

SYSTEM FLEXIBILITY

Push-Back utilizes a system of enveloping carts installed into high density storage rack. With push-back, all pallet loads on every level are readily available at the face of the rack. It saves space while providing increased stability and less opportunity for fork truck damage to rack or product. All push-back components are made of 100% structural steel. It is available in 2, 3, 4, 5 and 6 deep styles and can be arranged as back-to-back islands or stand alone bays. Number of levels high is restricted only by your lift truck's reach. No special fork trucks are required. Push-back systems are fully operational in freezers, coolers and high temperature environments.

Q & A

How much slope do the rails have? The system utilizes a slope of $3/8"$ per foot, or just a little less than two degrees. This slope ensures that empty carts will always return to the front of the lane. Most times the total slope is less than the lift clearance above the pallet at the load end, and therefore, does not affect the number of storage levels.

What size aisle is required? Aisles should be sufficient to allow an operator to square up to the pallet without turning into the rack. Usually this is 6" more than the truck manufacturers' minimum aisle requirement.

How much push is required by the forklift? Approximately 4% of the total weight being pushed back, not counting the pallet on the forks of the truck. This is well within the capabilities of most lift trucks.

How difficult is push-back to load and unload? Experience has shown that most operators are completely efficient within a half day. Many operators state that push-back is easier to load and unload than standard pallet rack. Operating instructions are sent with each system.

What about maintenance? There is no required maintenance. Bearings are permanently lubricated.



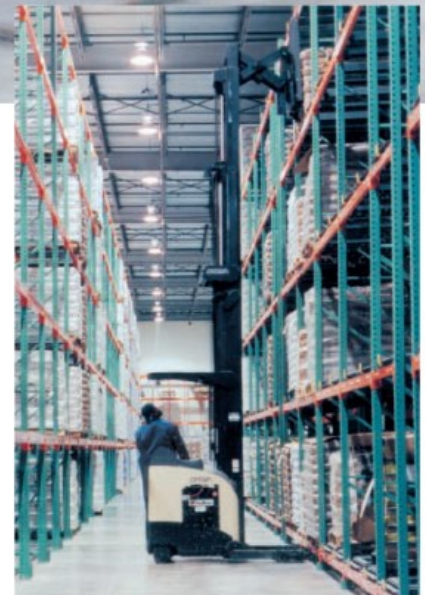
INCREASED DENSITY

Today's challenge in warehousing is to store an ever increasing number of pallets with an ever increasing number of products in a fixed storage space. These two factors work against each other, unless you utilize Push-Back. Push-Back storage increases the pallet count, while offering many more pick faces than traditional high density storage systems.



How does Push-Back stack up?

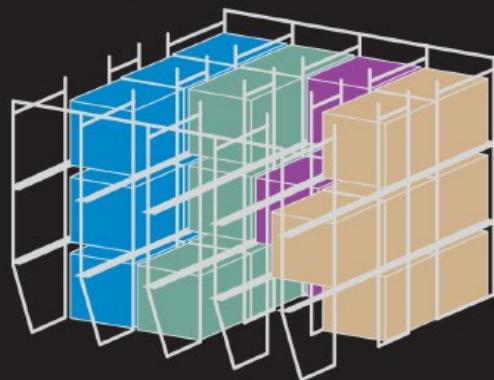
	Floor Storage or Drive-in	BIG JOE Push-Back
Typical occupancy	50-60%	85-95%
Handling costs	High	Low
Number of pick faces per tower	One	# Levels
Random storage all levels	No	Yes
Stock rotation	Rotate towers	Rotate lanes
Rack/Product damage	High	Low
Number of products applicable	Few	Many
Efficient bottom level case pick	No	Yes



PUSH-BACK ACCESSIBILITY – All 12 lanes and pallets are accessible from the aisle...all the time!



