



EFFECT OF COLUMN SHAPE UPON FRONTAL DAMAGE RESISTANCE

Test #032594-A

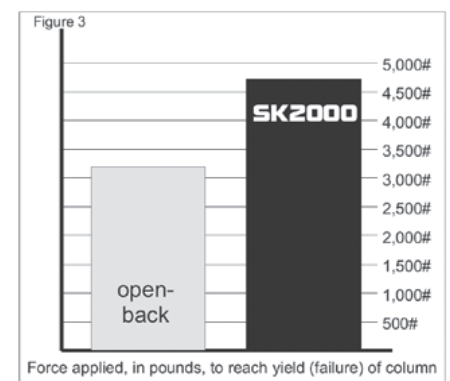
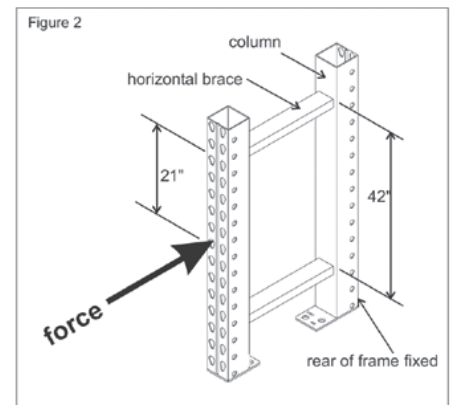
Additional testing has been performed recently on SK2000 racking, for the purpose of quantifying several of the design advantages inherent in the SK2000 design. The results of these tests are outlined below.

Steel King's SK2000 series pallet rack frame columns are constructed of closed tubular steel sections. Other rack manufacturers offer open-back, roll-formed columns (Figure 1). A test was performed to quantify the difference in the ability of these designs to resist a direct frontal impact.

The SK2000 frame type, and the industry standard frame type, were tested as shown in Figure 2. All columns tested were of an equivalent steel thickness and column size. The test load was evenly distributed across the face of the column, but was concentrated midway between horizontal braces (this imitates the manner in which many accidental fork lift truck impacts occur). The testing machine applied a continually increasing load weight, and the point at which each assembly yielded (failed) was recorded. The identical procedure was employed in testing both rack frame types.

The industry standard, open-back (roll-formed) frame assembly failed at 3,200# of pressure. When subjected to a similar 3,200# load, the SK2000 assembly exhibited no deflection, nor any visually detectable damage. The SK2000 frame assembly continued to withstand increasingly heavy amounts of pressure, until reaching its own yield point of 4,700# (Figure 3).

CONCLUSION: Users of SK2000 rack systems can expect decreased maintenance costs, and improved safety, by taking advantage of the 47% greater strength proven by this test. This is only one feature of the SK2000 system that gives users more value for their investment.





EFFECT OF COLUMN SHAPE UPON SIDE-DAMAGE RESISTANCE

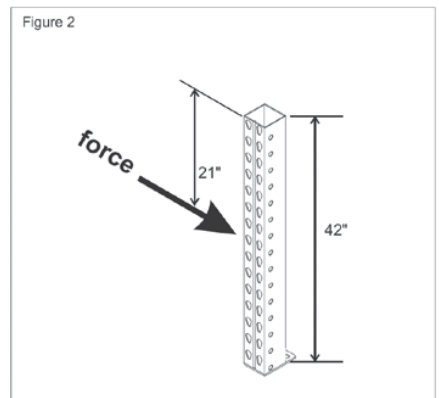
Test #032594-B

Additional testing has been performed recently on SK2000 racking, for the purpose of quantifying several of the design advantages inherent in the SK2000 design. The results of these tests are outlined below.

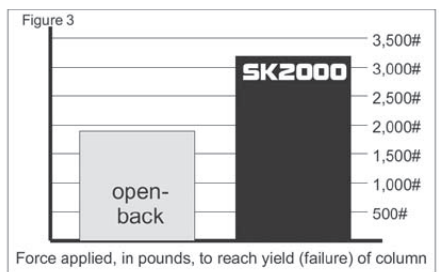
Steel King's SK2000 series pallet rack frame columns are constructed of closed tubular steel sections. Other rack manufacturers offer open-back, roll-formed sections (Figure 1). A test was performed to quantify the difference in the ability of these two designs to withstand side impacts.



