

Carpet Shrinkage and Expansion

In most cases, these two conditions can occur with installed carpet as a result of its reactions to changes in its moisture content. Typically, these reactions occur when ambient relative heat and/or humidity suddenly and significantly change, or when a carpet has been over-wet when cleaned. Carpet installed outdoors is especially prone to shrinkage if it is not properly glued down since it will be subjected to much more drastic changes in heat and humidity than carpet installed indoors.

Shrinkage occurs when moisture is removed from a carpet, or when a carpet is exposed to high temperature, causing the thermoplastic backings to shrink. Shrinkage can occur lengthwise, widthwise, or in both directions. When shrinkage occurs it can lead to split seams and carpet that pulls away from the perimeter of a room. If tack strip is used, carpet shrinkage can also result in the tack strip being pulled off the floor if it was not firmly secured. Graphic carpet constructions seem to be more susceptible to shrinkage in width. Because of the inherent moisture gain and release characteristics of nylon, carpets made using nylon will be more prone to shrink. In addition to this, because graphic carpets will have as much as 20% of the total pile yarn located beneath the carpet's backing where it is exposed to the floor adhesive and its moisture "flash-off", nylon graphic carpet styles will be even more susceptible to shrink than other carpet constructions. And if there is insufficient floor adhesive transfer to the backing of these carpets shrinkage is almost certain to occur.

Since insufficient adhesive transfer to a carpet's backing is a leading cause of carpet shrinkage it is imperative for installers to use proper trowel notch sizes and adhesive spread rates in direct glue down installations. It is also necessary that they test slab sub-floors for moisture permeability to insure that the subfloor does not rapidly absorb the moisture content in an adhesive before it has had ample opportunity to transfer to the carpet's backing and cure.

Carpet expansion occurs when carpet absorbs an excessive amount of moisture, causing the pile yarns to swell and the carpet to lose its tension as it moves under foot. Seams can become peaked and the carpet may pucker along the wall or buckle in the field as it releases from the floor adhesive, or lifts off the pins of the tack strip. Carpet expansion can also be traced to improper installation. Inadequate site acclimation can result in the installation of a cold carpet that will literally "grow" as it warms to the environment. Carpet pad that is too thick can result in a "trampoline effect", causing excessive flexion of the carpet, which often leads to wrinkles, buckles, peaked seams and delimitation. An improperly glued-down carpet is also prone to expansion if ambient heat and humidity exceeds the minimal grab and hold properties of an adhesive that obtained only minimal transfer to the carpet's backing. Improper stretch of a carpet, and/or failure to properly engage the carpet to the tackstrip pins will result in loss of initial stretch with traffic and use, causing the carpet to appear to expand with use.

Implicit to these occurrences is that properly acclimated and installed carpet is not likely to shrink or expand. However, tests such as the Aachen and the British Method for Dimensional Stability can be used to test carpet to confirm that it is not unusually prone to shrink or expand as a result of manufacturing defects.

Mark Johnston