Push-back **90%** Utilization of pallet positions



Drive-in Honeycomb **60%** Utilization of pallet positions

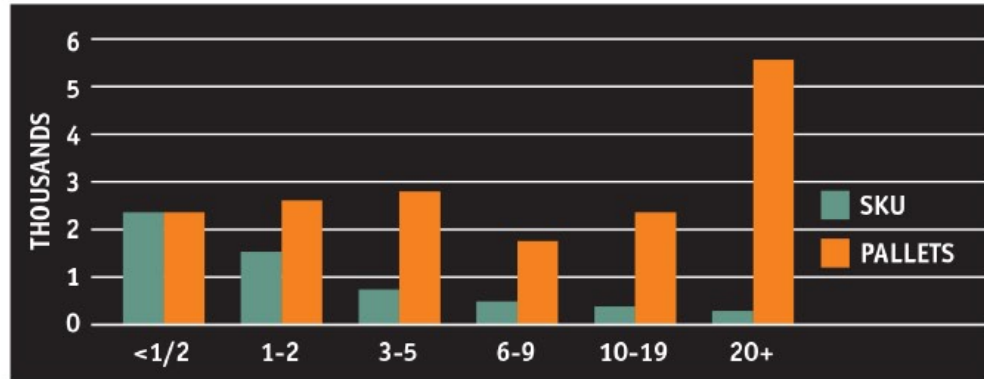
PUSH-BACK JUSTIFICATION

When the average number of pallets per product exceeds five, a push-back system is easily justified. The higher the number, the deeper the lane is feasible (usually 3 lanes per product minimum). These multiple lanes allow rotation to achieve first-in/first-out.

Push-Back systems can be configured to attain up to 100% more pallets stored than standard pallet rack, and equal or greater increases over poorly occupied drive-in or floor storage configurations.

The chart at top right shows a typical distribution center's inventory. The "80/20 rule" where 20% of the products (sku) represent 80% of the volume is common to most customers. Push-back would be applicable for the following categories:

- 6-9 pallets/product - 2 and 3 deep push-back
- 10-19 pallets/product - 3 and 4 deep push-back
- 20+ pallets/product - 4, 5 and 6 deep push-back



Typical Distribution Center's Inventory

Rules of Thumb for choosing dynamic storage rack

Average Pallets per Product	Standard Rack	Drive-In	Push-Back	Pallet Flow
1 to 5	1 Deep	N/R	N/R	N/R
6 to 8	2 Deep	N/R	2 Deep	N/R
9 to 11	N/R	N/R	2/3 Deep	N/R
12 to 14	N/R	N/R	3 Deep	N/R
15 to 23	N/R	N/R	3/4 Deep	N/R
24 to 35	N/R	2 Deep	4/5 Deep	8 Deep
36 to 47	N/R	3 Deep	4/5/6 Deep	12 Deep
48 to 59	N/R	4 Deep	5/6 Deep	16 Deep
60 to 71	N/R	5 Deep	5/6 Deep	20 Deep
72 to 83	N/R	6 Deep	6 Deep	24 Deep

This chart assumes four levels high.
Floor storage would use the same column as drive-in.
N/R - not recommended.

COST COMPARISON

Standard Warehouse, \$50./sq. ft.*

Solution A - 30,750 sq. ft. total

→ 2640 pallet positions of standard racking

Solution B - 15,375 sq. ft. in total

→ 2628 pallet positions of push-back racking

Solution C - 19,926 sq. ft. total

→ 2676 pallet positions, 300 in standard rack, 1332 in push-back and 1044 in floor storage

*Freezer warehouse would average \$100./sq. ft.



Cost Comparison of 3 Storage Solutions: Push-back vs. Standard Racking

FEATURES & BENEFITS

push-back is loaded with safety features and smart innovations. Its unique design provides trouble-free operation, and structural steel push-back components ensure long life in tough warehouse environments.



Multi Purpose Plate - Acts as:

Height gauge: If the load is high enough to clear the safety stop, then the pallet will not prematurely move the awaiting cart.

