

# How Dimensional Weight Pricing Affects Material Handling Systems

Shipping Rate Updates Present New Challenges for Automated Systems in the Warehouse



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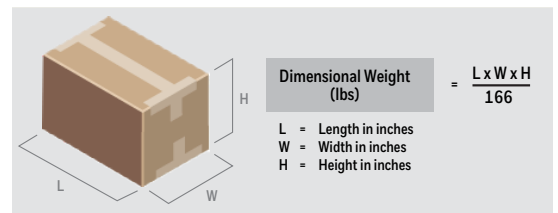
# How Dimensional Weight Pricing Affects Material Handling Systems

## Shipping Rate Updates Present New Challenges for Automated Systems in the Warehouse

FedEx and UPS made waves throughout the supply chain with the announcement of shipping rate updates that subject packages measuring less than 3 cubic feet to pricing based on dimensional weight. Before the update, carriers priced items smaller than three cubic feet based on actual weight and larger items based on actual size. This means e-commerce retailers could ship small items in large boxes filled with lightweight protective packaging for roughly the same price as smaller, denser boxes. From the retailer's perspective, corrugate cases offer superior item protection and are easier for automated equipment to handle. However, from the carrier's perspective, reduced package density inefficiently uses cargo space and increases the cost per package. The dimensional weight (DIM) calculation enables carriers to better correlate the price charged for the shipment of an item with the space used on the delivery truck.

According to a [Wall Street Journal report](#), the new rate structure affects more than one-third of all ground packages, the majority of which weigh less than 5 pounds. According to its [2014 service guide](#), FedEx calculates dimensional weight by multiplying the length by the width by the height (in inches) of each package, then dividing the total by a volumetric divisor, listed as 166 for domestic shipments. The final figure is then rounded up to produce the billable dimensional weight. UPS uses the same calculation.

The increased shipping rates leave e-commerce operations with a challenge to keep consumer shipping costs down in order to maintain high



## Dimensional Weight Calculation in Action

With DIM pricing in effect, a 12-by-12-by-12-inch box that weighs 1 pound is actually priced as 11 pounds. According to zone three FedEx ground delivery rates, which apply to shipments 151–300 miles from origin to destination, DIM pricing results in a 32 percent rate increase.

transactional volume. In a [UPS survey of online shoppers](#), nearly 60 percent of respondents cited shipping costs as their leading cause of online shopping cart abandonment. In order to prevent increased shipping costs from derailing orders, [analysts expect](#) e-commerce retailers to optimize packaging practices, shifting away from traditional corrugate cartons to more malleable packaging types that do not occupy as much excess space. E-commerce operations have myriad packaging options at their disposal, such as polybags, thin shipping envelopes and bubble packs. However, while each offers reduced overall package size and dimensional weight, they offer new challenges for material handling systems originally designed for more rigid packaging types.

## The Challenges of Polybags

Some existing automation systems may be capable of handling polybags, but the advent of widespread DIM pricing and more small, direct-to-consumer orders means most e-commerce fulfillment centers face a larger volume of non-rigid packaging types than ever before. As distribution operations evolve from manual processes with isolated “islands of automation” to fully integrated automated systems, companies establish performance benchmarks required to justify the automation investment. With polybags and other non-traditional packaging constituting a more significant portion of orders, fulfillment centers must decide if they want one automation system to handle all packaging types simultaneously or implement a separate system for polybags only.

The influx of flexible packaging types does not alter the throughput required to justify automation investments, and these new package-handling demands place a premium on gentle product handling and system flexibility. With multiple packaging types in use to optimize shipping price, the burden falls on material handling systems to accommodate increased packaging variety without compromising throughput, accuracy and product integrity.

Compared to traditional corrugate cases, malleable packaging types present several product-handling challenges. Polybags, for example, lack the structure to provide the same level of protection from impact as orders move through a distribution center. Many traditional material handling technologies were designed for items with firm, flat bottoms. However, polybag bottoms take the shape of the items contained within, creating potential for additional catch points from oversized bags.

