

CONSULTEK

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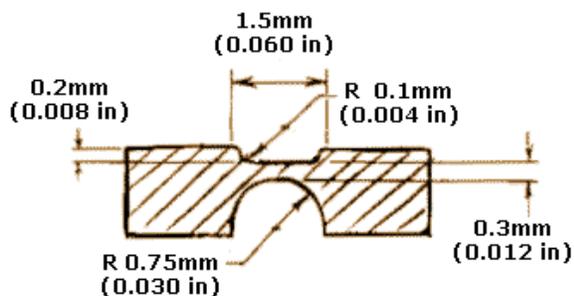
We have been looking into the possible reasons for the Storage Box to be somewhat brittle. From my preliminary study I have come up with following reasons and areas in which further investigation is necessary.

Material Selection

Random copolymer 10 melt Polypropylene appears to be the right choice for this application, however we may want to look into some other grades of random copolymer PP which offer more ductility than the current grade. Huntsman will be looking into recommending alternate grade.

Part Design

The ribs attached to the main wall in spine area do not seem to have adequate radius at the base. The rule of thumb calls for the radius to be 0.25 of the main wall thickness (See attached). In order to achieve the strongest living hinge, the material must flow across the hinge as the part is filled during injection cycle. Short shots indicate that such is not the case. This can only be achieved by allowing material to completely fill the spine area first and then allowing it to flow across the hinge. We may need to add flow ribs starting from the gate area and going towards both ends.



**LIVING HINGE DESIGN
FOR POLYPROPYLENE AND POLYETHYLENE**

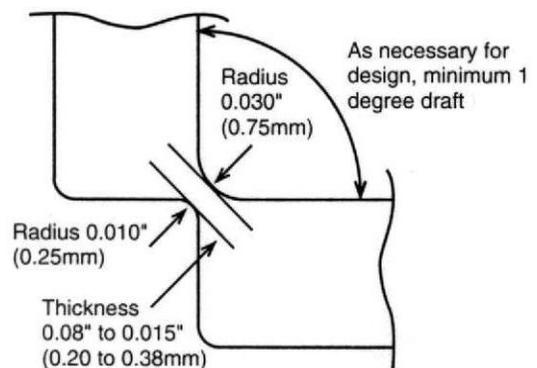


Figure 3: Dimensions for a right angle hinge.

Processing

The parts molded at lower mold temperature (55° F) may have contributed to the brittleness. Of course, the higher mold temperature may increase cycle time.

Color

Color compatibility can be an issue. Colors are specially formulated for the use in clarified random copolymer PP.

Tooling

We may have to incorporate a gate dimple on the opposite side of the gate if there is no objection from marketing (visual). The reason for the dimple is to allow the material to stay hot (molten) until the entire part is filled. If the material partially freezes during fill cycle, it may require higher injection pressure and increase stress in the part. Increasing gate size may be the other option.

Huntsman technical service representative who is stationed in Texas has offered to come here to discuss the issue as well as travel to Guadalajara to observe the tool run and make recommendations. They have also offered to analyze competitor's Storage Box which does not appear to be brittle and color concentrate to check for compatibility.