



TECHNICAL GUIDE  
*Cabinet Fabrication*



King Plastic Corporation

Our Innovation. Your Imagination.®





# HDPE

King Plastic corporation's line of performance polymers such as King StarBoard® ST and King StarBoard® WG are an excellent choice for your next project. They have many advantages over wood. Wood for instance has to be finished, typically in multiple step processes, and in outdoor applications typically fades, rots or warps. King StarBoard® ST and King StarBoard® WG are both environmentally stabilized and will not rust, delaminate, or need re-finishing years down the road.

As opposed to wood, when working with King StarBoard® ST and King StarBoard® WG there are different molecular properties that should be noted.

- On a molecular level King StarBoard® ST and King StarBoard® WG are in a constant state of movement. Referred to as "cold flow", or "creep". Which means that the material has the tendency to move slowly or "bow" under the influence of constant mechanical stresses.
- One of the most commonly unforeseen stresses is gravity. Gravity can effect King Performance polymers when not stored or constructed properly

Here are a few tips and things we have learned to help you with your project.

**KING**  
**STARBOARD® ST**

**KING**  
**STARBOARD® WG**



## Storage:

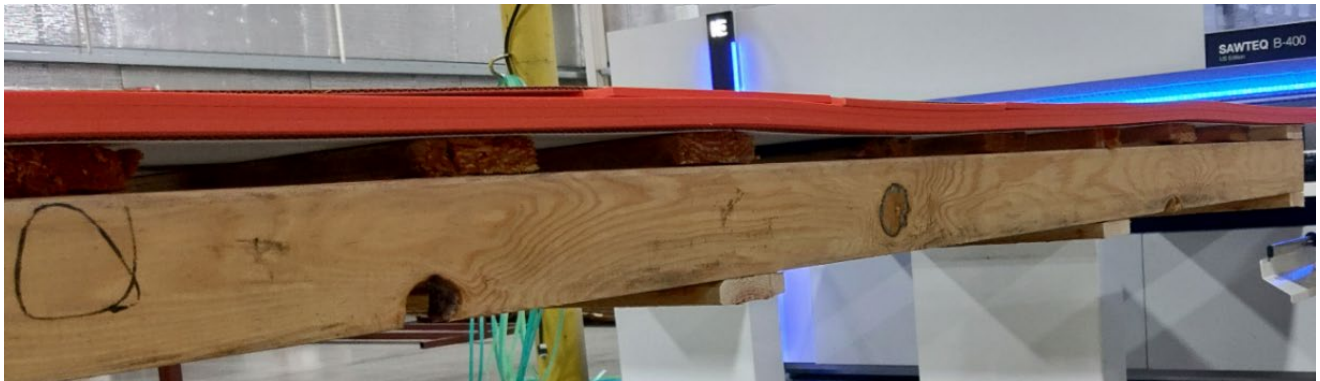
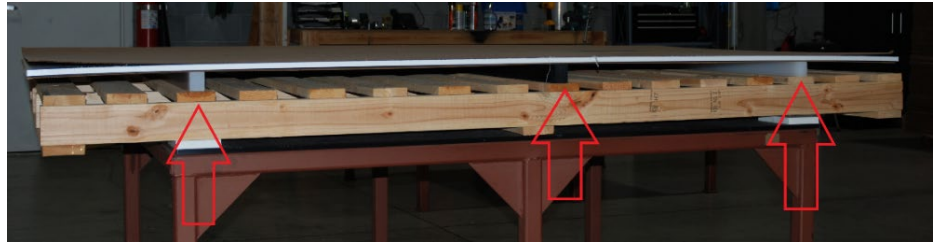


When full sheets of King StarBoard®ST and King StarBoard®WG are shipped from King Plastic they are shipped on a pallet that is built to support the weight, and surface of full sheets of flat material horizontally. For instance our standard 4'x8' pallet has 16 horizontal supports down the length of the pallet, and three vertical 96" runners covering the length of material. Three additional horizontal supports are located on the under belly of the pallet.



