governmental and regulatory in nature, the last is a voluntary initiative that is the focus of this paper. We will examine the relationship between food safety and bar codes using these topics:

- Current Practice
- Importance of Fast Action
- Benefits of Bar-Coding
- Global Trade Item Numbers (GTINs)
- Where Bar Codes Fit In
- Manufacturer Lot Numbers

"When an incidence of food-borne illness does occur, a fast, effective response should be the goal of every company"

We will conclude with a description of a hypothetical market withdrawal and some conclusions.

"Standard product identification, lot tracking and bar coding can play a vital role in quickly determining which units of which products may be affected — and where they are now"

Current Practices

Each day, foodservice manufacturers produce millions of cases of products for delivery to close to a million prepared food outlets in the U.S. The vast distribution network employed for this process requires products to be dispersed into millions of piles of inventory in warehouses, pantries and kitchens nationwide.

It is impossible to eliminate all pathogens and contaminants from such a complex process. When an incidence of food-borne illness does occur, however, a fast, effective response can and should be the goal of every company in the prepared food value network - suppliers, manufacturers, distributors and foodservice operators. Immediate containment and control of suspect products greatly reduces the risk of harm and the liabilities associated with an outbreak of food-borne illness.

Recalling specific cases of specific items is akin to being told to find a few "bad" pearls in a bowl filled with thousands of "good" pearls - a tedious and time-consuming task. Today's real-world response is to throw out the entire bowl of pearls. That crude approach is necessary because of the absence of the record-keeping required to track every case from point of production to point of use.

Today the proper level of record keeping in support of a recall is onerous. To withdraw a product, a supplier must search manufacturing records and tie them to inventory and shipping records. Customers must be contacted, and they also must search receiving, inventory and shipping records, then contact their own customers. At each stage, the process escalates as more and more trading partners become involved. Meanwhile, each tick of the clock increases the health risk to the consumer.

"The key to a market withdrawal is tracking the problem to specific manufacturing batches"

The withdrawal process succeeds only if each trading partner keeps records of items in inventory, in transit and on order. Otherwise, the only recourse is to withdraw broad swaths of products in the hope that the suspect products are included. This is an expensive proposition for suppliers and potentially erodes consumer confidence in the entire supply chain.

Importance of Fast Action

Once the link between an incidence of illness and a specific product has been established, two pieces of information are crucial to prevent further health risks and injuries:

- Which units of which products may be affected?
- Where are they now?

Standard product identification, lot tracking and bar coding can play a vital role in quickly providing answers to these crucial questions.

The key to a market withdrawal is tracking the problem to specific manufacturing batches or lots and then finding all of the cases in each of these lots. Determining which products are affected is not too difficult, at the manufacturing level, if every case produced was assigned a manufacturing lot number and the proper level of production records are maintained (these must be tied to raw material and ingredient lot numbers.) These manufacturing lots must be assigned and maintained at a granular level of detail, specifying the plant, processing line and date (down to the hour of production). This is a common practice in most food manufacturing plants. Determining the current location of affected products is the harder of the tasks and becomes possible only if lot numbers follow the cases through the supply chain to their ultimate destination.

"Manually generated bills of lading are replaced with scanning operations that accurately capture the items and quantities in the shipment"

This means every shipper of products must record the lot numbers used to fill a customer's order. The customer who receives the shipment must then also record the manufacturing lot numbers on all cases as they are received. When products are resold, the same lot numbers must then be assigned to the shipment by the next customer in the supply chain. Ultimately, in a perfect world, every foodservice operator should have a record of all the manufacturing lot numbers of all the cases received, used and currently in inventory. To make the process foolproof, at every step, the recording of lot numbers must be accurate. Therein lies the seeming impossibility of the task. The problem with such diligent record keeping is that data maintenance costs escalate as the number of trading partners increases.

Returning to our bowl of pearls example, imagine that instead of loose pearls, threads are strung through the pearls, creating many strands, each strand representing a single "lot." Once a single pearl has been identified as bad, all the other bad pearls are found by simply pulling that pearl out of the bowl. All the others in the lot come along with it, instantly separating and removing them from the remaining pearls in the

bowl. Standard product identification, lot numbers and bar codes provide a real-world analogy to this string. These three components enable recalls of suspect products as quickly and as easily as pulling the string of bad pearls from the bowls.

If utilized on a widespread basis within the foodservice value network, the existing bar code technology and the standards in the food industry can help companies execute an efficient product withdrawal when a problem is detected. This quick reaction can save lives and can save companies time, money and the headaches resulting from litigation.

Benefits of Bar Coding

A January 1997 industry report, Efficient Foodservice Response - Enabling Profitable Growth in the Food-Prepared-Away-From-Home Industries, estimated potential efficiency gains for manufacturers, distributors and operators at $847 million per year. This figure represents the logistics savings alone. It does not include market withdrawal costs or the liability costs of food safety. However, these additional benefits are achieved with little extra cost or investments.

