N E W S
L E T T E R

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Carpet Construction and Wearability

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An important step in the process that brings the manufactured product to the end-user as well as ultimately determining customer satisfaction is the sales person's knowledge of the product being sold in conjunction with understanding the intended application.

While color has long been considered a key selling point for carpet, more and more end-users are looking first for carpet that has the ability to meet the demands of time and use. These demands are appearance retention and wearability. Since appearance retention is influenced significantly by factors other than carpet construction there is no simple measurement to predict same; however, to a large extent wearability characteristics can be estimated by understanding how to evaluate the construction of a carpet.

Perhaps the first consideration for wearability is the density of the carpet's pile. The closer the tufts are to each other the denser the pile and the less weight each individual tuft has to support. Pile density is not only evaluated by the closeness of the tufts but also by the height and weight of the pile yarn.

Pile height is measured by the thickness of the yarn from the base of the tufts to the tips and is expressed in decimal parts of one inch (e.g. .133, .250, etc..). The higher the number, the higher the pile. All other factors being equal, a carpet with a higher pile height will possess more yarn on the wearing surface and will essentially be more durable.

Pile weight is the weight of the pile (total yarn mass per unit area) and is expressed in ounces per square yard. The more ounces per square yard, the denser the pile and, potentially, the greater the wearability of the carpet. Considering these factors, average pile density can be estimated by multiplying the pile weight ounces per square yard by 36 and dividing by the finished pile height. Some manufacturers list average pile density by dividing by pile thickness, which is generally about .05 less the pile height. Using this method, higher pile density's are calculated. To understand this more clearly imagine a 26 ounce product with a finished pile height of .170. Using the finished pile height the formula for average density would be 26 x 36 = 936 divided by .170 = 5506. Using the same product the formula for average density based on pile thickness would be 26 x 36 = 936 divided by .120 (.170 - .05) = 7800.

Another measureable quality of carpet is weight density. This measurement is achieved by multiplying density by the pile weight.

Pile density can also be evaluated by gauge and stitches per inch. Gauge is expressed in decimal parts of one inch as the distance between adjacent needles on the tufting machine. In the finished product gauge is the distance between tufted rows across the width of the carpet. When a carpet is said to be 1/10 gauge it implies that the tufted rows are 1/10 of an inch apart, or there are approximately 10 rows of tufts per inch throughout the entire width of the carpet. Stitches per inch indicates the number of tufts per inch in the length of the carpet. The higher the number of stitches per inch the closer the tufts are to each other and the more support they offer.

There are other factors in carpet construction that have a bearing on wearability. One of these is yarn denier. Yarn denier is a system of yarn count used for synthetic fibers and is expressed as the weight in grams of 9000 meters of yarn. As an example, if 9000 meters of a certain yarn weighs 1200 grams it is 1200 denier. The higher the denier the coarser the yarn and the more retention it will offer.

Yarn twist is another consideration. Twist is the process whereby two or more spun yarns are twisted together. Twist is counted by the number of turns per inch (TPI) of the yarn. The performance of cut pile carpet is highly dependent on rate of twist and twist retention. Heat setting helps stabilize yarn twist by subjecting the yarn to high temperature steam under pressure. This process helps ensure that subsequent temperatures and moisture below the set temperature do not distort the yarn twist.

The final consideration for helping to determine carpet wearability is fiber type and carpet construction. A carpet using a specific yarn system may perform significantly better in one type of construction, but be limited in another

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type construction. An example of this would be the greater resistance to crushing offered by a loop pile carpet compared to a cut pile carpet.

Once the carpet selection has been made it is essential to realize that proper installation and adequate maintenance are equally important issues that must also be considered.