"TEK" NEWSLETTER
Beaulieu Residential

Quartely Newsletter
January 1, 2001

Carpet and VOC's

Special points of interest:

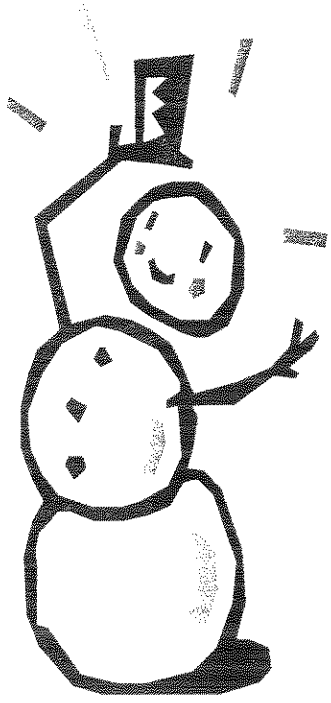
- *A follow-up to our last Newsletter on "overall" IAQ concerns, leading up to the question of carpet emissions*

Indoor air is a variable complex mixture of chemicals and airborne particles that can originate both outside of structures as well as within. Over the last decade much emphasis has been placed on chemical contaminants, particularly those that are capable of entering into a gas phase that refers to them as volatile organic chemicals (VOC's). Reportedly, over 900 different VOC's have been identified in indoor air. Common sources of VOC's include alcohol, solvents and cleaning compounds, paints, stains, varnishes, adhesives, caulks, spray propellants, fabric softeners, deodorizers, cooking, building and roofing materials, waxes and polishing compounds, pens and markers, certain fabric and furnishings, appliances, and office equipment (e.g.; printers, photocopiers, computer terminals). In this category you will also find short term, new carpet emissions.

Another acronym, "TVOC" defines total volatile organic compound levels and refers to the total concentration of all VOC's found in an air sample. Typical TVOC mixtures contain anywhere from 20-200 individual VOC's. Indoor TVOC levels found in residential structures are generally higher than those found in office buildings and can be 10-100 times higher than outdoor levels.

Reported TVOC concentrations are expressed as toluene equivalents (i.e.; individual VOC's are quantified relative to toluene as a standard). An aromatic solvent, toluene is found in the top 10 list of all VOC's in terms of frequency. Toluene is used as a diluent in most lacquers and thinners, and is used as a raw material in the manufacturing of other chemicals. Ten of the most common VOC's found in a TVOC mixture are toluene, benzene, ethylbenzene, tetrechloroethylene, 1,1,1, trichoroethane, styrene, limonene, isopropanol, ethanol, and xylenes.

Over the last twenty years there has been an increasing interest by the public in issues related to indoor air quality. Most of the focus on carpet emissions initiated in the 1980's as a result of concern that many building materials contained formaldehyde. Formaldehyde, which is a naturally occurring substance, is used as a strong disinfectant and preservative, and in the manufacturing of synthetic resins, dyes, etc. Particleboard, plywood, pressed wood, paneling, and most furniture is held together by phenol-formaldehyde resin glue. Exposure to formaldehyde gas can range from irritation of the eyes and respiratory tract, headache and dizziness, and palpitations of the heart. Contact with vapor or solution can result in erythema and other forms of skin irritation.



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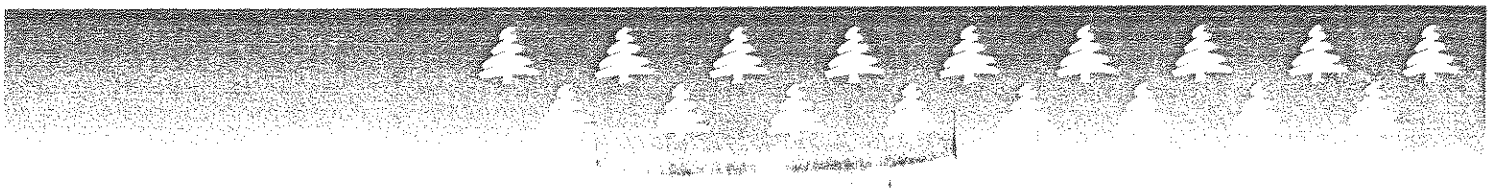

Prolonged exposure may lead to sensitization. Reproductive effects including menstrual irregularities and birth defects have also been associated with exposure to formaldehyde. According to extensive research by the Carpet and Rug Institute, formaldehyde in any form has not been used in carpet since 1982.

During the 1980's the carpet industry took voluntary steps to evaluate their products and to lower the levels of VOC emissions. This effort addressed all aspects of carpet materials and manufacturing, including backings, dye, fibers, and finishing (back coating). Prompted by these efforts and the growing concern over the relationship between new carpet and indoor air quality on May 29th, 1992 the Carpet and Rug Institute (CRI) launched their Indoor Air Quality Testing and Labeling Program. More than 90% of the carpet industry's production has since been accepted into this program. Carpets that are in compliance with the CRI IAQ "Green Label" program are tested for total volatile organic compounds, formaldehyde (to show it is not used in manufacturing) 4-phenylcyclohexene (or "4-PC"), and styrene. Criteria for this program is based on emissions of total volatile compounds and major chemical constituents that are quantitatively measured and determined in milligrams per meter square per hour (mg/m2) by gas chromatographic/mass spectrometric technique (a process of sorbent chemical collection, separation, and detection analysis). TVOC calibration is based on toluene response curves, with focus on 4-phenylcyclohexene (which is responsible for new carpet's characteristic odor). These carpets are tested and re-tested on an on-going basis to insure that maximum allowed emission levels are not exceeded and stringent indoor air quality requirements are maintained. The test methodology used for the CRI IAQ program is approved by the Environmental Protection Agency (EPA) Dialogue Consensus and has been accepted by the American Society of Testing Materials (ASTM) as a standardized test method (ASTM D-1156). The current TVOC criteria for carpet emissions in this program is 0.5 mg/m2; many times less than the emission levels given off by other products used in the home and workplace. As an example, it has been estimated that approximately 43,000 square yards of average carpet would be required to equal the same VOC emissions given off by one gallon of oil-based paint.

Ventilation plays a vital role in maintaining good indoor air quality. Therefore, new carpet installations should be thoroughly ventilated for at least 48-72 hours after installation. If, after this time an unpleasant or irritating odor persists the carpet can be cleaned with a clear water rinse using hot water (i.e.; "steam") extraction from a truck mounted unit (truck mounted units are recommended since all exhausts are carried outdoors). Detergents should not be used in this process since they are not needed and their fragrances may complicate existing odors.

Odor is considered to be a vital factor in the perception of IAQ. Odors perceived as irritating or harmful can induce stress that precipitates into symptoms like headache and nausea. The CRI IAQ Label assists the consumer by identifying carpet and components that have demonstrated features that minimize exposure to emissions. With the implementation of this program the carpet industry has steadfastly committed itself to providing consumers with products that insure good indoor air quality.

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