MODERN Equipment 101: Totes and containers
A primer for warehouse/DC managers
Solving the puzzle

Don’t take totes and containers for granted. These seemingly simple products are key components in the materials handling process, ensuring a smooth, efficient and safe flow of goods through the entire supply chain.

By Lorie King Rogers, Associate Editor

What’s made of plastic, has six sides and is brightly colored? If you said a Rubik’s Cube, you’re both right and wrong. If you said reusable plastic bins, totes and containers, you’re right. Unlike the puzzling toy, bins, totes and containers offer clear solutions.

Available in hundreds of sizes and configurations—and found throughout the supply chain—reusable plastic bins, totes and containers bring many benefits to the materials handling table. From reducing packaging waste, to maximizing product protection, to optimizing inventory management through standardization, returnable boxes generate dramatic cost and efficiency returns. But with so many choices, how do you choose?

Before you answer that question, Joe Borer, marketing manager for Buckhorn (www.buckhorn-inc.com) says you will need to ensure a good closed loop system. “First and foremost, you have to make sure you can get the containers back. If you can’t, you won’t realize the cost savings.”

With your closed loop system in place, you carefully consider which returnable you need. “Ask yourself the proper questions for the proper container recommendation,” says Nathan Franck, new
product development manager for Rehrig Pacific (www.rehrigpacific.com). For example: What’s the use temperature range? Is a lid needed? Will the container interact with automation? How long do you need the container to last?

“Study all of your handling needs, and get input from someone experienced in the field,” Borer says. “They can point out contributing factors that will help you make the right decision.”

Figuring out what’s right starts with product protection, says Norm Kukuk, vice president of marketing at Orbis (www.orbiscorporation.com). To get product safely from one point to another, you have to understand what’s required of the product from the time it’s manufactured to when it reaches its ultimate destination. “Considerations include product protection, parts per container, trip distance, supply chain velocity and proximity to destination, ergonomics, airflow, materials handling interfaces, and other special requirements for specific applications like food safety, cleanliness and identification needs,” Kukuk says.

Manufacturing and assembly
Totes, bins and containers are all incorporated in manufacturing and assembly operations. Small parts for assembly are organized in bins captive to the facility. Totes storing work-in-process are also captive as they travel through different workstations.

Internal totes tend to stack and nest. Efficiency comes from being able to stack them when full or condense them when empty. These totes, often with footprints of 24 x 16 inches or 20 x 12 inches in a variety of heights, are sized to product shape and weight considerations.

Non-captive totes and containers make the rounds in a closed loop system—trucked from a supplier’s facility full of components and arriving just-in-time to the assembly line.

The majority of totes are straight wall style and modularly designed so that when they are fitted together, the smaller footprints combine to form a unit load equivalent to the standard pallet footprint. The load is typically topped with a cap and secured to prevent shifting.

Similarly, larger containers carry larger parts and stack together for transport. Because the standard footprints are so established, users generally have a choice of off-the-shelf totes and containers from a variety of suppliers.

Customized dunnage is often used to protect the contents. When emptied, the dunnage stays inside the container, also eliminating the need to collapse.

“Reusable packaging supports many ISO-certified and six sigma operations by protecting incoming parts and outgoing products from damage,” says Orbis’ Kukuk. “Expensive components and finished products are safe in heavy-duty, durable plastic containers with customized interiors that protect delicate assemblies from damage.”

For closed loop systems between manufacturing operations, maximiz-
ing trucking efficiencies is important. Manufacturers shipping product to DCs want to cube out trailerloads, then bring the maximum number of empty, collapsed containers back to be refilled.

Automated systems/storage
Facilities with automation—particularly those with mini-load automated storage and retrieval systems (AS/RS)—incorporate reusable plastic totes as the standard unit load to maximize their investment, especially for moving and storing product from the receiving dock to the primary pick location.

There are two different philosophies about which style works best: Stackable and nestable. Stack-only totes optimize cube in the system, yielding 10% to 20% more volumetric efficiency than a nestable tote, depending on the height. Alternately, when the tote completes its circuit and comes to the end of the line empty, nestables are more compact and can be handled more easily.

The most common footprint is a 24 x 16 inch tote. Although there are many standard, off-the-shelf totes in this size available, custom totes are frequently created for these applications. But customization can be expensive.

Buckhorn’s Borer points out that creating a new mold could cost several hundred thousand dollars. Additionally, testing and production times for a custom unit average 12 months, so time and expense will be saved if your automation system is built around a standard sized tote.