Strip-off stop: If an operator has his forks in an improper tilt position, the safety stop will catch the bottom of the pallet and "strip" it off his forks.

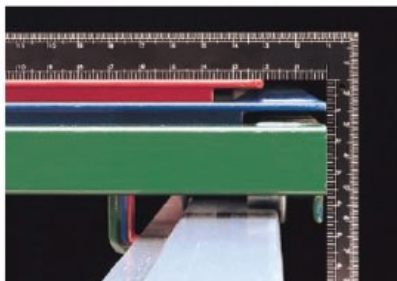
End stop: The end stop, situated on the lowest cart, prevents pallets from shifting beyond the front load beam.

Push plate:

Pushing on the plate with the last pallet being inserted into the lane ensures proper placement on the rails as well as guaranteeing safe clearance of the cart.

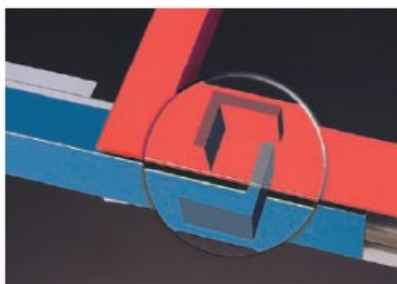


Full lane indicator: The operator can tell if a lane is full by the absence of the plate. If it is not showing, the last cart has been pushed back by the last load and the lane is full.



Low Profile:

push-back has a lower profile than other cart type systems. This allows for extra lift clearance, and possibly an additional storage level.



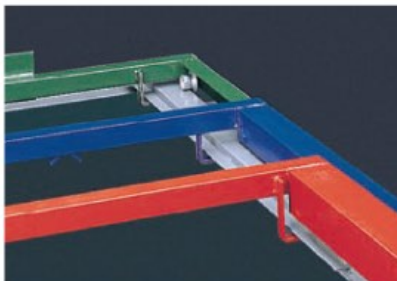
Linked Carts:

Carts are linked when extended, eliminating the possibility of single pallet hang-ups, which can lead to uncontrolled pallet load movement. No push-back system is complete without this important safety feature.



Flanged Steel Wheels:

Our wheels are manufactured from solid steel and equipped with heavy duty bearings. Sturdy 5/8" shafts are welded to the carts and are oversized to withstand shock loading - capacities of up to 1,400 lbs. per wheel.



Lift-Out Protectors:

Each push-back cart is equipped with lift-out protectors, which prevent accidental dislodgement of carts by forklift operators.



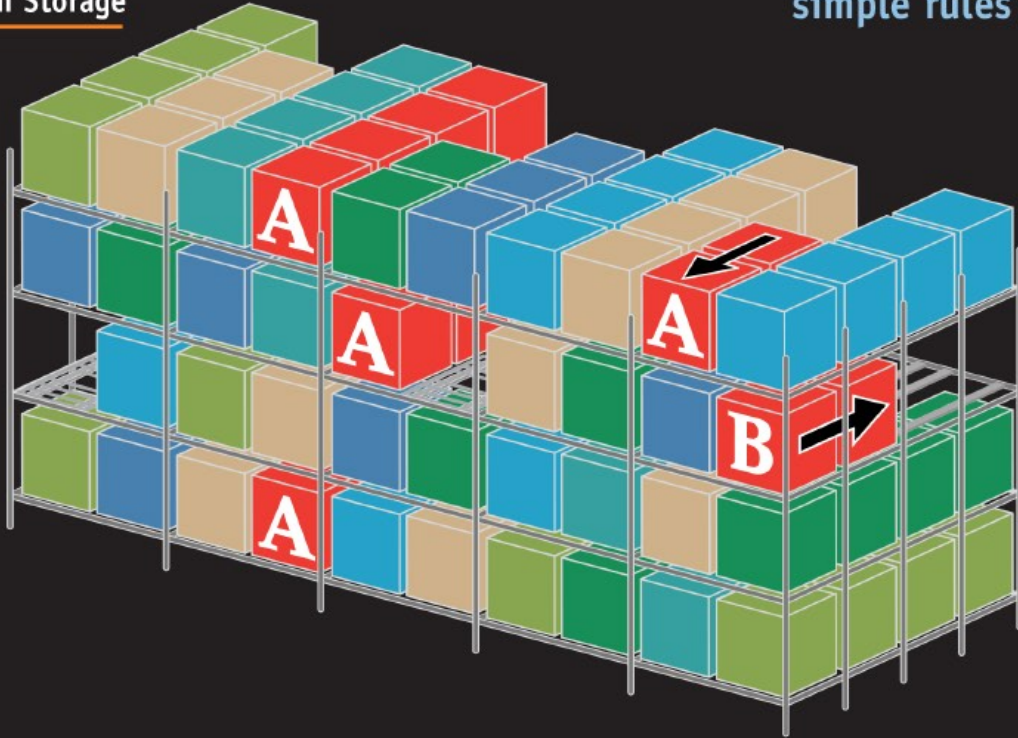
Gauge Bars:

