

Roll-Formed Selective Pallet Rack Installation Guidelines

ATTENTION

*** PLEASE READ COMPLETELY ***

Attached are *Installation Guidelines* for the roll-formed selective rack manufactured by The Konstant Group. It provides the basic instructions for small rack installations of relatively simple complexity.

A rack installation manual is a helpful resource to have, however, one should understand its limitations. For example, installation instructions should never be used without an accompanying drawing depicting plan layout, elevations, details and notes which may contain more detailed information. The manufacturer does not condone the installation of rack systems by personnel without adequate experience, training or knowledge in rack assembly nor does it take responsibility for their rack's structural integrity when installation services are provided by a third-party or by the users themselves. Final certification of a rack storage system is dependent on both its proper design and installation.

Roll-Formed Selective Pallet Rack Installation Guidelines

General Notes Prior to Installation and Usage

- Erection of the rack storage system should be by a professional rack erection company that is familiar with the design and assembly of the system depicted on the drawings. Rack installations must be in compliance with all local labour codes. If you require rack assembly, please contact us for professional installation services. No warranty coverage can be honoured for rack that does not comply with manufacturer's installation specifications or that is improperly installed.
- Never incorporate rack components from different manufacturers. While foreign components may appear to be compatible, their use may in fact affect the overall performance and safety of the rack structure.
- Rack frame allowable load capacity is based on specific beam locations and beam uniformly distributed loads indicated on drawings. Reconfiguration or rearrangement of the structure is not allowed without prior approval from a Professional Engineer. Any deviation by the installer from the manufacturer's drawings and instructions should be approved by the manufacturer and noted on all drawings.
- End-user is required to display appropriate signage indicating maximum permissible design loads in a prominent, unobstructed viewing position.
- Pallets are to be placed onto the supporting load beams without imposing any impact loads.
- CPC / CHEP pallets are to be in good condition, with adequate bottom boards. Product on pallets is to be sufficiently self-stable such that it does not "lean" against the side of the rack structure for support when placed in position.
- Maximum beam deflection is based on $L / 180$ limiting ratio, where "L" represents the beam length in inches.
- Avoid "top heavy" loaded rack bays by storing pallets systematically from the lowest beam level first, up to the highest beam level last and removing the pallets in the reversing order.
- Maintain vertical clearances from the top of loads to the underside of beam levels above by not exceeding the maximum pallet height specified.
- Establish fork truck minimum turning radius to ensure main access aisles are sufficiently wide and clear of obstructions to allow ease of movement of material handling equipment.
- End-user shall verify that the concrete slab-on-grade / sub-grade are adequate to support the rack post loads.
- Ensure adequate levels of lighting are provided and aisles are clear of all materials and debris.
- In-rack sprinklers, if required, are to be designed and installed by others.
- Storage rack capacities are based on racks in new condition and free of any damage. Damaged storage racks must be put out of service and repaired or replaced. A planned maintenance inspection program should be implemented to visually identify and report damaged components and unsafe practices

**END-USER TO CONSULT WITH
LOCAL BUILDING DEPARTMENT FOR BUILDING PERMIT REQUIREMENTS
AND APPROPRIATE AUTHORITIES FOR HEALTH & SAFETY REQUIREMENTS**

Pre-Assembly Guidelines

1. Inspect the Rack Components

Check to make certain that all materials have been received. Check the material received against the Bill of Lading and packing lists. Notify the shipper immediately of any shortages or product damage. Ensure detailed up-to-date installation drawings have been provided and are thoroughly reviewed and understood. Never incorporate existing rack components unless specifically approved.

2. Inspect the Building Area

Once the components are unloaded, clear the area where the rack system is to be located. Check the area for all obstructions, such as building columns, lights, heating ducts, pipes etc., to ensure a clear area for rack installation. Building column locations should be verified for accuracy relative to their dimensioned positions on the installation layout plan.

3. Establish Rack Layout

Establish the rack layout, determining aisle dimensions and the positioning of the rack. Snap chalk lines to locate a starting reference line for the rows of rack, as well as lines locating the front face of frame posts on the aisle. Column face lines must be exactly 90 degrees perpendicular to row start lines. Beware of expansion and / or construction joint locations and their proximity to frame posts to ensure adequate distance from frame posts.

Rack Installation Guidelines

1. Erect the First Bay ('Starter' Bay)

Each rack bay requires two upright frames. All frames are to be installed with the diagonal brace angled down towards the front of the aisle such that the diagonal brace member in the bottom panel will be at approximately 9 inches (22.5 cm) from the ground on the front frame post. Determine and mark the beam elevations on the upright frames, then stand the first frame vertically. Attach the pallet load beams as follows:

Engage the beams into the frame posts by inserting all the beam bracket protrusions (i.e. Prongs, tabs, studs etc) into the respective frame post perforations. One factory supplied "drop-in" bracket safety clip is provided per beam bracket connection to help protect against accidental beam disengagement by a forklift.

NOTE: Make sure all bracket protrusions are seated properly into each frame post to create a sufficient bearing connection and also that safety pins or clips are properly engaged.

Stand the second upright frame vertically, attaching the pallet load beams as above. Install the rest of the beam levels starting from the lowest level and working up to the highest level.

2. Plumb, Level, and Anchor the First Bay

The first rack bay of each row must be anchored to the floor to ensure proper placement of the rack structure in the floor layout. Make sure that the bay is vertically plumb and square before anchoring. This may be done by ensuring diagonal post-to-post measurements within the bay are equal at horizontal planes both near the ground and at the top of the upright frames. All rack posts must be shimmed where required to provide firm contact between the post and the slab (floor) to ensure vertical plumbness.

Shims must have equal or greater footprint dimensions as those of post baseplates. They are usually available in 1/8" and 1/16" thicknesses.

