UNEX®

Engineered Space Optimization

Design Your Own Carton Flow Solution

A Step-by-Step Guide to Designing Carton Flow Systems

- BASED ON YOUR EXISTING PALLET RACK
- BASED ON YOUR STORAGE REQUIREMENTS
- BASED ON YOUR EXISTING FOOTPRINT

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DESIGN YOUR OWN CARTON FLOW SOLUTION

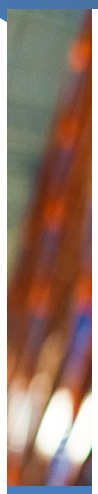
In most fulfillment and warehouse facilities, the operation begins with storing products, or SKUs, on industrial pallet racking. However, as you optimize your operation for speed, accuracy, and storage density, you'll need to incorporate solutions like carton flow to maximize space utilization, and ultimately, reach your goals.

Before you start your search for an off-the-shelf solution, did you know you can analyze your operation and design a carton flow solution based on your unique needs? All you'll need is a tape measure, a calculator, and a little help from the Space Optimization Experts at UNEX.

In this guide, we'll cover the step-by-step process of designing DIY carton flow systems that will reduce pick times, decrease travel times, and dramatically improve your operation's efficiency.

HOW TO DESIGN A CARTON FLOW SYSTEM BASED ON YOUR EXISTING PALLET RACK

3 Steps to Optimize Your Space with Carton Flow and Existing Pallet Racking



1 Determine Your Pallet Rack Details

Not all pallet racks are created equal. While pallet racking may seem like a commodity product, every rack manufacturer's process results in slightly different finished products that aren't always interchangeable. It's essential to keep your equipment consistent as your business grows. Understanding the specifics of your current pallet rack will help you determine how many additional beams you need.

Once you familiarize yourself with your rack manufacturer, focus on three additional items:

DIMENSIONS

1

Your length, width, and depth are crucial specifications you need to measure to design your carton flow system. At certain depths, most carton flow tracks will need to be supported by an intermediary beam. Without adequately measuring your dimensions and making appropriate design decisions, you'll likely invest in a carton flow product that will fail after extended use.

BEAM STYLE

2

Different pallet rack uprights require different styles of beams. They come in three different styles: structural, step, or box beams. Step and box beams are roll-formed and welded shapes, while structural beams are made from "C" channels. Structural beams typically feature a bolted connection to the pallet rack uprights, while roll-formed beams feature a tear-drop-shaped drop-in connection to the uprights. This feature is important for two reasons: Beams are secured to uprights through different methods - securing the wrong beam to the wrong upright can create a significant safety hazard. Also, the type of beam informs the kind of hanger you need to mount carton flow lanes or beds in your pallet rack. Make sure to note the beam style and the manufacturer when taking all your measurements.

WEIGHT CAPACITIES

3

Industrial pallet rack is typically very sturdy equipment, but just like beam styles, many manufacturers have racks with different weight capacities - and capacities can change depending on the width of the beams you need. Capacity is typically expressed in pounds per pair of beams and assumes the weight is evenly distributed across the beams. While you can always get shorter or longer beams, make sure you know the weight of the products you'll be placing on them and ensure your beams can handle it.

Related Reading:
Pallet Picking: Getting on Track

2 Analyze Your SKUs to Determine Track Requirements

Once you've measured your dimensions and consulted with your rack manufacturer's documentation to confirm beam styles and weight capacities, you can begin to analyze the throughput of your SKUs. The carton flow system's design depends on your volumetric throughput - the production rate or the processing speed. Building a carton flow solution without analyzing throughput could mean not having enough space to store your SKUs or buying more or fewer carton flow lanes or wheel beds than you need.

HOW TO MEASURE VOLUMETRIC THROUGHPUT

1. Identify the number of times a SKU is picked in a shift and multiply it by the volume of the SKU - this will determine how much physical space your inventory of that specific S U occupies.
2. Divide that number by your time frame for replenishment - this can be a shift, a day, or even a week.
3. Your final number epresents your volumetric throughput for a given SKU.

