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A SMART GUIDE TO PVC BACKED MODULAR CARPET



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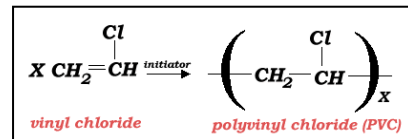
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Modular Carpet also known as carpet tile – is probably the least difficult soft flooring product to actually handle and install. That being said, the chemistries involved in most of the modular carpet backing systems that are in general use today can create serious and occasionally catastrophic issues that **WILL** land squarely on the shoulders of the flooring contractor if the correct steps have not been taken. Various aspects of this issue have been dealt with in a number of articles and publications.

In this article, I intend to go into detail regarding the chemistry involved in the manufacture of PVC modular carpet backings and some of the downstream issues that can be created. Knowing and understanding this chemistry will hopefully reinforce the need for caution when dealing with products that utilize PVC chemistry and make you smarter.

First and foremost, **PVC is a superb backing for modular carpets.** This is true so long as the following conditions are met: 1. Component parts of the PVC compound are properly manufactured. 2. The compound itself is correctly handled through the various manufacturing processes involved in creating the carpet web from which the modular carpet will be cut. 3. The final product is properly handled during the installation process. Wait a minute – How in the world am I, as a flooring contractor, architect, designer, general contractor or specifier supposed to know about any of this stuff?

Polyvinyl chloride abbreviated as “PVC” is a hard brittle white plastic in



its pure form. It was discovered back in the mid 1800's but was too brittle and unworkable to be commercially viable. In 1926, B.F. Goodrich discovered a way to make the material softer through the use of additives – known as plasticizers. The incorporation of these additives made the



plastic extremely useful for a number of applications. When the term “PVC” is used in this article, it means a mixture of the hard brittle PVC polymer – usually ground to a very fine particle size – with a plasticizer to form what is called a “plastisol”.

This plastisol generally has the consistency of toothpaste and can be pumped and manipulated through a manufacturing process with minimal difficulty. This plastisol also has the unique property that it can sit for long periods of time without drying out or becoming unworkable which makes it very

friendly to the manufacturing process. When heated to high temperature – on the order of 380 degree F – this plastisol undergoes a phase change or fusion from liquid to solid and becomes the material we have all seen and handled when PVC backed flooring products are installed.

Please note that plasticizer is mechanically mixed with the PVC polymer to form the plastisol. There is no chemical reaction between the two. When this mixture is cured via heating, some of the plasticizer is driven out which restores a portion of the original rigidity of the PVC polymer and gives the flexible workable PVC backing that is a familiar part of the flooring contractors experience. There always remains a certain level of “free” plasticizer in this backing. This “free” plasticizer will be slowly released from the backing throughout the life of the product through a process known as diffusion. This release is the phenomenon known as “plasticizer migration”.

PVC is an inherently unstable material. A pure homogeneous PVC film will grow and shrink with temperature and humidity changes. All PVC films change dimension over time as the various components that make up the compound seek equilibrium with the environment through the migration process noted above. To serve as a viable modular carpet backing, PVC films must be mechanically stabilized usually by the incorporation of multiple layers of a non-woven fiberglass fleece.

Essentially all plasticizers used in the manufacture of PVC backed flooring fall under the general chemical family known as “phthalates”. Some work is also being done on the use of epoxidized vegetable oils as a substitute for phthalate based plasticizers by some manufacturers. For purposes of safety, always assume that the PVC backed material you are working with has phthalate type plasticizer.



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Plasticizers are manufactured by reacting with a chemical known as phthalic anhydride with various organic alcohols. The reason that the installation contractor on anyone else involved or associated with the installation of these type flooring products should even be concerned with this is that – under very special conditions - this reaction can be reversed through a process known as alkaline hydrolysis. This is just a fancy way of saying that the material can be broken down by the action of water in a high pH environment. This can happen when PVC backed material is installed over a concrete slab that is emitting high levels of water vapor. There are also documented instances where this breakdown has happened due to issues within the PVC backing itself even when the PVC backed carpet was installed over a perfectly acceptable floor. It is extremely important for the contractor to fully understand and rigorously document that the sub floor meets or exceeds ALL of the requirements of the manufacturer. In a typical situation where PVC backed carpet is installed over an out of specification sub floor, the emitted vapor may condense to liquid water under the PVC backed carpet– usually with a pH of about 12 or 12.5 which is about the internal pH of concrete itself. Inevitably, this high pH condition comes in contact with the plasticizer that is continually diffusing out of the cured PVC plastisol that serves as the backing.


What happens is that the high alkalinity acts as a catalyst for the hydrolysis reaction and the plasticizer breaks down into its component parts. This in itself would not be a problem except for the fact that the alcohols liberated by this breakdown have an EXTREMELY pungent odor. This odor is so objectionable that it has caused buildings to be evacuated for months while the contaminated slab is either cleaned or removed and replaced. Remediation of this type of issue is currently the subject of a number of lawsuits and the dollars are HUGE.

DO YOU HEAR THE CASH REGISTER YET? GUESS WHO GETS BLAMED FOR THIS? YOU GOT IT – THE INSTALLATION CONTRACTOR. This is why it is doubly important to dot the “I’s” and cross the “T’s” when it comes to vapor emission rates, In situ RH values and the surface pH of the concrete when you are working with PVC backed material.

