



Counting Requirements for Typical Warehouse Racking

Below are some simple rules useful in developing accurate counts for basic selective rack projects.

Count the number of rows of racking. Assign a letter or number to each row. Make note of varying bay styles as you count.

Count the number of bays in each row. A bay is the space between two uprights. The number of bays may differ from row to row, or even within a row.

Uprights. The number of uprights or frames required will equal the number of bays per row plus 1. When working up upright counts, be aware that the depth, height, and capacity may vary.

Beams. Determine the number of beams required. This sum will depend on the number of beam levels per bay. This number may vary from row to row and sometimes from bay to bay within a row. Be aware that beam capacities sometimes vary within the same bay. Assume a row of eight bays, each having three beam levels. How many beams will be required for this row? **Answer:** 8 bays times 3 beam levels times 2 beams per level equals a total of 48 beams.

Wire Decks. Use the convenient sizing table located in the DAK Dealer Price List. A deck must be the same depth as the depth of the upright it serves. Its width must cover the beam length adequately. Thus, a pair of 8-foot beams connecting an upright whose depth is 42 inches will require 2 wire decks of 42"D x 46"W. This gives a surplus width of 4 inches, which means that goods will overhang the deck by a few inches. The number of wire decks and the number of beams will be identical when the decks are used with beams of 72," 84," 92," 96," 102," and 120." Decks will outnumber beams 1.5 to 1 when the beams are 132," 144," or 168." Note that in cases where gaps in the width of the decking is unacceptable, decks can be cut down width-wise to customize the fit to the beam length.

Row spacers. Back to back rows of racking are often joined by row spacers in order to create a flue to aid in fire safety and to provide additional support to the rack. The number of row spacers required will vary by the height of the uprights being used and the seismic conditions involved.

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Row spacers should not be placed more than ten feet distant from a previous row spacer. For instance, a 20-foot upright in a normal seismic zone of zero or 1 will require three row spacers. Assume two rows of 20-foot uprights back to back. Each row has eight bays. How many row spacers will be required? **Answer.** Count the total number of uprights in each row. A row of eight bays will have 9 uprights in each row or 18 uprights in a matching back-to-back configuration. Divide the total number of frames by 2 because two frames are joined by one row spacer. Thus nine pair of uprights will need to be joined. Then multiple the number of row spacers required per pair, in this case 3. Thus the total number of row spacers required is 27.

Wall Ties. When racking is close to a building wall, often a wall tie is used to provide additional support. This assures that in case of forklift operator error, the structural integrity of the building endures. One end of the wall tie, the flared end, fits into the upright and is secured by bolts. The bent end is fastened to the wall by anchors. The exact type of anchor depends on the material composition of the wall. Wall ties observe the same rules as row spacers. They should not be separated by more than ten feet along an upright. DAK currently stocks 8 and 12 inch wall ties, but our warehouse people can create many other sizes by bending a row spacer appropriately.

Anchors. DAK recommends that every installation of rack be anchored in order to provide greater stability. This is the case whether DAK or some other party performs the installation. Under normal conditions, each upright footplate is given one anchor. Thus the number of anchors needed on a normal job will be the total number of frames times 2. In heavier traffic areas or in higher level seismic zones, 2-4 holes in a footplate may be anchored, thus requiring in that case 4-8 anchors per frame. The number and kind of anchors will also depend on the kind of footplate welded to a frame and whether it is being used in a seismic zone. Interlake offers 17 different footplate options. Don't overlook the number of anchors needed for column protectors.

Shims. Because it's important to have racking be as level as possible, the upright footplates can be shimmed to help accomplish this in cases where the floor is not level. Current constructions standards for warehouses and distribution centers require very flat floors and as a result, modern facilities will often require no shims at all. If a floor is rated FL 60 or 80, and FF 80, then shims are rarely needed. If the floor is bad or the building is older, additional shims are always needed. In general, the number of shims needed should follow these suggestions:

8-10'H uprights—generally no shims unless the floor is bad.

12-16'H uprights—one shim for every 2-3 uprights.

18'H+ uprights—one shim per upright, but if the floor is new or known to be flat, just one shim for 2 uprights.



EXAMPLE

In a normal seismic zone, a customer wants to create four rows of racking, two rows back to back on either side of an aisle. Two of the rows on one side have 8 bays. The two on the other have 7 bays. There are four beam levels per bay, and the uprights are 20-feet high. How much equipment will be required to fulfill the customer's need?

Row A equals 8 bays
Row B equals 8 bays
Row C equals 7 bays
Row D equals 7 bays

By rule, every row requires the same number of frames as bays plus 1. Thus row A requires 9 frames. Row B requires 9. Row C requires 8. Row D requires 8. Thus the total number of frames required is 34.

By rule, the total number of beams required equals the total number of bays (8 or 7) times 4 beam levels times 2 beams per level. Thus Row A, containing 8 bays, requires 64 beams. Row B requires 64 beams. Row C requires 56 beams, and Row D requires 56. The total number of beams required is therefore 240.

By rule, the total number of row spacers required equals the total number of frames divided by 2 times the number of row spacers required per frame (3 in this case).
 $34 \div 2 = 17 \times 3 = 51$ row spacers

By rule, under ordinary circumstances 2 anchors are required per frame. This job has 34 frames and will therefore require 68 anchors.

By rule, the number of shims required is one per upright or 34 for upright height above 10 feet. If the floor is very good or very bad, the quantity will need to be adjusted downwards or upwards as appropriate.