Once you've analyzed your entire inventory this way, use the information to determine more specifications for your ideal carton flow system, including:

Type of Carton Flow

There are several different types of carton flow on the market. Some of the most common include roller lanes, wheel beds, and plastic wheel rails. Your throughput will help you better understand the variation of your SKU dimensions and which SKUs move quicker than others. Throughput informs the type of carton flow solution you need - the more variation in dimensions and throughput, the more universal wheel bed carton flow you'll need in your facility.

End Styles

Knowing your throughput also helps you identify which type of end style best fits your application. Your each picks (split case picks) will need to be picked from knuckled carton fl w track, while your full case picks will require low-profile track. If your operation involves a conveyor to move picked products out of the aisle, use high-profile tracks to store SKUs below the conveyor.

Weight Capacities

The amount of product moving through a lane or bed of carton fl w will create variations in total load weight for different SKUs. Understanding how much your carton fl w solution needs to hold will allow you to identify where you need light, standard, or heavy-duty beds or lanes.

Roller Centers

Roller centers refer to the spacing between rollers within the sections. As product increases in length, additional space can be added between rollers/wheels. Having closer roller centers will increase the conveying surface and make the system more fl xible. Analyzing your inventory and throughput will allow you to identify the dimensions of your SKUs that need to be placed in carton fl w and help you make the right choice for roller centers. The general rule of thumb for roller centers is as follows:

Minimum Length of SKU	4"	8"	12"
Maximum Roller Centers	1"	2"	3"

Related Reading:

Carton Flow Helps You Grow Engineered Space Optimization

Properly capturing and analyzing your throughput data is critical in ensuring you make informed decisions when designing your carton flow solution. The analysis will help you avoid headaches and wasted costs down the line. By investing in a system that is tailor-made to your unique application and scrutinizing every detail, you'll be sure to make the wisest investment possible.

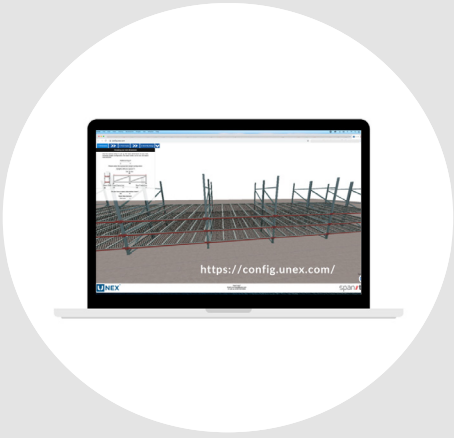
3 Design Your Own Carton Flow Solution

Once you determine your existing pallet rack details and carton flow track requirements, it's time to start designing your solution! We know this is easier said than done. That's why our team of Space Optimization Experts created the SpanTrack configurator.

Using a warehouse design tool, like the configu ator, makes it easy for you to build your ideal carton fl w solution from scratch. Using your recorded pallet rack dimensions, the configu ator will determine how many lanes or beds per level you can use, as well as the number of intermediary beams required. Identifying your rack manufacturer will automatically configu e which style of hanger is needed to secure your carton fl w system, as well as the total weight your solution can support.

Use your inventory data and throughput to identify how many carton fl w levels you need, how many additional pallet rack beams are required, and the total amount of carton fl w lanes or beds you need. This ensures you've stored your slow, medium, and fast-moving SKUs in their proper storage medium with the appropriate end style. When your work in the configu ator is complete, it provides a customized configu ation based on your inputs that increases your storage density and dramatically reduces your operation's footprint.

No matter the size of your facility, your throughput, or your rack manufacturer, these are steps you must take to ensure your DIY carton fl w project is a success.