Maintain the proper distance between cart rails. This assures precise alignment and smooth operation of the cart nesting system.

THREE PRINCIPLES OF SUCCESSFUL PUSH-BACK APPLICATIONS

1. First-In/First-Out Stock Rotation
2. High Occupancy
3. Random Storage

These 3 principles can easily be implemented by following the simple rules below.



Rule #1: Select products to be stored that have at least 3 times the lane depth in average pallets in inventory.

Most storage facilities have products that range from one pallet per item up to many pallets per item. The average amount of storage per item should be used to select optimum lane length.

The table shown will yield occupancy rates of 80% – 90%. The higher the number of lanes per product the higher the occupancy rate.

PALLETS PER PRODUCT	LANE DEPTH
1 – 4	STANDARD RACK
5 – 8	2 DEEP PUSH-BACK
9 – 12	2 – 3 DEEP PUSH-BACK
13 – 16	3 – 4 DEEP PUSH-BACK
17 – 20	4 – 5 DEEP PUSH-BACK
OVER 20	5 – 6 DEEP PUSH-BACK

Rule #2: Never replenish a partially filled lane with a new lot code of the existing product or a different product.

As a result of rule number 1, there are a minimum

of three to five lanes available for any one product. Therefore, when a new lot code is introduced, a new lane (as depicted in Red B) is selected so as to not block access to an existing lot code (as depicted in Red A).

Rule #3: When retrieving loads for shipping or for use within the company, be sure to pick from the oldest part lane first.

Picking from the oldest part lane, (as shown in Red A) will automatically rotate your stock while freeing up empty lanes for general availability. This will result in no more than one part lane, per lot code.

This procedure will ensure FIFO Stock Rotation (First in – First Out).

Rule #4: Use random storage to minimize honeycombing. This will enable you to maximize your storage facility.

Random storage in any of the lanes that become available will allow the storage requirement for any item to grow and shrink as necessary. Fixed locations would require storage to be preset for every item at its peak. Exceptions could be made for bottom level case picking with fixed locations.