The $847 million in pure logistics gains accrue in the shipping of goods between trading partners. In the bar-coded world, manually generated bills of lading and manifests are replaced with scanning operations that accurately capture the item and quantities in the shipment. At the receiving end, in-bound shipments are quickly scanned to verify the contents of the shipment and update inventory.

"Two key data messages enable efficient market withdrawals: the Global Trade Item Number and the lot number"

Efficiencies are also gained within distribution facilities in the handling and movement of pallets and cases. Bar codes can further cut administrative costs significantly by improving the quantity and quality of movement data. Replacing manual recording and entry of item numbers, pallet numbers, weights and lot numbers with an accurate scan reduces errors, eliminating costly re-work. The food safety benefits of bar coding go far beyond these logistics savings.

The existing product identification standards facilitate efficient market withdrawals in three ways.

1) Bar codes capture product data in such a way that the same information is available at all points in the supply chain thus dramatically lowering the cost of putting product information into the system and tracking product movement.

2) Global Trade Item Numbers (GTINs) provide an unambiguous and

unique numbering system for food and related products at every point in the value network. Universal Product Codes (U.P.C.), European Article Numbers (EAN), and Standard Carton Codes (SCCEAN/UCC-14 a.k.a. UCC case codes) are all subsets of the GTIN numbering scheme.

3) Application Identifier standards provide a globally recognized standard for tagging manufacturing lot numbers into a standard bar code.

In short, product identification and data standards provide the means to track product in an industry where each supplier has many customers and each customer many suppliers. The standards provide a coherent framework for communication that prevents a "tower of Babel" where each trading partner uses a different "language" for product identification and coding.

Where Bar Codes Fit In

To understand how bar codes fit into this picture, one must first understand two important aspects of bar codes and the associated standards: bar code language standards (symbologies) and the messaging standards that govern the construction of the data encoded by the pattern of bars and spaces.

Symbologies: Many types of bar code symbologies exist. Each one is a language for translating data into a pattern of bars and stripes. A single data "message" can be encoded using multiple bar code languages or symbology much as the same phrase can be translated into English, French or German. The importance of using a standard symbology is that it makes the message readable by a wide variety of scanning devices. This efficiency can be witnessed daily at the checkout counters in virtually every retail store. Not all scanners are made by a single supplier, but they all read the standard symbology applied in the U.P.C. bar code that is on the label of virtually every consumer product.

Bar code symbology standards: Specify which languages companies should use for specific purposes. When these standards are adhered to, individual companies can invest in scanning devices to read these bar codes without the risk that they will encounter a non-standard bar code language their scanners are unable to read. This first level of standardization is necessary to support an application, such as product recalls or grocery store checkouts, that involves many companies.

Messaging Standards: All that is gained from symbology standards is the ability to read the bar-coded messages. To be easily used, these messages must be in a standard format using "rules" to construct data so that computer systems reading bar codes from a variety of sources can interpret and use the data. These rules govern the definitions of data contained in the bar code. This is at least as important as the bar code itself.

The two key data messages that enable efficient market withdrawals are the standard product identifier, or the GTIN, and the lot number. While no standards exist that specify lot number, there is a standard means of identifying which part of the bar code is the lot number. The GTIN, on the other hand, has some very special rules for construction that ensure that a company can assign a number to a product and that the number assigned will be unique in the pool of all products around the world. This is an extremely powerful feature that deserves more attention.

Constructing the Global Trade Item Number - Four Key Data Elements

The Global Trade Item Number (GTIN) is a 14-digit number that is composed of four basic data elements concatenated together. In order, these are: (1) Company Prefix, (2) Item Reference Number, (3), Indicator Digit Indicator Digit, and (4) Check Digit. The resulting 14-digit data "message" is encoded into a bar code using the bar code language, or symbology, called UCC/EAN-128. Let's take the four data elements that compose this powerful number in more detail.

Company Prefix: Global uniqueness of the GTIN is enabled by use of the Company Prefix combined with the Item Reference. The Company Prefix is seven-digits long. It's name is somewhat of a misnomer in that it does not necessarily represent the business entity that physically produces the product. In fact, it identifies the business entity that specifies the product and its label (or brand). In most cases this is the physical manufacturer. For example, a potato processor, Famous Potatoes, would apply the Famous Potatoes Manufacturer Identifier to all products that carried the brand name Famous Potatoes.

However, in instances where an operator or a distributor specifies a product to be produced by Famous Potatoes for its exclusive use, it would be the entity identified by the Company Prefix in that product's GTIN. For example, if the owner of a restaurant chain, Chuck's Fabulous Fries, commissions Famous Potatoes to produce a Chuck's Frozen French Fries bearing the Chuck's Fries label, then Chuck's would be considered the manufacturer and it would be Chuck's Company Prefix in the GTIN.