Plasticizer migration is also the reason that it is imperative that the installation contractor and all parties involved KNOW what is being removed from the floor and what type of adhesive will be exposed to the potentially damaging action of plasticizer. Plasticizer is basically an organic solvent. Over time it will soften

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and begin to liquefy the existing adhesive. The very worst situation is where there is exposed asphaltic adhesive such as "cut back". Plasticizer literally returns the "cut back" to the consistency it had when it came from the pail. Once this happens it is inevitable that this nasty, gooey, black "stuff" works its way to the joints and seams and wicks to the surface of the carpet. With latex based general purpose adhesives, this effect still happens but is not so dramatic. As a general rule, the softer and stickier the exposed general purpose film is, the more likely it is to reach a degree of emulsification that allows it to wick up between the seams or joints in the carpet. Remediation of this type of problem can easily reach 10 to 15 dollars per square FOOT.

Wait – there goes the cash register again and again it is the installation contractor that will be blamed unless they are smart.

Regardless of the type of adhesive exposed, get detailed preparation guidelines from the manufacturer of the carpet in writing. If the manufacturer is reluctant to put guidelines in writing – don't install the floor.

Everyone in the chain of a project should know and use this information. If the flooring contractor tells the general contractor he thinks there's going to be a problem or the potential for a problem exists everybody needs to heed his advice. Thinking nothing will happen is a very dangerous risk that can result in untold expenses to fix the problem. If a furnished facility has to be torn apart you can multiply the loss related to having to replace the flooring and remediate the substrate by at least a factor of 4. Do you really want to spend or be liable for upwards of \$50.00 a square foot to correct something that could have been prevented?

If you have questions or we can help you with a problem or better yet, help you to prevent having a problem call us. We can help keep you out of trouble



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THE MODULAR CARPET MARKET: Facts You Should Know

- ✓ Highest Growth Rate of Commercial Carpet Material
- ✓ Key Element of the Systems Furniture Driven Office Market – Allows Carpet to be Replaced with no Disruption to Operation
- ✓ Unlimited Design Flexibility
- ✓ Ease of Installation – Transportation, Handling, Application and Speed
- ✓ Lower Waste Factors
- ✓ High Visibility of Major Installations
- ✓ Profitability

Market Share

- ✓ About 30% of Commercial Carpet is Modular Carpet
- ✓ Fastest Growing Segment of the Textile Floor Covering Industry
- ✓ It is the Most Highly Engineered Textile Floor Covering Product
- ✓ The Highest Performing Textile Floor Covering Product

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A NEW LINK

We've included a new link to the CRI – Carpet and Rug Institute – website so that you'll all be aware of the **“NEW CRI CARPET INSTALLATION STANDARD”** which goes into effect October 1, 2009. Click on the CRI link on page 2 of the newsletter, then click on Carpet and Rug Industry in the heading and then click on Installation Resources.

FOR OUR READERS

We will continue to provide you with what we think are the most pertinent and important issues regarding commercial flooring material and aligned information. But, if you have a question or would like to suggest an article on something you have concerns about so that we can share the information with all our readers, we'd welcome your input. This newsletter is meant to help you understand commercial flooring products and issues to help you be the best you can be at your business and to help you be successful and profitable in your business. We've got a multitude of topics to cover but we can always use your input. Thank you,

Lewis G. Mepline

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SUMMARY

Over thirty five years' experience in executive management, sales, project planning and business development. Proven track record of generating and cultivating business relationships at the executive level. Demonstrated ability to stimulate overall growth through organizational excellence, exemplary customer service and sound decision making, including building a multi-decade enterprise into one of the leading flooring retailers in West Michigan. Superior interpersonal communication skills. Lifelong learning, active commitment to social service, including over thirty years volunteer experience mentoring and counseling individuals working to overcome substance abuse.

PROFESSIONAL EXPERIENCE

DIANE'S & DESIGNER FLOORING - Grand Rapids, Michigan
 October 2008 - September 2009

Director of Finance

- Supervised all functions of five separate locations to include purchasing, specification, pricing, billing, and sales.
- Designed and supervised the creation of a new \$1,000 sq. ft. facility for Kingman's Furniture Company.
- Established and promoted programs to create a concerted effort on the part of the hardware and flooring sales personnel to increase sales.

WEST MICHIGAN AUTO AUCTION - Motte, Michigan
 September 2007 - September 2008

District Sales Manager

- Developed relationships with automobile dealerships, in order to get them to both buy and sell vehicles at our weekly auctions.
- Increased vehicle sales/revenue in a six county area of Western Michigan.

FLOOR COVERING ASSOCIATES (FCA) NETWORK, INC. - Showroom, Illinois
 September 2006 - May 2007

Regional Manager of Business Development

- Identified business opportunities and consulted with potential clients in new markets, in order to generate membership growth for a nationwide buying group of independent floor covering installers.
- Developed and modified print and audio-visual marketing strategies, to align corporate brand image with current market trends and target key client demographics.

MEDEMA'S CABINETS & INTERIORS - Grand Rapids, Michigan
 April 1983 - June 2006

Dale Medema - Resume

Postings are at CFR's discretion



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- **SPECIFICATIONS, CONSULTING AND INFORMATION – BEFORE AND AFTER THE SALE**
- **OVERSEE MANUFACTURING AND INSPECTION OF PRODUCT AT THE SOURCE**
- **EDUCATIONAL SEMINARS**
- **CERTIFIED PRODUCT TESTING**
- **INSTALLATION OVERSIGHT, GUIDANCE CORRECTION AND SPECIFICATION WRITING**
- **INSURANCE LOSS EVALUATIONS**

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