Full sheets and cut parts must be stored horizontally on a flat surface until ready to cut or be assembled.

In the Lumber industry using “stickers” or “runners” to separate or stack material is very common. Due to cold flow and creep, this is NOT an acceptable way to store King StarBoard®ST and King StarBoard®WG. This can lead to permanent damage known in the wood industry as “warping or bowing.”



In this example you can see the warping or bowing from cold flow due to an insufficiently made pallet that does not fully support the material. There are not enough horizontal supports, and the horizontal supports are not the same thickness.

Storing cut parts or full sheets vertically or leaning them is also an unacceptable way to store King StarBoard®ST and King StarBoard®WG. Doing this will again have the same damaging results.



Additionally whenever stacking full Pallets of material more than two high it is necessary to interleaf the stack. Notice in the example to the left, how an additional pallet is put on top of the material upside down so that the sixteen horizontal supports are on the material. Failure to do this when stacking more than two pallets high can lead to permanent damage.

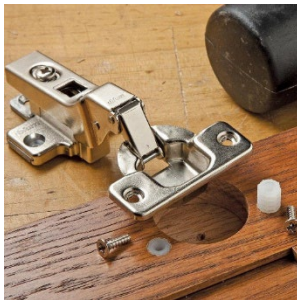
### **Expansion and contraction:**

Expansion and contraction must be kept in mind throughout the entire building and design process's. It has to be built into, and taken into account on every piece that is put together on the box. Our customers must be aware that there needs to be a "bigger gap" or more reveal around inset doors and drawer fronts, and in European styles as well. There may need to be a piece of trim added to end panels to cover gaps that will allow the panel to expand and contract.

### **Cabinet fabrication:**

Use only like material for the full assembly of the cabinet box. Using a different material (wood) for any part of the cabinet box (including drawer boxes) is not recommended as the materials expand and contract at different rates.

Build a separate toe for the cabinet box to sit on. This will allow the toe to expand and contract with the floor. Use plenty of runners to help support the floors of wider cabinets, and cabinets where heavier items may be stored.



When possible over bore holes for handles and knobs to allow for expansion and contraction.

Use a doweled (pressed in) hinge on the door to allow for expansion, contraction and for wear.

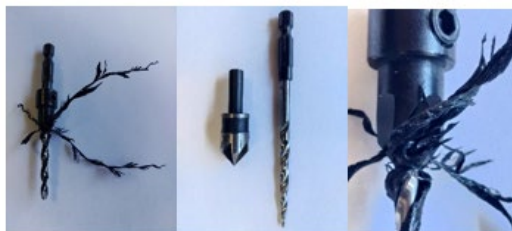
Do not trap side panels, end panels or island panels. They must be allowed to expand and contract up and down and left to right.

Use more of a gap (reveal) in between doors and drawer front's to allow for expansion and contraction. 3/16"-1/4" possibly where normally there would be 1/16<sup>th</sup> to a 1/8<sup>th</sup>.

Fig 1

Fig 2

Fig 3

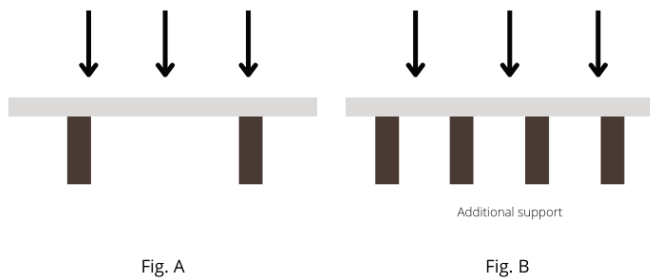


Use a tapered drill bit and counter sink to predrill screw holes (Fig 2). Use of a separate counter sink (not a tapered bit/countersink combo see Fig 1 and Fig 3) is more efficient.

