

## **Recommended Site Conditions and Floor Preparation for Carpet Installations**

Strict adherence to site acclimation and proper floor prep is an essential component of successful carpet installation. This is particularly true in areas where there is a potential for noticeable fluctuations in ambient relative humidity (RH). Since increases in RH can cause carpet to absorb moisture and expand, pop off the tack strip, wrinkle and buckle, and decreases in moisture can cause carpet to shrink, seams to open, and the carpet to pull away from the wall. Pre-conditioned carpet installed in a properly maintained environment will not be swayed by moisture loss or gain. It is not unusual to see and hear of these developments when site conditions are not controlled.

The installation of a direct glue-down carpet can be deterred by higher humidity, since “flash-off” time (tack time) of the adhesive can be slowed considerably, and this can also impede on adhesive transfer from the floor to the carpet’s backing. When this occurs carpet will be more prone to the influences that can cause either shrinkage or expansion. Whether one opts to install carpet by direct glue-down or by using the tackless method it is recommended that site conditions (temperature and humidity) be maintained at or very near to normal conditions of use for at least 48 hours prior to installation, and the carpet be allowed to relax and acclimatize to these or similar conditions for at least 24 hours prior to installation. Recommended site conditions allow for a range in temperature of 65 to 95 degrees Fahrenheit, and a relative humidity not in excess of 65%. If you are installing by the direct glue-down method you should be sure that the subfloor is 55 degrees Fahrenheit. Cooler floor temperatures tend to retard adhesive dry times and reduce adhesive grab characteristics. Radiant heated subfloors should not exceed 85 degrees Fahrenheit.

Moisture’s deleterious effects on carpet can also result from an unforeseen and unanticipated source, such as moisture migration of ground water through on-grade and below-grade concrete slabs, which typically becomes laden with alkaline as it passes through the slab. This emission is very destructive to both multi-purpose latex adhesives and carpet latex, and serves also to provide an ideal medium for mold and mildew growth. Our industry recommends the use of anhydrous calcium chloride, utilizing test method ASTM F 1869 (Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Calcium Chloride) when installing carpet over slab to insure that the moisture emission rate (MVER) is within the acceptable range of 3 lb. /1000 sq. ft. /24 hr. (expressed or measured in pounds of moisture emitted over a 1000 sq. ft. area during a 24 hr. period) for most carpets.

Slabs that display moisture emission rates in excess of this amount can be addressed by the use of liquid and sheet membranes, and while these type products work well they do have their limitations and may only inhibit moisture emission up to 5 lb/1000 sq. ft. /24 hr. Keep in mind also that the installation of carpet over tile that is already installed over a slab also requires moisture emission testing, and because the tile may skew the test reading it is recommended that a tile be removed in each test area, the adhesive scraped, and the slab scarified prior to emission testing. The tile then can be reinserted prior to the carpet installation.

A second test method used to evaluate the suitability of a slab is by internal relative humidity testing. This test relies on drilling holes in a slab at 40% and at 80% of a slab's thickness from the surface, and then placing moisture probes (sensors) in a protective sleeve that is inserted in these holes and are left for a period of 72 hours prior to evaluation (ref. ASTM F 2170). The maximum relative humidity for concrete slab is 75%. Although the use of this test is not currently required by our industry, because the internal relative humidity of a slab can increase over time, this test can be used to complement calcium chloride testing.

Another site consideration with slab floors is alkalinity. This is probably the most carpet debilitating/installation failure related concern with direct glue-down, since slab alkalinity in excess of 9 pH can literally "burn up" (oxidize) multi-purpose latex floor covering adhesives by attacking the carbon chains and synthetic rubber resins, reducing the adhesive to a white powder. Here again our industry has a means to test slab for alkalinity using the ASTM F-710 test method (Practice for Preparing Concrete Floors and other Monolithic Floors to Receive Resilient Flooring). Slabs that display a pH reading between 7-9 are considered acceptable for most all floor coverings. Information on proper floor preparation and site conditioning, as well as all other industry approved installation practices can be obtained from the Carpet and Rug Institute's CRI Carpet Installation Standard, October 1, 2009.

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