These handling challenges threaten product damage, shingling, jams, snags, irregular item and label orientation, and side-by-side products – all of which deter smooth travel

## Looking for the Right Carrier?

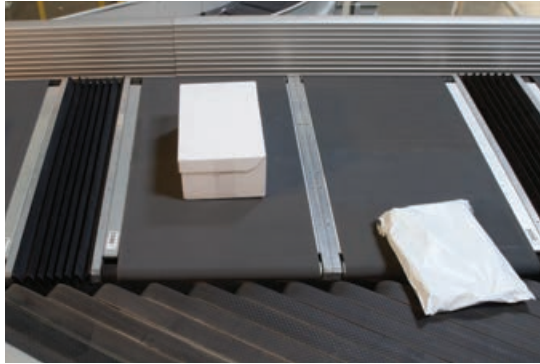
### Rate Shopper Software Finds the Right Service Level at the Right Price

*By Gene Billings, Director, Software Products, Honeywell Intelligrated*

Distributors have a variety of carrier options at their disposal, from global stalwarts like UPS and FedEx, to smaller regional and last-mile transportation companies. Each handles rate structures and service levels differently, meaning certain carriers provide a more cost-effective shipping solution for different types of orders. At the same time, carriers communicate rate information differently and employ unique labeling requirements.

To help make an informed shipping decision and consolidate workflow, operators can utilize rate shopper software that aggregates shipping rate information and labeling requirements from multiple carriers into a single interface. The software automatically updates with negotiated rates for each carrier and integrates with WMS, WCS and other automated solutions such as print-and-apply label systems to eliminate opportunities for operator error and help reduce freight costs. Rate shopper software applies pre-programmed logic based on a variety of business rules such as delivery area, service level and carrier rates – including dimensional weight – to automatically determine the best shipping method.

from pack-out to shipping, risking unplanned downtime, increased order cycle times and worst of all, unhappy customers.



## Can You Handle It?

Given the challenges involved with transitioning from full-case cartons to bagged and smaller items, operations can ask three questions to evaluate if a system can handle certain products.

### 1: Can Existing Technologies Effectively Handle the Product?

The answer depends on the packaging type, the items within, the specifics of the existing technology and the desired throughput. For example, if an operation ships a cheese grater in a polybag, the system must be able to handle the shape of the cheese grater packaging, plus extra catch points that the polybag may present. OEMs can provide guidance on an existing system's capability to handle various product and packaging type combinations.

## Considering Polybags?

### Think Beyond Automated Material Handling Equipment

In addition to automated material handling equipment, auxiliary systems in the warehouse can also affect lightweight, polybagged items. After successfully testing all SKUs housed in the distribution center during its system implementation phase, a large retailer wanted to test the limits of its new sorter to determine the maximum and minimum size items it could handle. Staff placed an extremely small, lightweight item in a polybag on the sorter; the test failed, but not due to a catchpoint or jam on the equipment. The airflow from an overhead fan caused the item to lift up and change position on the sorter. The lesson? When planning for new items with challenging handling characteristics, look beyond automated equipment and consider the entire warehouse environment. Sometimes factors beyond the characteristics of the automated equipment dictate system limitations.



## 2: Can Existing Technologies Locate the True Position of the Item?

An automated system relies on sensors to detect item presence, size and position to regulate product flow and maintain accurate control. Compared to the defined shape of corrugate boxes, nebulous bags lack clearly-defined leading and trailing edges that provide integral data for material handling systems. This data determines proper gapping and positioning to effectively convey, gap and sort orders, and ultimately maximize throughput.