If Famous Potatoes also packed out frozen french fries that carried the brand of a distributor, John's Distributor, then John's Company Prefix would be specified in the GTIN. This means that a single company, Famous Potatoes, is supplying product with three different Company Prefixes - their own, Chuck's and John's.

So where do these Company Prefixes come from? If Famous Potatoes, Chuck's and John's all made them up, there would be the risk of duplication. Therefore, these numbers are controlled and assigned by a neutral, third party standards-making body. In the United States, the Uniform Code Council (located in Princeton, NJ, and Dayton, OH) assigns Company Prefixes. By using this nonprofit agency, all can be assured that no duplicate Company Prefixes are created. EAN International and EAN numbering organizations assign Company Prefix numbers to companies outside of North America to ensure that their numbers are unique throughout the world.

"Standards make it possible to recall product quickly, saving time, money and reducing consumer health risks"

Item Reference Number: The Item Reference is a five-digit number that uniquely identifies a product within the set of products controlled by a single Company Prefix. That is, once a company has a Company Prefix, it has in essence "bought" the set of Item Reference Numbers from 00000 to 99999. These are assigned independently and autonomously by the "owner" of the Company Prefix. The UCC publishes guidelines for what constitutes a unique product, and it is the sole responsibility of the company that owns a Company Prefix to adhere to this "uniqueness management" function.

When an Item Reference Number is concatenated to the Company Prefix, we have the basis of a globally unique number. No other product from any other supplier can bear this number since each company has its own Company Prefix. However, there are two other digits that complete the GTIN.

Indicator Digit: This single-digit number ranges from 0 to 8 (9 is reserved for products that are variable in weight) and can be used to specify the packaging level of the product. For items intended for sale to the consumer (i.e., consumer packaged products) the packaging indicator is by definition zero. However, the zero value can also be used on cases or other packaging levels as well. This is the first digit to appear in the GTIN.

Check Digit: The 14th and last digit of the GTIN ranges from 0 to 9 and is computed by applying a standard set of logic to the preceding 13-digit number (1-digit Indicator Digit + 7-digit Company Prefix + 5-digit Item

Reference). The check digit greatly reduces the chances of an erroneous read of the bar code and/or data entry error if the number is manually keyed in.

The familiar U.P.C. number that is found on almost every consumer product sold in the U.S. is a special subset of the GTIN system. The U.P.C., of the familiar form, **1 23456-67890 9** has an implied "00" on the front of the code. These are not printed and scanners "assume" the zeros. One zero is the Indicator Digit, which is always zero for consumer packaged goods. The other is the leading digit of the Company Prefix, which in the U.S. has historically always begun with a zero. This will change when the 14-digit number replaces the 12-digit U.P.C. in the U.S. in 2005. (Scanners programmed to decode the 14-digit symbol will be capable of decoding the U.P.C. symbol.)

Why is the GTIN important in a market withdrawal situation? It represents the only unambiguous way suppliers can identify the products they produce. If all trading partners in the value network use this number to identify products (which by definition uniquely identifies products), then a supplier can tell any trading partner which products should be contained. This is not possible if each trading partner uses its own proprietary numbering system for product identification.

Manufacturer Lot Numbers

While the GTIN is essential, it does not specify closely enough the products that should be withdrawn. That is, if the GTIN is the only number used then all a supplier can do is to say, "Contain all of the products identified by a particular GTIN." A lot number is needed to create a finer level of product granularity. During a market withdrawal, lot or batch numbers are crucial information. Manufacturers of foodservice products must have a means of assigning and recording lot numbers at the time of manufacture. This practice is already widespread, thus, this is not typically where recalls break down.

Where the system breaks down is in the hand-off of these numbers to trading partners that receive products. This hand-off presents two problems:

- Physically recording these numbers is burdensome when cases are repeatedly shipped and received. Often these lot numbers have many digits, making manual recording a time-consuming, error-prone task.

- Receivers of product typically receive products from many suppliers. Thus, in the absence of standards, suppliers' lot numbers can be constructed in any manner and integrating this into a single system is difficult. In addition, different suppliers may repeat the same lot number.

Bar codes solve all these problems. Using bar codes, lot numbers can be efficiently and accurately recorded at each point in the supply chain. Lot numbers can be identified within a stream of numbers encoded in a bar code using a standardized data structure. The standards used are the application standards for Shipping Container Codes, coupled with the UCC/EAN-128 Application Identifier standard. They allow suppliers, distributors and operators to "link" physical cases of product with information systems. If adopted on a widespread basis, these standards would make it possible to recall product quickly and efficiently, saving money and reducing any health risks.