The SK2000 column type, and the industry standard column type, were tested as shown in Figure 2. All columns tested were of an equivalent steel thickness and column size. The test load was evenly distributed across the side of the column, but was concentrated midway along its height (this imitates the manner in which many accidental fork lift truck impacts occur, especially in drive-in configurations, or at ends of rack rows). The testing machine applied a continually increasing load weight, and the point at which each column yielded (failed) was recorded. The identical procedure was employed in testing both column types.



The industry standard, open-back (roll-formed) column failed at 1,900# of pressure. When subjected to a similar 1,900# load, the SK2000 closed tubular column exhibited no visually detectable damage. The SK2000 column continued to withstand increasingly heavy amounts of pressure, until reaching its own yield point of 3,200# (Figure 3).



CONCLUSION: Users of SK2000 rack systems can expect decreased maintenance costs, and improved safety, by taking advantage of the 68% greater strength proven by this test. This is only one feature of the SK2000 system that gives users more value for their investment.





EFFECT OF HEAVY HORIZONTAL BRACES UPON IMPACT RESISTANCE

Test #030494-A

An independent engineering laboratory tested SK2000 racking for the purpose of quantifying several of the design advantages inherent in SK2000 pallet rack. The results of one such test is outlined below.

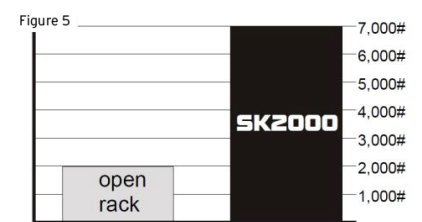
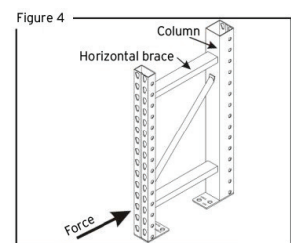
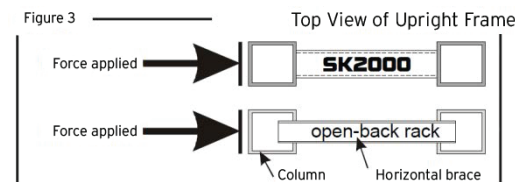
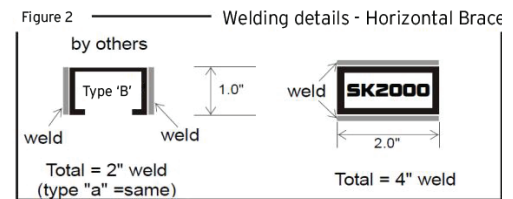
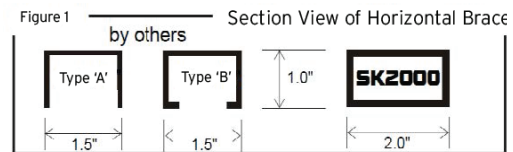
At no extra charge to the consumer, Steel King's SK2000 series pallet rack frames feature "heavy horizontal braces". These braces are constructed of closed structural steel tubing, 1" high x 2" wide, as compared to the industry standard formed sheet metal sections, usually 1" high x 1.5" wide, with or without return flanges (Figure 1). The SK2000 brace is welded across both 2" surfaces, as compared to two 1" welds on most other racks (Figure 2). When these design features are combined with the SK2000 tubular column, resistance to damage from accidental impacts is greater. This test was performed to quantify that difference.

The SK2000 frame type, and the industry standard open-back frame type, was tested as detailed in Figure 3.

The "industry standard" frame type included braces with return flanges (type "b"). A continually increasing force was applied to one column, through the horizontal brace, and into the rear column. This is in the same direction as one would expect fork truck impacts to occur (Figure 4).

The industry standard open section design failed at 2,000# of pressure. When subjected to a 2,000# load, the SK2000 design performed without any visually detectable damage, and continued to withstand increased pressure, until reaching it's own yield point at 7,000# (Figure 5).

CONCLUSION: Users of SK2000 rack systems can expect decreased maintenance costs, and improved safety, by taking advantage of the 250% greater strength proven by this test. (An even greater advantage would exist between SK2000 racks, and racks manufactured with bracing type "a"). This is only one feature of the SK2000 system that gives users more value for their investment.



Force Applied, in pounds, to reach yield (failure) of frame assembly

