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Fluorochemical Carpet Protectors: How they Work

The carpet industry is one that is in constant evolution. Because of this, carpet continues to be made using better raw materials and manufacturing technologies in our on-going mission to provide consumers with longer lasting carpets that consists of more vibrant colors, intricate designs, and performance features. While these progressions in carpet manufacturing technology continue, protecting textiles, whether they are used in carpet, clothing, draperies or furniture, often relies on almost unchanged fluorochemical protectant, such as that discovered by the 3M company more than fifty years ago.

Fluoro-treatments **consist of phenolic resins and other copolymer blends such as acrylic** (no PFOS: perfluoro-octanyl sulfonates) that are applied to carpets during the manufacturing process to protect the fibers from dry and wet soils, as well as water-based and oil-based contaminants. These treatments, which are estimated to be used on somewhere between 70-90% of all carpets, can consist of common name products such as Scotchgard,™ Teflon,™ as well as in-house proprietary fluorochemicals, such as our own Permashield. While the vast majority of these carpets are residential styles, it's not uncommon to find nylon commercial carpets treated with fluorochemicals. Fluorochemicals can be applied to the fibers either during the dyeing or coating process. Based on how they are applied, fluorochemicals can either coat the upper third of carpet fibers or coat carpet fibers from their base to their tip.

Fluorochemicals work by reducing surface tension of carpet fibers, which causes them to repel soils as well as suspend spills on the fiber tips longer in order to help assist in spot cleaning as well as minimizing the spreading of spills. This characteristic allows for easier and more effective vacuuming of soils. Two other noteworthy characteristics of fluorochemicals is a reduction in the static generating properties of a carpet, and less potential for wicking.

In addition to fluoro-treatment protectors, colorless acid-based dye stain blockers (protectors) can be added to post-dyed nylon fibers to provide improved stain resistant properties. Positive charged stain blockers accomplish this by being attracted to negatively charged dyes sites on post dyed yarns. Stain blockers impregnate fiber dye sites, forming a barrier that protects the fiber from stain-producing contaminants, especially those that contain acid-based dyes (e.g. colas, coffee, tea, fruit punch, etc.) similar to the acid-based dyestuffs used during the carpet dying process. The presence of stain blocker prevents potential staining agents from having a site on the fiber to cling to. Dye blockers and fluorochemical can be steamed and heat-set, or baked-on fibers during manufacturing to provide more long-lasting protection.

Although fluorochemical treatments and acid-based dye blockers help extend the beauty and life of a carpet, they are not permanently attached to carpet fibers. As a result, their effectiveness diminishes with repeated foot traffic abrasion and cleanings. Because of this, the re-application of a fluorochemical protector during carpet cleaning is recommended.

Solution dyed fibers offer permanent and more effective stain resistance features than fluorochemical additives can provide. Solution dyed nylon fiber has a minimal number of dye sites on the fiber that allows fluorochemicals to cling to and provide a functional benefit. However, solution dyed olefin lacks site on the fiber for fluorochemical to be receptive to.

Ideally, commercial carpet is always properly cleaned and maintained in strict compliance with the manufacturer's requirements, and fluorochemicals are always properly applied when cleaning so that a carpet continues to benefit from the advantages of this type treatment. Unfortunately, the carpet cleaning industry is quick to point out two particular "real world" things to consider: Very few commercial carpet cleanings are done "as needed". And very few commercial carpet facility managers are willing to pay the additional 25% to often as much as 50% increase in carpet cleaning cost (.12 to .16 cents per sq. ft. or more) in order to also have a fluorochemical re-applied to their often sizeable carpeted facility. While the additional "down-time" required for carpet to dry with the application of fluorochemical treatments may not be an inconvenience to consumers, it might be perceived as a disadvantage to commercial facility requirements because of the aforementioned reasons.

Generally speaking, the effectiveness of fluorochemicals is reduced by approximately 30 % with each scheduled cleaning. A smaller percentage is lost through foot traffic abrasion. For this reason, carpet manufacturers recommend re-application of fluorochemical with every deep carpet cleaning with carpets manufactured with stain and/or soil resistance treatments in order for the carpet to continue to be capable of providing adequate soil resistance and stain repellency properties.

While a loss of 30% of the original effectiveness of a fluorochemical may not sound significant, if a carpet has been poorly maintained, or, is heavily soiled (such as is often the case with commercial carpet installations), the carpet cleaning technician is often required to use more aggressive, higher pH cleaners. In these instances the decline rate of fluorochemical protectors can be as much as 50%, compared to their original properties. With these considerations in mind; residential and even commercial carpet consumers who are genuinely committed to obtaining optimum carpet appearance and performance during the life cycle of their carpet should consider having the re-application of a fluorochemical treatment as an essential part of each professional carpet cleaning.

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