Lot numbers can be included in the same bar code as the GTIN thus enabling both data elements to be captured in a single swipe of a scanner. This is accomplished using a set of standard data constructs called Application Identifiers (AIs). AIs identify additional information that may be useful (such as lot number or expiration date).

An AI is a number shown in parentheses that "tells" the scanner what to expect in the following data fields. It is shown in the "human readable interpretation line." AI (01), for example, is reserved for telling the system that the next piece of data to be read is a GTIN using the data structure and rules described for GTIN construction (on a case, the GTIN is typically referred to as the EAN/UCC-14.)

AI (10) is set aside for batch/lot numbers, which can be up to 20 characters long and contain letters and/or numbers. This flexibility is designed to allow every supplier to fit its lot or batch numbering scheme into this data structure. Coupled with the unique GTIN, this further reduces the likelihood of duplicate lot numbers coming from different suppliers.

A Hypothetical Market Withdrawal

Now, let's see how all of this comes together in a hypothetical example. Famous Potatoes produces potato-based food products (to tie to our previous example). It has obtained from the Uniform Code Council the Company Prefix **0112345**.

One of the products Famous Potatoes manufactures is 20-pound cases of frozen french fries (bearing the Famous Potatoes brand name). Famous Potatoes uniquely identifies all cases of this product through the assignment of an Item Reference of **67890**. This is both the internal number used to identify this product and the number used by customers when ordering the product.

Let's assume the Indicator Digit for cases of this product is **zero** and the check digit is **9**. Therefore, the EAN/UCC-14 standard identifier for all cases of this product is **0 0112345 67890 9**. This 14-digit number can be used by anyone in the world to uniquely identify the 20-pound cases of these french fries that are produced by Famous Potatoes.

At Famous Potatoes, manufacturing lot numbers are assigned using a letter that designates the plant, a number that indicates the pack line at the plant, the 4-digit year, 2-digit month, 2-digit day and 2 digits to indicate hour of production. So the batch number assigned to a batch produced on Line 1 at Plant A on April 4, 2000, at 2:15 p.m. would be **A-1-2000-04-04-14** (hyphens shown would not be encoded). This level of granularity lets Famous Potatoes narrow problems to a relatively small number of cases.

Putting all these numbers together using Application Identifiers yields the following:

(01) **0 0112345 67890 9** (10) **A12000040414**

This number is translated into a bar code using the UCC/EAN-128 symbology standard for the purpose of case labeling. The bar code is applied to each case as it is produced. The lot number is incremented at the top of each hour and/or at item changeover.

With a single swipe of a scanner programmed with standards, anyone in the supply chain can determine that the first portion of the code is the GTIN that uniquely identifies the trade item, and that the second part is a lot or batch number. Using cross-referenced tables in a Vendor and Item file, this trading partner could further learn that the case contained frozen french fries made by Famous Potatoes.

As cases are picked to fill an order, the picker scans the bar code. This (1) verifies that the item being picked is the item ordered and (2) records the lot number of the case to the shipping documents. Now Famous Potatoes has a record of which distributor customer received this lot of product and on which order.

The distributor customer can, in turn, record the lot number either from the information received from the supplier electronically on an EDI advanced ship notice, or by scanning the case directly when it is received.

In a similar fashion, the case can be scanned into and out of storage locations within a plant, warehouse, distribution center or pantry. If all trading partners participate in this process by voluntarily using the standards, a market withdrawal can be quick and efficient. If a withdrawal is required, only those cases that are affected are actually withdrawn. This saves time and money.

For example, if an operator, Chuck's Famous Fries, finds a piece of metal in a fry that came from this case and notifies Famous Potatoes, then Famous Potatoes can call for the withdrawal of lots: **A-1-2000-04-04-12, A-1-2000-04-04-13, A-1-2000-04-04-14, A-1-2000-04-04-15, A-1-2000-04-04-16**. This brackets the affected lot by two hours before and two hours after. This withdraws much less product than if they simply had to withdraw every case of the product in the marketplace.

Famous Potatoes queries its inventory and shipping records for these lot numbers and immediately determines which customer orders contained this item and these lot numbers. A customer contact list is quickly created, and each customer is notified of the offending lot numbers and the specific withdrawal procedures required. Distributors can then scan their inventory and shipping records to pull the remaining suspect cases and locate and notify their own operator customers who received the product.

In hours if not minutes, the potentially tainted cases can be located and suspended from further use. The key was the day-to-day tracking of lot numbers through the system. This process is enabled by the effective use of bar coding standards. When integrated with shipping, receiving and inventory systems and procedures, these standards enable an unbroken chain of tracking and control that can save crucial minutes in a recall situation.

Not only do bar codes save the foodservice industry time and money, they have the potential to save the consumer the pain and discomfort of a food-borne illness. Best of all, the technology and standards already exist. They are ready for use by those companies who choose to do so.