PUSH-BACK – High Density and Product Accessibility

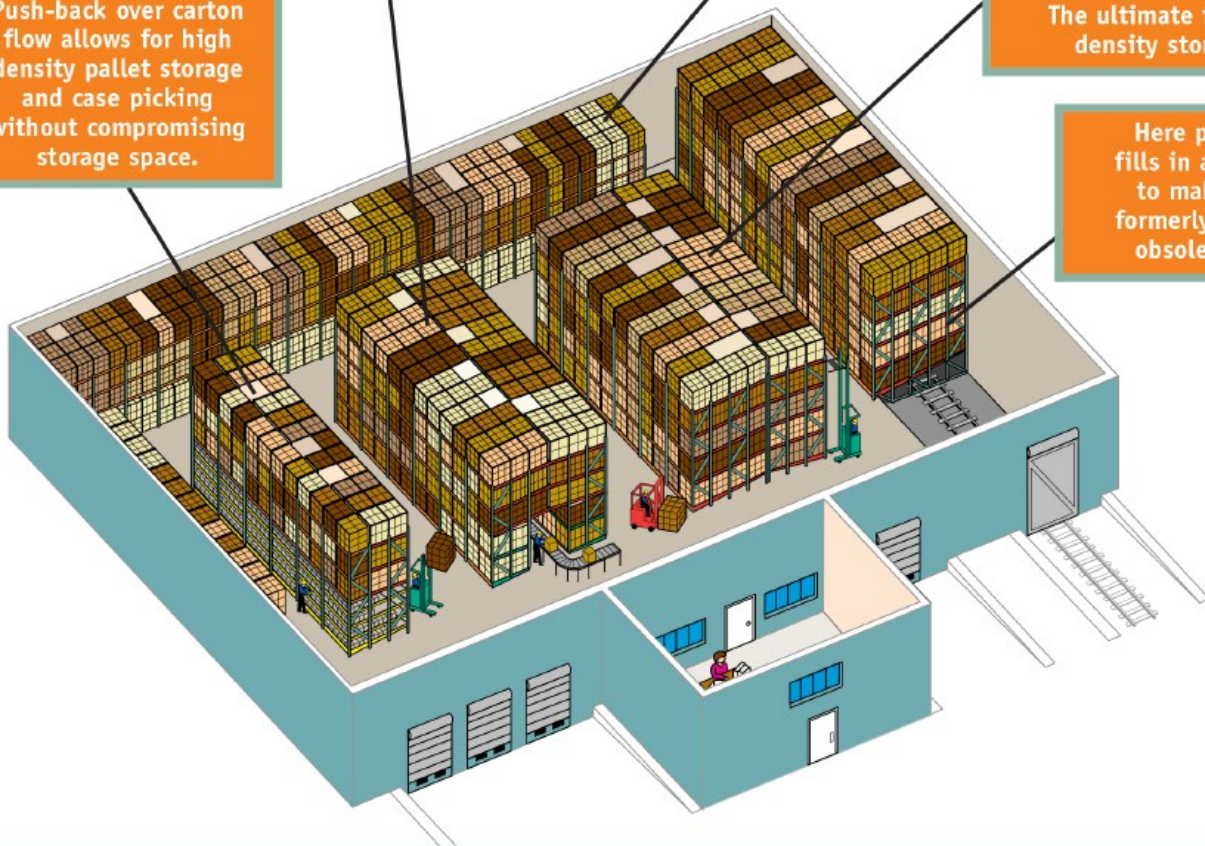
Push-back provides easy replenishment for full pallet pick lanes in this pick module.

Push-back over floor storage provides a cost effective way to achieve density, selectivity and high occupancy.

Back to back push-back in any combination, to suit building constraints and inventory requirements. The ultimate in high density storage.

Push-back over carton flow allows for high density pallet storage and case picking without compromising storage space.

Here push-back fills in a train well to make use of formerly wasted or obsolete space.



OTHER DYNAMIC STORAGE PRODUCTS FROM



Pallet Flow: Well suited to manufacturing environments, or any distribution facility where the average number of pallets per product is high and the SKU is low. Pallet Flow is perfect for high turnover items, providing "automatic" stock rotation and reduced handling for less product damage.