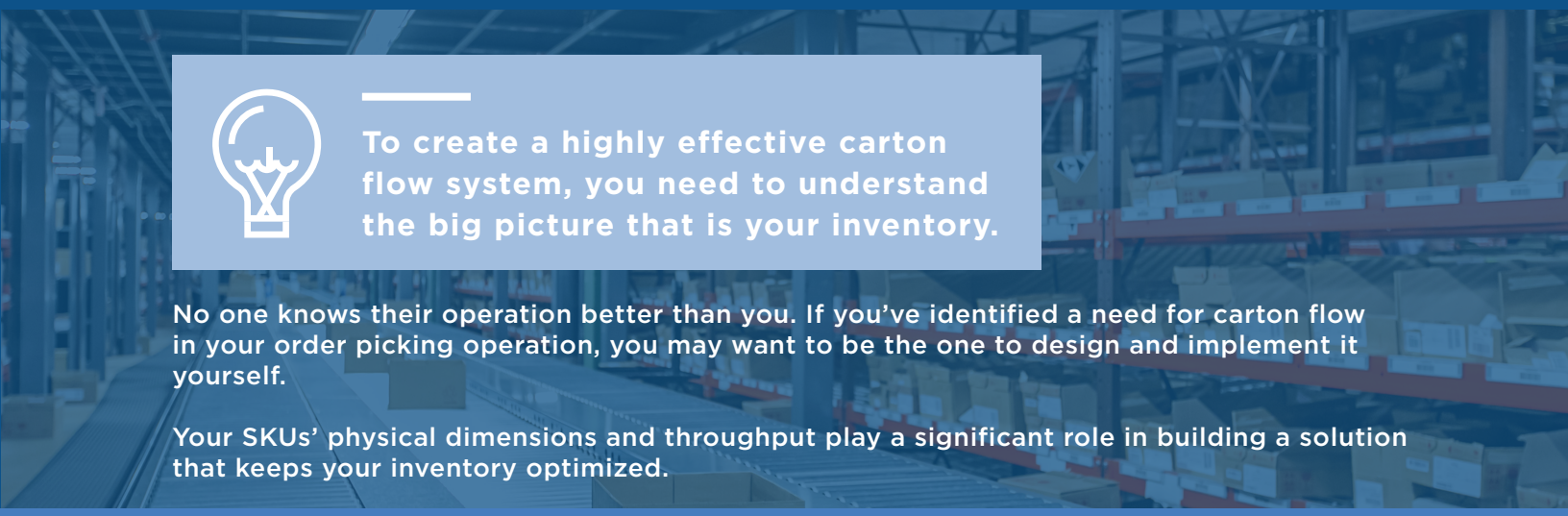


SPANTRACK CONFIGURATOR

With endless configuration options, build optimal carton flow solutions designed around your space's unique parameters to maximize space and meet the demands of even the most complex operations.

- Begin by entering your rack dimensions and features.
- Select track types and define your specific needs.
- Have your free 3D design sent straight to your inbox.

HOW TO DESIGN YOUR OWN CARTON FLOW SYSTEM BASED ON YOUR STORAGE REQUIREMENTS



To create a highly effective carton flow system, you need to understand the big picture that is your inventory.

No one knows their operation better than you. If you've identified a need for carton flow in your order picking operation, you may want to be the one to design and implement it yourself.

Your SKUs' physical dimensions and throughput play a significant role in building a solution that keeps your inventory optimized.

Here are the four steps to create an efficient carton flow system based on your storage requirements:

1 Understand Your Inventory Characteristics

To design the best carton flow solution for you, you need a complete understanding of how many pick locations (or facings) your inventory requires. Your storage needs for each of your SKUs can be entirely different - you may carry 100 of Product A and 1,000 of Product B - and the number of pick locations needed to store and pick a SKU efficiently can vary widely.

Conducting a profiling of your inventory or a slotting analysis is one of the most effective ways to determine how many storage locations you require. There are three main characteristics you'll need to identify to design an appropriate carton flow solution:

1. Picking Methods

First, identify the types of picks you need to accommodate in your carton flow system. While your primary focus will be on split case (each) and/or full case picks, analyzing your full and partial pallet picks will help you determine if you need to integrate pallet picks above or below your carton flow system. Picking methods can affect how many facings you need as well.

2. Quantity

Your most popular products will demand more space in a carton flow system and more pick facings to store the amount needed. If your storage needs change with the seasons, identify your required quantities during the highs and lows of their demand. Combining this information with your box dimensions will help determine storage medium and storage medium dimensions.

3. Physical Dimensions

The length, width, height, and weight of your SKUs will play a major role in determining the depth of the carton flow system and the elevations needed to store your product. Be sure to document these details for every SKU.