## 3: Can Existing Technologies Identify the Package Contents?

In addition to determining physical dimensions, material handling systems use scanning technology to identify a package's contents and intended route to its final destination. Polybags offer myriad scanning challenges. Their round shapes and non-flat surfaces produce reflective glare, encumber the process of presenting barcodes with the proper side up, and present inconsistent scanning angles. Furthermore, without a rigid shape, bags complicate automatic label application and their inconsistent leading edges complicate triggering the scanning system at the proper time. Instead of a single narrow beam, an array sensor enhances polybag detection so that the scanner knows when to read a barcode. Furthermore, additional scanners at opposing angles can improve scanning accuracy of uneven polybag surfaces to maintain successful identification rates.

### Detecting an Item's True Leading and Trailing Edges

Shown in red, narrow photo-electric eye beams shoot across conveyor lines to detect item position.



## Addressing the Challenge: Optimize Current System or Invest in New Technology?

Distribution operations can use or upgrade existing technologies to cope with the windfall of items in non-rigid packaging. Contrary to popular belief, some sliding shoe sorters are capable of handling polybagged items, provided the sorter has a well-designed conveying surface and pushing element. Upgrading a sliding shoe sorter from tubes to aluminum slats enables a wider variety of



conveyable SKUs to pass through the system and provides a more continuous surface for improved polybag-handling performance.

## Scanning Strategies for Polybags

*By Steve Smith, Logistics Account Executive, SICK, Inc.*

To guard against no-reads and ensure consistent scanning performance, operations can utilize opposing patterns for barcode scanning that account for increased angles presented by the irregular surfaces of polybags. If a signal washes out due to glare from a barcode presented at the same angle the scanner is mounted, a secondary scanner can approach from an opposite angle and produce a successful scan, maintaining an increased level of overall system performance.

A scanning system can include diagnostic tools to identify common issues associated with handling polybags on automated equipment. A scanning system comprised of cameras and a dimensioner can not only capture barcode and volumetric data, but also

detect side-by-side items, improper product gaps, excessive box rotation, inaccurate speed and other information. From these additional data points and image reporting, the operator gains a visualization to help better understand the causes of no-reads and improper product presentation. Once a scanning system detects an issue, it can communicate with the warehouse control software to avoid misdirecting product down a sortation lane and recirculate the products through the system.

To learn more about the specifics of scanners in polybag applications, operators should contact their solutions provider. Today's polybag scanning systems identify products and capture dimensions within a very high tolerance, with accuracy levels down to 5 millimeters. With operations calculating shipping costs based on dimensional and volume data for DIM pricing, accuracy is more important than ever.



Operations can also optimize conveyor system performance with strategic upgrades. In some cases, operations may need to upgrade zone sensors to better detect the true leading and trailing edges of items. Further upgrades include changing roller conveyors from 3- or 4-inch roller centers to 2-inch centers and converting roller conveyor to belt conveyor or belted motor-driven roller zones. These upgrades provide a more consistent conveying surface, improving product flow and decreasing the risk of jams, improper orientation and side-by-side items.

Rather than relying on a sophisticated accumulation conveyor throughout the warehouse, some carriers employ bulk handling to move parcels before advanced singulation systems separate items to a single-file flow before entering a sorter. As retailers and OEMs alike adjust to the proliferation of polybags, retailers may take cues from parcel carriers and incorporate more bulk flow in their fulfillment centers and only singulate when needed.

## Balance Package Size and Security With Cartonization Software

*By Gene Billings, Director, Software Products, Honeywell Intelligrated*

With the advent of DIM pricing and the associated need to minimize packaging size, cartonization software takes on a more important role than ever before.

Cartonization software considers order contents and available packaging types to determine the optimal container for an order. Since the average direct-to-consumer order contains two to three items, the software accounts for the entire order, not just single products. Using predetermined business rules that account for item dimensions, weight, dunnage, labeling and other special requirements, the software produces a recommendation that reduces excess packaging while ensuring sufficient protection.

For more information on rate shopper and cartonization software, operational staff should contact their solutions provider. Software modules built in to a provider's existing systems avoid additional time and financial strain associated with third-party integration. However, all rate shopper and cartonization software modules are not created equal, offering different levels of functionality, customization options and integration requirements.



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