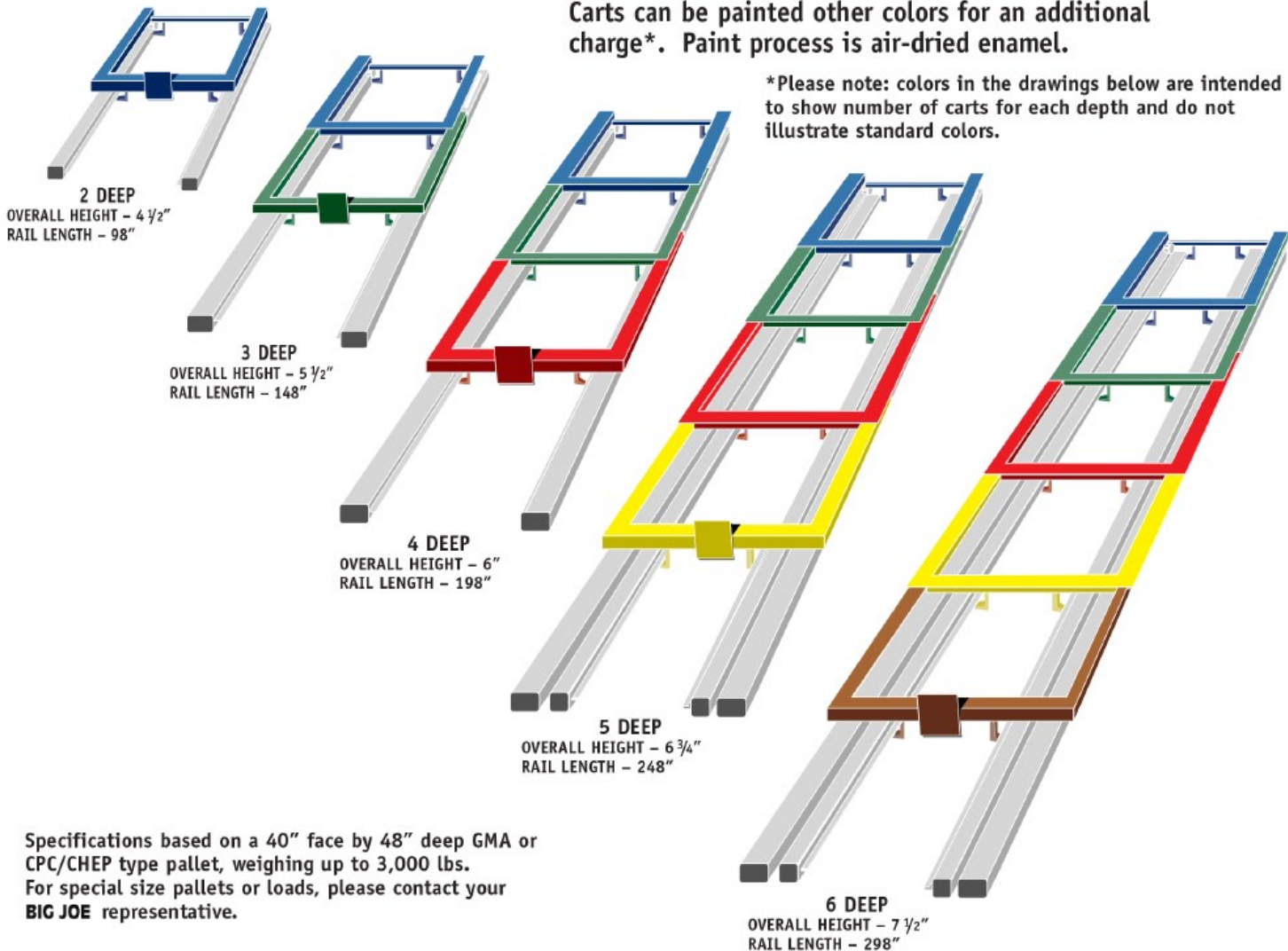


Carton Flow: **BIG JOE** offers high capacity carton flow with unrivaled reliability. All-metal construction with galvanized steel side channels and full width rollers deliver total carton support from load point to pick. **BIG JOE** carton flow drops easily into pallet rack with no shelves or intermediate supports.

DEPTH OPTIONS & SPECIFICATIONS

Standard colors: Stone Grey, Royal Blue, Forest Green
Carts can be painted other colors for an additional charge*. Paint process is air-dried enamel.

*Please note: colors in the drawings below are intended to show number of carts for each depth and do not illustrate standard colors.



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