

"Tek" Newsletter

Newsletter

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Overview of Carpet Emissions and Carpet's Healthy Role in the Indoor Environment

The relationship between new carpet, indoor air quality, and other aspects of environmental health has received considerable media attention for more than 15 years. However, despite the efforts of some to besmirch the positive impact carpet has on human health, all testing performed to date using scientifically approved test methodologies have proven that new carpet will not invoke dermal, respiratory, or neurological sensitivities and helps promote a healthy indoor environment.

Over 1.2 billion square yards of carpet is installed each year in the United States. If one considers this and the fact that 90% of our time is spent indoors it is easy to see that if new carpet could produce acute, sub-acute, or chronic adverse health effects in humans these effects would have long ago reached epidemic proportions in our country.

Much of focus on carpet pertains to new carpet odor, which is directly linked to the volatile organic compound emissions (VOCs) present in new carpet. Although the particular VOCs obtained from new carpet can vary slightly depending on the dyeing process and the addition of soil retardant and stain resistant additives, new carpet emissions are generally associated with the styrene butadiene (synthetic) latex used as the back coat laminate. And while new carpet total VOC emissions (TVOC) can range from 3 to 40 different substances, only 12 VOCs are found emanating from new carpet with any regularity.

The testing and Green labeling program used today to measure carpet emissions was developed in conjunction with the Environmental Protection Agency (EPA) using strict and accepted laboratory

protocols in accordance with Good Laboratory Practices. This testing program concentrates on what is referred to as three critical emissions: styrene, 4-PC (4-phenylcyclohexene), and formaldehyde. Carpet does not contain formaldehyde. This naturally occurring substance can be found in the air in virtually every indoor environment. In order to meet the Carpet and Rug Institute's Green Label Indoor Air Quality Program (IAQ) formaldehyde emissions cannot exceed 0.05 milligrams per meter square per hour (mg/m²) when tested in accordance to the ASTM D 5116-97 test method. This test methodology is very complex, and requires a high degree of analytical capability and experience in environmental chamber operation, sorbent collection and gas chromatograph and/or mass spectrometric/gas chromatographic analysis, and provides a standard and reproducible means for accurately testing for VOC emissions. The maximum critical VOC emissions measured in the IAQ program are: 4-PC- 0.05, Styrene- 0.4, and Formaldehyde- 0.05.

Peak values of styrene emission from new carpet has been found to be 0.18 parts per million (ppm) in the air. The irritant level of styrene for humans is considered to be 29 ppm. Peak values of 4-PC reach 0.02 ppm in the air. 4-PC has been studied via inhalation up to 70 parts per million (ppm), which is the maximum level possible in air (10,000 times higher in concentration than expected from new carpet), and no adverse health effects occurred (Mizell, 1989, Nitschke, 1991). In another study (Styrene Butadiene Latex Manufacturing Council, 1989) 4-PC has been studied at exposure levels 125 times higher than the levels that were used in the infamous Anderson Study (circa 1993). This study was presented to the EPA for review. These

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findings confirmed there were no signs of toxicity from these exposures. Other studies to determine if 4-PC would produce an allergic response (dermal response or delayed contact hypersensitivity) from repeated exposures to the skin of guinea pigs failed to produce an allergic reaction.

There is no question that exposure to high VOCs can potentially produce sensory irritation, mucosal irritation, systemic toxicity, genotoxicity, and carcinogenicity. However, new carpet emissions have been studied at the highest levels observed under very low ventilation rates (to create a worse-case scenario) and still produced emission levels 100 to 10,000 times lower than the levels required to invoke adverse health effects in humans. According to a published statement by the EPA new carpet emissions are so low that they pose no risk to human health. Of other importance here is the rapid decay curve for carpet emissions, which typically reach non-detectable levels to most individuals after 96 hours.

In regard to the one of the many positive roles carpet plays, is estimated that over 50 million Americans suffer from various allergy symptoms, including sneezing, coughing, running nose, and itchy eyes. Allergies can develop at any age. And while it is not fully understood why certain individuals develop allergies, heredity is a significant influence. If one parent has allergies, their children have a 48% chance of developing allergies. If both parents have allergies, their children's risk increases to 70%. Individuals who suffer from various allergies should vacuum their carpet twice a week and have it professionally cleaned according to the manufacturer's recommendations every 12 to 18 months. Additionally, dust mite populations can be reduced and mold grow can be controlled by keeping relative humidity below 55 percent.

When an allergic person encounters an allergen their immune system becomes activated and produces an allergic response. Most allergists agree that common allergy symptoms can be minimized or

remedied by regular house cleaning to remove common household allergens such as dust mite, mold, pet dander, and cockroach (whose exposure is a significant risk factor for allergic sensitization, asthma development, and asthma morbidity). Fungi, bacteria, and dust mites do not grow on carpet constituents, and allergens do not proliferate in carpet.

Unlike hard floor surfaces, which allows household dusts/allergens to be easily re-suspended into the air by means of normal activities and thus becomes available for dermal contact and respiration, carpet holds allergen-causing substances tightly, thus keeping them from becoming airborne and minimizing the level of allergens in the breathing zone until they are removed by routine vacuuming. The fact that there is no link between carpet usage and the incidence of asthma and allergies can be supported by a 10-year study at the Swedish Institute of Fiber and Polymer Research. They found that while the use of carpet in Sweden had decreased since 1975, the occurrences of allergic reactions in the general population had increased. Another point of interest is that according to a study done by the Building Office Managers Association (BOMA) determined that hard-floor surfaces require two-and-a-half times more annual cleaning than carpet.

On a final note here; very recent tests performed by the University of Georgia's Department of Toxicology to determine microbial transfer from floor covering materials of viable pathogenic populations (including *E. coli* and *staphylococcus*)

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