Once you have a clear picture of your inventory's characteristics and how orders will be picked, you'll need to determine the throughput of your SKUs.

2 Understand Your Inventory's Throughput

Now that you have your quantity, dimensions, and picking methods plotted out, your next step is to understand the velocity of products moving through your facility. You need to identify slow, medium, and fast-moving products at a high level and whether or not your SKU velocities change seasonally.

Throughput is the rate at which SKUs are processed through a facility. You may calculate these numbers by the hour, shift, day, or whatever best fits your particular business. To calculate your throughput for a SKU, multiply the volume of the product (length x width x depth) by the number of times it is picked in a given time interval. Throughput can also vary significantly by product and by season - for example, cases of string lights may fly off the shelves during the fall and winter and dwindle in spring and summer. Failing to account for the seasonality of your inventory can result in designing an ineffective carton flow system.

Effectively analyzing your throughput data in this step and combining it with the physical attributes of your inventory you identified in step one gives you the information you need to determine the total facings you need for each SKU. Analyzing your throughput also informs the dimensions of the rack required to store your inventory efficiently.

Get the Guide:
Understanding Throughput

3 Identify Your Racking Needs

With the throughput and dimensional data you've collected, you can now determine what type of racking will best meet your needs. Other factors, like existing equipment and picking methods, will also play a part in this step.

To avoid excessive replenishment, which slows down your operation and can increase pick times, you need to ensure that the depth and width of the rack can accommodate enough SKUs so that each pick facing remains stocked throughout a shift (or your preferred measure of time). The data you collected in the previous steps is invaluable here - it will help you determine how many SKUs you can store at a given depth, if you can stack SKUs in a pick location, and where in the rack the SKU should be placed to provide for the most effective pick. This will inform the style and size of rack you need.

However, factors outside this exercise may also play a part in selecting the best rack for your operation. If you have existing pallet racking in your facility, you may want to use it in your carton flow system to stay consistent across your operation and to reuse beams and uprights you already have. **SpanTrack Lane** and **SpanTrack Wheel Bed carton flow** tracks easily drop into your existing pallet rack to utilize the racking you already have in your facility. If you don't need to store pallets above your picking locations or are constrained vertically in your facility, you may opt for a **standalone carton flow rack solution** like **Roller Rack** instead of pallet rack. Additionally, if you intend to use forklifts or order pickers in your picking process, you'll need to choose a racking system that best compliments your equipment.

With these three pieces of information, you are ready to design your own carton flow system.

4 Engineer Your Rack and Tracks

Now it's time to design - using your product dimensions, volumetric throughput, and rack requirements, you can configure your order picking operation to meet your specific needs.

Whether you identified a need for pallet racking or flow racks, UNEX Manufacturing has developed free and easy-to-use tools to design your solution yourself. To design a carton flow system for your existing pallet rack, use our **SpanTrack configurator**. The configurator will help you plot out the amount of carton flow lanes or beds you need, the weight capacities you need at each facing, the heights of each level of storage, and the track style best suited for your picking methods for each bay of carton flow.

If your inventory is much better suited for a rack + track solution, our **Roller Rack flow rack builder** will help you quickly and easily input your required dimensions and levels, pick methods, and track styles to create a solution that meets your needs. These carton flow rack systems can also be customized to meet your required weight capacities and can be used as standalone or connected bays to provide the necessary amount of pick facings per SKU.

Designing a carton flow system based on your storage needs will ensure your facility is not overwhelmed by inefficiently stored products and SKUs are always available at the point of pick.

DIY Carton Flow Checklist

Document the characteristics of your inventory, including:

- Picking methods required for each SKU
- Quantity of each SKU
- Length, width, height, and weight of each SKU

Calculate the throughput of each SKU over a designated time interval.

Use your dimensions and throughput data to identify the type of rack needed and the rack dimensions required to house your inventory.

- Include any existing constraints, like types of equipment being used or types of storage rack being used in other parts of your facility.

Design carton flow lanes or beds to fit within your selected rack type, or design a rack and track combination.

