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## 1993 Technical Bulletins

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### **PRINCIPLES OF IMPROVING INDOOR AIR QUALITY THROUGH CARPET CLEANING**

When one examines the concept of indoor air quality, an important key to understanding its relevance is the recognition of the increased exposure that people have to indoor air as compared to the outdoor environment. People spend approximately 90% of their time "indoors" whether it be at home, at work, shopping, driving, flying, or attending functions socially. Quite simply, more time is spent indoors. Therefore our exposure to air concentrations is greater indoors than outdoors. In addition, because there is less ventilation and air movement indoors, concentration levels of contaminants that do exist are much higher in the indoor environment than in the outdoor environment.

Carpet acts as a collection and filtration center in the indoor environment. That is an advantage of carpet over hard surface floors. Hard surface floors allow the continuous movement of contaminants through the indoor air space. But if carpet does act like a filter, then we must treat it like any other filtering system. It must be periodically cleaned and the resulting removed contaminants disposed of properly. That is where the whole process of carpet cleaning becomes part of indoor air quality management. According to Dr. Michael Berry of the Environmental Protection Agency, the number one cause of indoor air problems is poor maintenance practices. In his studies, Dr. Berry expands this train of thought to carpeting.

How great of a health threat are indoor contaminants to a building occupant and/or the general population? It's hard to say. As you read this article, tests are being conducted throughout the world to try and establish scientific fact rather than unfounded paranoia. What we do know however is that there are five primary known sources of indoor air pollution: 1) migration of outdoor pollutants, 2) respirable airborne contaminants; 3) biological contamination; 4) combustion particulates and gases; and 5) chemical off-gassing.

As the scientific community establishes the facts behind these potential health threats we must recognize that those of us involved in the maintenance of the indoor environment play an important role in the prevention and correction of indoor air quality problems.

One way we can do that is through periodic cleaning of carpeting by trained technicians using environmentally sound techniques, chemistry, and equipment. We want to use the cleaning process to reduce through control, elimination, or removal - these contaminants in the indoor environment. Principles of sanitation teach us that there are four primary methods to reduce contamination. First, we could destroy the contamination or particles by fire. Not exactly a practical alternative. Second, we could destroy, kill, or inactivate by chemical application. Third, we can destroy some contaminants by the application of heat. Fourth, we can physically remove the contamination by agitation, breaking down and then absorption or extraction. Fifth, we can provide increased air movement and ventilation to the indoor environment.

We who are involved in the field of carpet cleaning can apply four of these five principles. We can apply chemical treatments that destroy or counteract the contaminants. For example, we can use sanitizing agents to kill some microorganisms. However, we must also recognize the need for removal or inactivation of these chemical treatments. Principles of low residue

cleaning take precedence here. Secondly, with truck mounted hot water extraction cleaning equipment, we can reach and maintain temperatures of 130°F within the carpeting. This can contribute to aiding in the physical removal of contamination by dissolving some contamination. But more importantly, solution temperatures of 130°F and higher should act as a sanitizing agent. Third, we can effectively physically remove contamination. Through the use of safe cleaning solutions, we dissolve, suspend, lubricate, emulsify, or absorb soils to aid in their subsequent removal by extraction or absorption. With some carpet cleaning methods, through the use of water agitation, brush agitation, or pad agitation, we assist in subsequent physical removal of contaminants by suspension or lubrication of contaminants. In the extraction or removal process, whether by vacuum extraction or pad absorption, we remove contaminants from the carpet for safe and proper disposal elsewhere. Finally, with the use of hot water extraction cleaning equipment, we provide two important means of ventilation. We provide, through vacuuming, a massive flow of air movement across and through the carpet. When carpet is cleaned, not only are solid particles suspended and removed, but so are gases and aerosols that were trapped within the carpet. We also, with the use of truck mounted extraction equipment, provide displacement ventilation by effectively removing much of the air to the outdoors.

How much contamination do we remove? How great a contribution can we make to improving indoor air quality? Is one carpet cleaning method more efficient at contributing to indoor air quality than others? Everyone has an opinion it seems. The truth is — we must first establish industry accepted standards for cleaning. Then those standards can be applied and tested by independent scientific analysis. Then we can be more specific. For now, we can simply conclude that based upon what we already know, the filter, i.e., the carpet, needs to be periodically cleaned. No longer can we ignore the principles that contribute to maximum contaminant removal. Effective safe carpet cleaning programs in all buildings with carpet must be established and implemented.

About the author:

R. Doyle Bloss is the Chief Executive Officer for Steam Way International in Denver, Colorado. Steam Way manufactures a complete line of carpet cleaning equipment and solutions and is the leading provider of education to the professional carpet cleaner. Doyle heads up the Indoor Air Quality issues research team for Steam Way and is involved in many industry investigations of related issues.