

CRI Air Particulate Study

2025

Introduction:

There have been two previous studies to measure particulate concentrations above carpet versus hard surface flooring. In 2002, Braun et al. published a study entitled *Indoor Pollutant Measurement and Modeling Comparing Impact of Surface Characteristics*, which indicated resuspension of particles is lower over a carpeted surface versus a hard surface. In 2014, Tian et al, the study results confirmed the Braun study. In 2025, CRI commissioned a new study to update and affirm the differences between soft and hard surface flooring.

Discussion:

An "Independent Peer Review" of the test design and conclusions were found to be methodically sound and internally consistent for a controlled chamber experiment. The reviewer emphasized that the dust test material contains a larger proportion of finer particles than typical household dust that includes organic and inorganic matter.

Explanation of Test Protocol:

The study was performed by CTEH, a third-party environmental testing laboratory.

Two average particulate sizes were used 2.5 and 10.0 microns they were applied to two flooring materials (32 oz/yd² tufted carpet and sheet vinyl resilient floor). The sampling of the particulate was conducted at two heights (3 and 6 feet). Variables were tested by both introducing silica particulate (ISO 12103-1 A2 Arizona Test Dust) into the chamber and resuspending the recently settled particulate by walking in the chamber. All test data were replicated 5 times for accuracy.

The following are statements from the report:

- The increased decay rates for carpet following resuspension indicate a potential presence of a filtration effect provided by carpet.
- With each particulate loading, the average concentration of particulates decreased over carpet but increased over vinyl flooring.



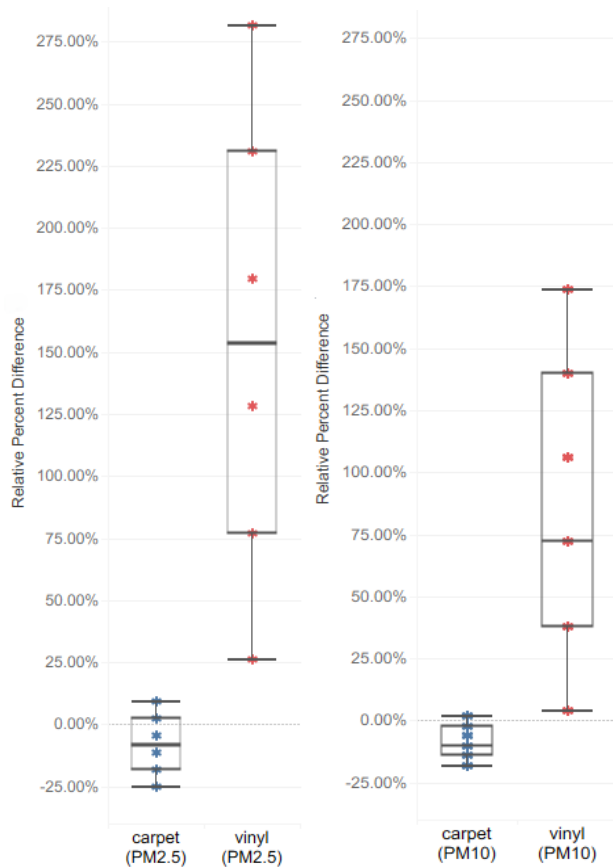
- On repeated particulate loading, mean particulate concentrations decreased, suggesting that as particulate migrated deeper into the carpet from repeated walking, it became less airborne.

In a natural environment with small incremental loading, an inflection point might occur that results in higher concentrations of particulate over vinyl than carpet during surface disruption

Conclusion:

Overall, this study supports the conclusion provided in previous studies mentioned in the introduction, that carpet provides entrapment of particulate matter and holds more particulate matter than hard surface flooring. Resuspension rates were greater than 2.5 times, PM 10 size particulate, for hard surface versus carpet and greater than 1.5 times, PM 2.5 size particulate.

Graph: Percent difference of air particulate concentration between carpet and vinyl



Explanation:

The graphic shows the percent difference of air particulate concentration between carpet and vinyl from the initial test and each subsequent test.

Note: Implementation of a proper carpet maintenance plan will improve indoor air quality.