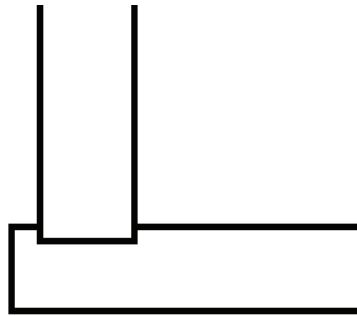
Make sure the screw hole in the countersunk piece is over bored (bigger than the screw) to allow for expansion and contraction.

Predrilling will not only help from a screw bulging out from the side of the material, but will also help with a tighter joint. If the joint is not tight, take it apart and clean up the plastic "bump" around the screw hole.





Use plenty of partitions in upper cabinets, and runners in the toes of base cabinets to help support the floors of cabinets where there is potential for heavy items to be stored. Figure A improper floor support. Figure B more runners added to support the floor. Refer to weight distribution chart.



Using a dado or slot to help hold pieces in place in addition to pocket holes, can be much more effective than using clamps as plastic is more “slippery” than wood.

Refer to Working with King Starboard, and Information Guide for tools and Fabrication Techniques literature for more ways to fabricate the material to avoid visible screws.

EXTERIOR “decking” style screws or multi material style screws work very well for outdoor cabinet fabrication to help avoid rust issues. We also recommend using a 316 marine grade stainless steel screw.

### **Installation:**

Make sure that the hole in the cabinet that the screw goes through is over bored (predrilled to a larger diameter than the screw) to allow for expansion and contraction.

Whenever possible trim out and leave room for expansion and contraction if the cabinet is trapped between two walls.

If possible hold base cabinets off the wall with shims, and trim to the wall with  $\frac{1}{4}$  X  $\frac{3}{4}$  or a quarter round, again allowing for expansion and contraction.

### **Tooling:**

Use standard woodworking tools: table saws, table routers, drills, blades and bits.

Cut using a 50-70 tooth carbide blade. A triple chip tooth works very well.

If you find you are melting the plastic rather than cutting the plastic try a slower speed and a blade with less teeth.

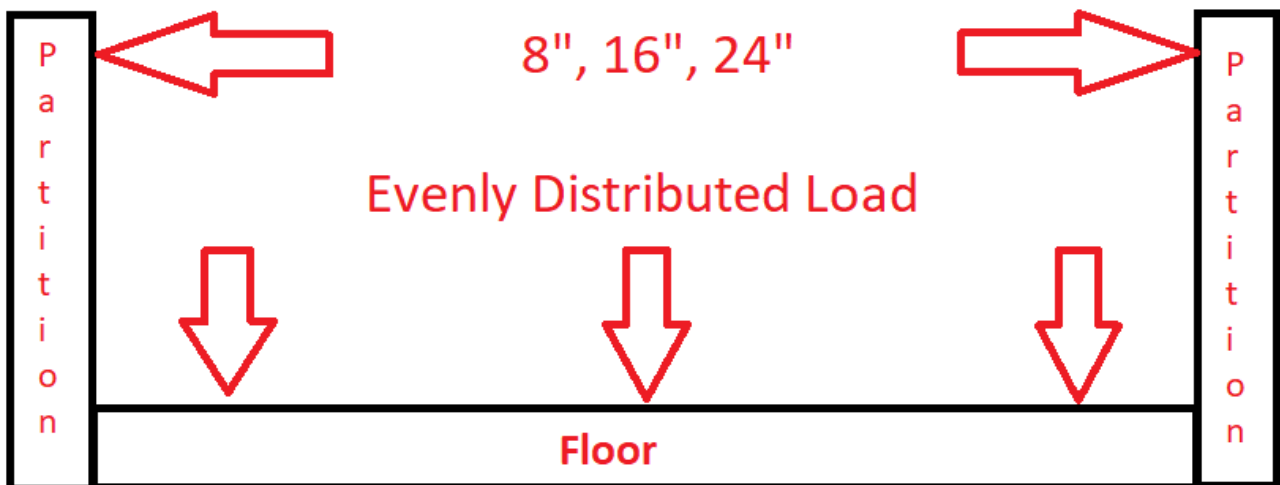
Sharp carbide router bits leave clean smooth edges!