HOW TO DESIGN YOUR OWN CARTON FLOW STORAGE SYSTEM BASED ON EXISTING FOOTPRINT

4 Steps to Turn Your Open Floor Space into a Humming Order Picking Operation

If you are looking to build an order picking system from the ground up, you'll first need to discover where it fits in the grand scheme of your facility. Before you reach for the phone to call a consultant or purchase shelving in bulk, we wanted to share four steps that allow you to identify and layout a storage system that improves the efficiency of your operation. For most distribution and warehouse operations, implementing a carton flow system in their storage area is the most cost-effective way to achieve this goal.

If you've already identified the need for carton flow but you're not sure what's next, here are four steps to get your project going:

1 Define the Constraints for Your Carton Flow System

When you first designed your warehouse, you likely put pen to paper to draw out your entire operation. Your drawing includes docks for loading and unloading, ceiling heights, structural obstacles like pillars, office space, and any other items that affect your facility's total available square footage. This drawing will come in handy again as you design your carton flow system. Suppose you haven't drawn out your entire floor plan yet. In that case, this is where you need to start - remember; you need to ensure you prioritize operational storage and stock processing and minimize non-value-added features like offices and storage for empty pallets.

You also need to make sure the flow of your operation makes sense. For example, having your carton flow racks too far from the loading dock can waste a lot of time due to extra travel and disruptions to other processes. Your carton flow storage should be close enough to related processes to minimize footsteps but far enough away to not create disruptions.

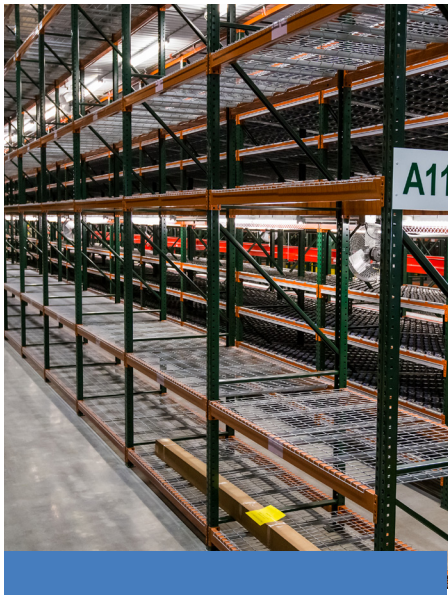
When designing a carton flow system for your operation, you likely face more constraints than simply square footage and flow.

- Will you use order picking equipment or workers to facilitate manual order picking?
- Will you need to navigate forklifts into aisles for replenishment?
- Will you use conveyors to move picked items out of your order picking area?
- Do you need reserve storage above your carton flow racks?

All these factors will dictate your carton flow systems dimensions, like width, height, and depth for your layout.

With these factors in mind, sketch out a dynamic storage area in the ideal position, think three-dimensionally - considering every inch of vertical space available will help maximize space within your order picking operation.

2 Design Your Racking Layout



Now that you have identified where your dynamic storage system should be and its role in your overall operation, you need to design a layout that fits within your space. This layout will be a significant determining factor in choosing your rack style.

If you already have **industrial pallet racks** in your facility, this choice becomes pretty straightforward - you'll likely want to match your existing racking in your order picking area. Matching your existing racking allows you to easily use uprights and beams you already have to create your carton flow system. Use the dimensions of your existing uprights to create aisles in your layout. If you need reserve pallet storage or floor-to-ceiling carton flow, industrial pallet racks equipped with **SpanTrack carton flow** will be your best bet. Remember to factor in your picking and replenishment methods to determine the necessary widths of each aisle.

Related Reading:
Order Picking Perfection

Depending on your needs, there are also many other racking options available. For example, **distribution operations** with low ceilings and no need for reserve pallet storage above their order picking bays can opt for customizable carton flow racks like **Roller Rack**. These gravity flow racks are ideal for manual order picking operations, can boost your space utilization by up to 50%, and are flexible enough to account for structural obstacles like pillars in your facility.

Once you've determined your rack layout based on equipment, picking methods, and footprint, you can determine how many levels and which style of carton flow you need.

3 Determine Levels and Profiles Based on Your SKUs

The next step in designing your carton flow solution relies on the weights, dimensions, and throughput of your SKUs, as well as the type of picks required for your inventory. Gathering this data will help you determine how many levels of carton flow you need, the necessary depths and widths of the carton flow solution, and the style of the carton flow that will work best for your situation.

