

DIRECTIONAL VARIATIONS IN MECHANICAL PROPERTIES OF ELASTOMERIC FOAM

Because the elastomeric foam matrix is made up of various kinds of polymers and manufacturing processes that involve extrusion and vulcanization, most K-FLEX USA foams show variation in mechanical properties in different directions. The elastomeric matrix referred here consists of either NBR/PVC or EPDM.

Elastomeric materials are characterized by long chains depending on molecular structure and nature of the polymer. During any processing of elastomeric compounds, the long chains orient in one direction due to various forces exerted on the material. Orientation can be varied depending on the type of manufacturing process. For example, orientation of a polymer in an extrusion process will be different from orientation during a calendaring process.

The orientation of elastomeric molecules is the key for any mechanical property variations observed in elastomeric foam insulation products. K-FLEX USA uses an extrusion process for manufacturing various elastomeric foams. During extrusion molecules align mostly in the extrusion direction. This leaves product with slightly better mechanical properties in the direction of extrusion and slightly weaker mechanical properties in the direction perpendicular to the extrusion direction. Shrinkage and recovery characteristics of the products would also be affected slightly in different directions due to the orientation of the molecules. It might also be affected by other processes (such as skiving, die cutting, etc.) involved to make finished products. It has been observed that the usage of scrim PSAs for backing would help to minimize the variation during a die cutting process. The orientation of the molecules may vary for various thickness of the products due to different heat history and pressure of the material during the extrusion and vulcanization processes.

K-FLEX USA encourages customers to have internal evaluations of the product based on their manufacturing process for finished products. This will enable customers to adjust their tolerances to meet end user requirements.

If you have any further questions on this matter, please feel free to contact the K-FLEX USA technical department.