Make sure work surfaces are clean and burr free. Use masking tape on saw surfaces to help avoid scratches.

Keep in mind scratches cannot be sanded out! They can be hidden with automotive silicone spray, or furniture polish.

## Load Distribution Chart

Fixed Supported-Evenly Distributed Load				
		Load (LBS per square foot)		
	Length	20	40	80
King Starboard® 1/2" King Starboard WG® 1/2"	8"	.041"	.059"	.069"
	16"	.044"	.061"	.072"
	24"	.051"	.073"	.085"
King Starboard® 3/4" King Starboard WG® 3/4"	8"	.036"	.049"	.050"
	16"	.040"	.052"	.059"
	24"	.046"	.058"	.066"
King Starboard® 1" King Starboard WG® 1"	8"	ND	.037"	.046"
	16"	ND	.040"	.050"
	24"	ND	.049"	.052"
King Starboard ST® 1/2"	8"	.036"	.052"	.059"
	16"	.040"	.055"	.062"
	24"	.049"	.061"	.064"
King Starboard ST® 3/4"	8"	.035"	.052"	.056"
	16"	.041"	.056"	.060"
	24"	.047"	.060"	.066"
King Starboard ST® 1"	8"	ND	.045"	.046"
	16"	ND	.048"	.050"
	24"	ND	.049"	.066"
*All testing is done with a 12" wide piece of material.				
ND= No Deflection				





# Thermal Expansion/Contraction Worksheet

This worksheet is designed to aid in determining what expansion and contraction your King Plastic HDPE product part will experience.

## EXPANSION

In Box A = write the approximate temp. at the time of fabrication.

In Box B = write the highest temp. your part will experience in its place of service.

Subtract Box B from Box A to get the temp. difference for expansion due to heat.  
(i.e. 70°F – 100°F = -30°F)

Box A  °F — Box B  °F = \_\_\_\_\_ = D (Expansion)

## CONTRACTION

In Box A = write the approximate temp. at the time of fabrication.

In Box B = write the lowest temp. your part will experience in its place of service.

Subtract Box B from Box A to get the temp. difference for shrinkage due to cold. i.e.  
(70°F – 30°F = 40°F)

Box A  °F — Box B  °F = \_\_\_\_\_ = D (Contraction)

## Let's call the temp. difference "D"

To calculate the amount your part will expand and contract, multiply the following:

$$\begin{array}{ccccccc} \mathbf{D} & \times & \mathbf{L\ or\ W} & \times & \mathbf{.00006} & = & \mathbf{Expansion\ or\ Contraction} \\ \text{(temp. difference)} & & \text{(Length or Width} & & \text{(coefficient of} & & \\ & & \text{in inches of part)} & & \text{King Product Brand)} & & \end{array}$$

**Expansion Example:** If a sheet of HDPE was being cut in a shop at 70°F and the highest temp. the part will experience is 100°F, the temp. difference (D) is 30. The part is 96 inches, so expansion is:

$$\begin{array}{ccccccc} 30^{\circ}\text{F} & \times & 96'' & \times & .00006 & = & .173\ \text{or approximately } 3/16'' \\ \text{(temp. difference)} & & \text{(length of part)} & & \text{(coefficient)} & & \text{(expansion)} \end{array}$$



## Our Innovation. Your Imagination.®

King Plastic Corporation began as a small, family enterprise. Founded in 1968, King Plastic Corporation is a leading manufacturer of quality polymer sheets, slabs and massive shapes—including several products pioneered by the company. Its polymers are sold worldwide through a network of top plastics distributors to customers who fabricate products for the marine industry (King StarBoard® brand), signage, food service, healthcare, architectural, industrial and other markets. The company headquarters is a 250,000 square-foot manufacturing facility in North Port, Florida. The King family still maintains independent ownership and control. The same values that made the company so successful in the past still prevail today.



King Plastic Corporation

1100 N. Toledo Blade Blvd. | North Port, FL 34288 USA

P: 941.493.5502 | F: 941.497.3274 | [www.kingplastic.com](http://www.kingplastic.com)