Each upright frame has two (2) baseplates, each with two anchor holes for anchoring. Unless otherwise specified by the rack manufacturer, one (1) Hilti "Kwik" expansion anchor ½" x 4 ½" must be installed per frame post on back-to-back rows of rack. Anchors are to be offset on opposite corners of the frame's post baseplates and installed as per the manufacturer's specifications, paying particular attention to drilling the ½" diameter anchor holes vertically straight. Concrete embedment depth of anchors is to be 3 ½" minimum, and anchors are to be tightened to a torque of 40 ft-lbs.

3. Install Remaining Bays (Add On Bays)

Follow the same procedures as step 2 using common upright frames for each bay.

4. Single Rows (where applicable)

When installing single rows of rack exceeding a height to depth ratio of 6 to 1, the rack frames are typically cross-aisle tied to an adjacent back-to-back row of racking for stability. A beam with "wrap-around" end connectors is side-bolted at the topmost position of every frameline using four (4) Grade 5 3/8" diameter bolts, flat washers, and serrated flange locknuts per post connection. Two (2) Hilti "Kwik" anchors per post appropriately spaced for effectiveness are typically installed in single rows of rack. Where warehouse clearance height prevents the use of cross-aisle beams, custom engineered frame baseplates and anchorage may be designed by a Professional Engineer to resist overturning of the rack. Impact protection for frame front posts in single rows (usually sacrificial, "horseshoe-style post protectors) are also recommended since single rows, even though of equal capacity to back-to-back rows, are much more susceptible to overturning or collapse if damaged.

Note: Securing racking to the building structure for stability requires approval from the building's Engineer / Architect and the rack manufacturer's Engineer. Connections, if any, must be such that reactions or displacements of the building will not damage the rack, or vice-versa

5. Install Back-to-Back Rows

When installing back-to-back rows of rack, suitable row spacers are required. Unless otherwise specified, each rowspacer must have one SAE Grade5, 3/8" diameter nut & or hex head bolt per end connection. The rowspacers should be positioned at brace panel points starting at the second horizontal frame brace elevation (approximately between 48" {120 cm} and 60" {150 cm} from the ground), and then at every second horizontal brace panel point thereafter (approx. between 84" {210 cm} and 108" {270 cm}) Flue spaces 24" wide or greater may require heavy-duty rowspacers with additional hardware. We recommend the nuts and bolts for row spacers be not only fully tightened until ensuring that the rack is plumb and level.

6. Tighten Hardware

Tighten all rack components' nuts and bolts and double-check anchor connections to complete the installation process. Most bolted connections in our rack product line are bearing / shear connections. Hardware for these connections are minimum SAE Grade 5 and should be tightened to a snug-tight condition plus a 1/3 turn of the nut.

7. Install Safety Bars and Wire Mesh Deck Accessories

Where applicable, two pallet safety bars are installed per pallet position at approximately 24" to 30" apart (centred within 40" wide pallet locations) to temporarily support pallets when accidentally misplaced on load beams. When using box-style load beams, particular attention should be paid to installing safety bars with the correct size straddle clearance for both 1 ½" and 2" wide box beams. A minimum of one (1) ¼" diameter - 14 hex washer head "Tek" screw per safety bar should be installed at the saddle cup's pilot hole location to prevent the possible shifting of safety bars during pallet storage or retrieval operations. When using step-style load beams, particular attention should be paid to installing "snap-in" safety bars with proper engagement of end tabs into the slots.

One wire mesh deck is installed per pallet position to temporarily support pallets when accidentally misplaced on load beams. Decks must be rated for the maximum pallet weight being used in accordance to ANSI MH 26.2. Wire mesh decks are the recommended product fall-through protection accessory within rack tunnel bays or over personal walkways.

Note: Safety bars and mesh decks are not designed to support pallets where the frame depth exceeds the pallet depth. Please consult your rack supplier for proper pallet support requirements in the above instance.

8. Single Rows - Rear Pallet Load Fall Protection

Generally, rear safety netting is the preferred product in restraining rear pallet loads from falling since it expands or flexes when product is pushed against it and provides a "soft catch" should something fall into it. Safety netting is to be installed as per the manufacturer's specifications.

Rear safety beams area visual load positioning aids and act as an additional safety measure against accidental misplacement of pallets on load beams. They are not intended nor designed to be utilized as load stop beams during regular pallet storage operations as such forces imposed by forklift equipment will jeopardize the structural integrity of the rack system. They should not be bolted to the rack frames

If you have any further questions, contact your rack supplier for assistance.

WARNING: INSTRUCTIONS FOR ASSEMBLY SET FORTH ON THESE PAGES ARE INTENDED AS BASIC GUIDES FOR USE BY EXPERIENCED AND TRAINED RACK INSTALLERS AND USED IN CONJUNCTION WITH DETAILED DRAWINGS FOR THE INSTALLATION OF STANDARD COMPONENTS. PROPER ASSEMBLY IS THE RESPONSIBILITY OF THE PURCHASER AND IS NOT COVERED BY ANY WARRANTY OF THE SELLER. BUYER IS CAUTIONED NOT TO SUBSTITUTE PARTS OR HARDWARE. SELLER DISCLAIMS ALL LIABILITY WITH RESPECT TO ANY SUBSTITUTION OF PARTS OR HARDWARE NOT APPROVED IN WRITING BY SELLER. DEPENDING UPON THE SPECIFICS OF THE SYSTEM, THERE MAY BE LIMITATIONS REGARDING THE USE OF THESE STANDARD COMPONENTS AND / OR A REQUIREMENT FOR SPECIAL INSTALLATION TECHNIQUES. ADDITIONAL INFORMATION MAY BE OBTAINED BY CONTACTING THE KONSTANT GROUP.