

Tear Resistance of Architectural Fabrics

The tear strength of an architectural fabric is an important performance property. The ability of a material to resist a tear or tear propagation may be critical to the structural integrity of the building. This can be particularly true in an air-supported building where the loss of air pressure inside the structure can lead to a catastrophic failure.

Tear strength properties are related to a combination of factors involving the base fabric, weave/knit construction and adhesion values. To obtain the highest possible tear properties, the yarns need to be able to slide within the coated fabric. If the yarns are locked into place, a tearing force is applied to individual yarns one at a time, resulting in lower tear values. In general, a warp-knit weft-inserted material will have a higher tear strength than a conventional plain woven fabric since the yarns are not inter-woven. Shelter-Rite architectural fabrics have superior tear strength and are warp-knit weft-inserted. Seaman also offers a woven polyester into the framed structure business.

The adhesive coat and adhesion values between the base fabric and the coating compound will also greatly influence the tear strength properties. Seaman has formulated the Shelter-Rite fabric to have an excellent balance between adhesion and tear strength. Higher coating adhesions will limit the ability of the polyester yarns to slide and rope-up within the coated fabric, thereby reducing the tear strength. While low coating adhesion may yield higher tear strength, it will introduce other significant problems.

Testing for tear strength can be done by either ASTM D 751 Tongue Tear Method or Trapezoid Tear Method. In many cases both methods are used to better characterize the tear properties. In addition, tear testing is performed on material that has been aged to determine if there is a loss in tear strength over time.