“Don’t overlook the importance of a proper container design before an automated system is installed,” says Rehrig Pacific’s Franck. “Custom container designs may be cost prohibitive in cer-

A tote by any other name...

You say pop, I say soda. Milk shake vs. frappe. No matter what you call it, it’s all good. Here are definitions to make sure we’re all speaking the same language.

Bin: A box used for storage and organization of small parts prior to use in manufacturing and assembly, frequently with a hopper (or open) front. Bins are generally stackable and may feature an integrated tab in the back that permits them to be hung from a louvered storage unit. They may be constructed of solid or corrugated plastic. Often found in workcells, bins rarely leave one area. Lids are incorporated in clean environments. Dimensions range from 3 x 3 inches to 24 x 12 inches.

Tote (also called a crate, handheld container, reusable security container or work-in-process tote): A box transported by hand, with molded-in ergonomic handles. Totes are primarily offered in two designs: nestable and stackable. Nestable totes feature drafted, or sloped, sidewalls created from a base footprint smaller than the top opening. This allows the units to be nested inside each other when empty. Stackable totes have an identical footprint top and bottom, and feature an integrated lip that prevents shifting when stacked.

Flap lids may be attached to the top of the tote, hinged on either long side and meeting in the middle when closed (commonly found on nestable totes), or they may be separate from the totes. Dimensions vary based on industry and application. Maximum capacities range from 40 pounds for totes handled by humans to 80 pounds for totes handled by automated systems.

Container (also called a bulk container, bulk box, bulk bin, shipping container, gaylord or by any one of a number of brand names): The largest of the reusable boxes, containers include four straight walls built on pallet-sized footprints with fork openings on two or four sides. Generally used for discrete component parts delivered to assembly lines, these heavy-duty units can only be moved by pallet jack or fork truck. Sidewalls can collapse down into the container when empty, or they may not, depending on the design.

The walls may be designed with openings or drop doors to permit easier access to contents, and unattached lids or covers are sometimes used. Containers stack when full or empty, with capacities ranging from 1,000 to 2,000 pounds.

Less common are nestable bulk containers, typically used for bulk ingredients, and bulk packs with a collapsible corrugated plastic sidewall unit sandwiched between a pallet base and top cap.

Dimensions vary by industry and application, but the two most common sizes are 40 x 48 inches for general product handling (a standard established by the Grocery Manufacturer’s Association [GMA] and used for most general product handling), and 45 x 48 inches for the automotive industry (a standard set by the Automotive Industry Action Group [AIAG]).
tain systems so it is important to first look at available products when designing automated systems.”

**Distribution**

Maximizing truckload efficiencies was a key consideration in distribution from warehouse to retailer, but many companies are now taking a broader view in total supply chain optimization, picking to store aisles to reduce overall costs.

Custom interior dunnage in right-sized reusable containers standardizes the number of parts per container and ultimately per truckload, enabling better ordering capabilities, cost estimating, logistics and transportation planning, says Kukuk.

Typically defined by less-than-case-load picking, nestable totes with securable attached flap lids to prevent pilferage are the reusable box of choice for this application. Being nestable allows the totes to stack compactly when empty and waiting for their return trip from the retailer to the DC, which minimizes transportation costs.

Returnable totes are replacing corrugated paper boxes. Security is the primary benefit, but reduced product damage is a close second. Plastic totes, which can endure about 300 round trips, don’t get crushed when stacked and the molded-in handle makes them easier to handle.

Footprints and heights of these products vary depending on contents. For handling general merchandise, totes typically have a 21 x 15 inch footprint and 9 or 12 inch height. Hardware and automotive aftermarket products tend to ship in a slightly larger footprint of 27 x 17 inches and heights of 9 or 12 inches. A 28 x 21 x 15 inch container typically ships to retailers, as that size was built to accommodate a man’s suit on a hanger, folded in half.

**Green benefits**

Sustainability is increasingly playing a major role with bins, totes and containers. “Sustainability and reuseables go hand in hand,” says Allan Howie, director of continuing education and professional development for the Material Handling Industry of America (MHIA, www.mhia.org) and managing director of the Reusable Container & Pallet Association (RCPA, www.mhia.org). “Sustainability is a common thread throughout the industry and an issue that’s increasingly important.”

Green initiatives have increased interest and need for reusable/sustainable products, and containers play a big part, explains Ken Beckerman, president of Flexcon Container (www.flexcontainer.com). “Customers are looking for containers that are reusable and are made of recycled material to show they are participating in the overall global movement.”

Choosing the right bin, tote or container for the right application will move your product moving smoothly and keep your operation running efficiently.