N E W S
L E T T E R

"Tek" Newsletter

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Test Procedures For Latent Defects

Carpet complaints due to manufacturing defects can be placed in two categories: visible defects and latent defects. Visible defects, such as streaks, stop marks, high and low rows, and missing tufts are generally obvious to even a casual observer and should be seen prior to installation. On the other hand, even the most astute observer can not detect "latent" or hidden defects such as delamination, poor tuft bind, and pilling and fuzzing until the carpet is subjected to use.

Because many complaints for latent defects are due to improper installation and abuse, an attempt to validate the defect must be conducted by employing specific testing and analysis.

Knowing what tests are required to address the problem and to establish what or who is at fault requires knowledge of the product, knowledge of mill and industry tolerances, and technical awareness; all of which are essential for successful claims handling.

Most of the test procedures used in our industry are established by the American Association of Textile Chemists and Colorists (AATCC) and the American Society of Testing and Materials (ASTM). Listed below are examples of the most common latent defects, a brief explanation of the possible causes, the test procedure required for proper analysis, and the industry tolerance for same.

Face Weight: Most manufacturing specifications state the total pile yarn weight. Variables such as shearing cut piles and adjustments in tufting can create normal variations from the specified weight to the finished weight.

Test Procedure: ASTM D 5848 (D 418-93), Mass Per Unit Area of Pile Yarn Floorcovering. The test sample is subjected to physical and chemical dissection to determine the total amount of pile yarn in ounces per square yard. The tolerance for finished pile yarn weight is typically plus/minus 5% to 7% of the specified weight.

Delamination: separation of the secondary backing from the primary backing. Can occur as a result of improper formulation or application of the backcoat (latex), or from improper installation such as inadequate stretch and improperly sealed seams, or from excessive flex due to improper cushion specification.

Test Procedure: ASTM D 3936, Resistance to Delamination Strength of Secondary Backing (expressed in average pounds per inch width). The HUD/FHA minimum requirement is 2.5 lbs/inch width.

Tuft Bind: The force required to pull a single tuft from the face of the carpet. Yarn pulls, fraying and raveling can occur as a result of improper latex formulation, improper latex wrap of the yarn bundle, or from abuse such as snags and yarn pulls. Often occurs at seam locations due to improper seam sealing.

Test Procedure: ASTM D 1335, tuft bind of pile floor coverings (expressed in average pounds from side, center, and side analysis). The HUD/FHA minimum requirement for tuft bind on loop pile carpets is 6.25 lbs., and 3.0 lbs for cut pile carpets.

Pilling and Fuzzing: Hairy appearance on the face of the carpet due to slack yarn twist, from fiber slippage from the yarn bundle due to poor latex encapsulation and penetration of the binding site (fuzzing) and entanglement of the stray fibers forming knots (pills).

Test Procedure: Dupont Pilling and Fuzzing Random Tumble Test TRL-609, ten hour tumble of sample in tumbler with hardwood block, rubber stripping and cotton balls. Visual comparison of tumbled sample to control. Minimum tolerance for pilling and fuzzing is a 4 rating.

An alternate test for berbers is bundlewrap and penetration. Based on percent of average latex penetration and encapsulation at the yarn bundle binding site. There is no industry pass/fail standard. Readings below 70-75% deserve consideration.

An alternate test for all other loop pile carpets is the Velcro Roller Test. This test uses a 1 ½ inch, 2 pound cylinder roller equipped with the hooked portion of number 88 velcro. The test procedure typically requires from 5 to 15 reciprocating cycles with the velcro roller on the carpet's face. Pass/fail criteria are based on individual mill tolerances.

"Tek" Newsletter
BEAULIEU

Mark Johnston--Tech Manager

Excessive Soiling: In manufacturing, soiling can be caused by excessive spin finish on the fiber (used as a friction and static suppressing agent). More common in non-scoured yarns (solution dyed), generally appears as soil "streaks" after installation, can occur due to lack of maintenance and residue from cleaning.

Test Procedure: ASTM D 2257, Extractible Matter in Yarns. Ten grams of sheared fiber is exposed to an extraction media and siphoned 3-5 times per hour for twenty siphonings. The weighed results are representative of the total solvent soluble extraneous matter on the fiber. No industry standard. Readings of 2% or less are generally considered acceptable and will not compromise the appearance of the carpet.

An alternate test for soiling is the AATCC 123 Accelerated Soiling Test. The test sample is subjected to tumbling in a porcelain ball mill filled with 50 flint pebbles and prepared laboratory soils for a pre-determined period of time. Samples are evaluated for appearance after soiling and after soiling and cleaning by using the Gray Scale of 1 to 5. A rating of 4 or above is generally required.

Staining/Soiling: Carpets treated with a topical stain/soil retardant. If spills immediately penetrate the pile or soiling is excessive, insufficient fluorochemical treatment may be the cause.

Test Procedure: AATCC 118, Oil Repellency: Hydrocarbon Resistance Test Method. Test determines the presence and effectiveness of the fluorochemical stain resist treatment based on it's resistance to a series of liquid hydrocarbons with decreasing levels of viscosity and increasing levels of penetration. Ratings of 1 or above indicate the presence of fluorochemical. Ratings of 2 or above is generally considered the normal "range" or repellency for these treatments.

Colorfastness: Color change due to atmospheric contaminents or environmental conditions, affects dye fixation.

Test Procedures for Colorfastness are:

AATCC 6 Colorfastness to Acids and Alkalis (for yellowing). Samples are evaluated by using the Gray Scale of 1 to 5. A rating of 4 or above is required.

AATCC 16E Colorfastness to Light (for fading to light). Samples are evaluated by using the Gray Scale of 1 to 5. A rating of 4 or above is required.

AATCC 23 Colorfastness to Burnt Gas Fumes (for yellowing). Samples are evaluated by using the Gray Scale of 1 to 5. A rating of 4 or above is required.

AATCC 107 Colorfastness to Water (for color bleed). Samples are evaluated by using the Chromatic Transference Scale and the Gray Scale of 1 to 5. A rating of 4 or above is required for both.

AATCC 129 Colorfastness to Ozone at High Humidity (for fading due to atmospheric gases). Samples are evaluated by using the Gray Scale of 1 to 5. A rating of 4 or above is required.

AATCC 138 Colorfastness to Shampoo (for color loss due to cleaning). Samples are evaluated by using the Gray Scale of 1 to 5. A rating of 4 or above is required.

AATCC 165 Colorfastness to Crocking (for wet and dry color transfer). Samples are evaluated by using the Chromatic Transference Scale of 1 to 5. A rating of 4 or above is required.