Using the weights of your SKUs will allow you to determine the needed capacity of your carton flow, as well as the total number of SKUs you can safely store in a bay. With this information, you can incorporate a mix of light, standard, and heavy-duty carton flow solutions that allow you to exactly match your needs and avoid paying for more load capacity than needed.

The length, width, and height dimensions of your SKUs will determine how many SKUs you can store in a single position, allowing you to design a storage system with enough levels per bay to store your inventory and optimize space effectively. Your throughput is also an important factor here - SKUs picked at a high velocity will need to be stored properly to make replenishment efficient and likely need more pick positions and more depth than your less popular SKUs.

Finally, you'll need to understand how your picks are being made to determine your carton flow solution profile. SKUs picked from a master case (**each picks**) will need a different style of carton flow than full case picks - each picks should be stored on a knuckled track at a level that makes the opening of the case visible to an order picker.

Accounting for these variables will allow you to design the most efficient rack and track solution that will work within your unique space.

4 Design Your Ideal Dynamic Storage Solution

With this powerful information in hand, you're ready to configure a storage solution that fits in the designated footprint.

If you have determined that an industrial pallet rack is an optimal choice for your new dynamic storage process, the UNEX SpanTrack Configurator allows you to build a solution from the ground up, using a mix of various carton flow track styles and capacities. If a customized flow rack option is the best fit, you can build a Roller Rack to create gravity flow racks with your specified dimensions and complement it with useful accessories.

DIY Carton Flow Checklist

- **Use or create a drawing of your existing floor plan to determine where to integrate your new carton flow racks in your facility.**
- **Catalog your existing equipment (racks, order picking carts, forklifts, and more) that will play a role in your picking and replenishment process.**
- **Define the requirements for your new carton flow system.**
- **Consider everything that will impact your space and processes, like the need for reserve storage above your carton flow racks or adding in other equipment like conveyors, packing stations, etc.**
  - Determine the weights, dimensions, and throughput of your SKUs.
- **Determine the style of the carton flow track based on your application requirements.**
  - ie: dedicated lanes, wheel beds, knuckled track, low profile, hangerless, etc.
  - Determine the capacity and dimensions of your carton flow track based on your SKU's size, shape, and throughput.
  - Determine levels of carton flow required.
- **Design your customized solution with the SpanTrack configurator or send us your specifications for a Roller Rack system, and we'll work with you to bring your design to life.**

AMP UP PRODUCTIVITY WITH UNEX CARTON FLOW

Our carton flow solutions dramatically improve productivity and accuracy on the pick line, maximize SKU storage, and minimize strain on pickers.

98 & 99 Series Lane Light-Duty & Standard

SpanTrack lane 98 & 99 Series carton flow drops into existing rack, creates FIFO rotation ideal for full case picking, ensures product is at the pick point and eliminates the need to reach into the rack.

100 Series Heavy-Duty Lane

SpanTrack lane 100 Series is best for abusive environments (metal totes, pails, etc.) or assisted picks (like Keg Flow, TVs, auto panels) where repeatedly lifting heavy containers may injure workers.

SpanTrack with Adjustable Pick Trays

SpanTrack carton flow rollers with adjustable pick trays present open cases to order pickers so products can be picked from the case without interference from the shelf level above.

98 & 99 Series Bed Light-Duty & Standard

SpanTrack bed 98 & 99 Series carton flow drops into existing rack, creates FIFO rotation ideal for full case picking where the cartons vary in width, ensures product is always at the pick point.

100 Series Heavy-Duty Bed

SpanTrack bed 100 Series is ideal for assisted picks (like TVs, heavy auto parts) or abusive environments (metal totes, bulky boxes, etc.) where the heavy containers may damage the rollers.

SpanTrack with Knuckled Ends

SpanTrack lane and bed carton flow can be customized with knuckled end treatments to present open cases to order pickers for increased efficiency in each picking applications.

The Space Optimization Experts at UNEX are always available to help you through the customization process. We'll work with you to identify a carton fl w solution and help you design a system that keeps your operation running smoothly.