

# CFR The Commercial Flooring Report

For the Commercial Floor Covering Industry

Volume 184 - January 2024

[Click here to View and Download all CFR Newsletters](#)

## **What Effect Does Heat Have on Vinyl Flooring Products?**

The heat we're talking about is not what the vinyl flooring material may experience where it's installed but heat that the vinyl flooring material is subjected to during the manufacturing process. We will talk particularly about vinyl tile and plank, but we'll throw carpet tile into the mix as well. Making flooring of any kind that contains thermoplastics exposes the product to heat in dry and applied form, it's an integral part of the manufacturing process and in the production of thermoplastic flooring. Since most soft and hard surface flooring is a thermoplastic, it must be formed into the end product, and this requires heat. It also must be finished with heat, which subjects the material to even more heat, and the way the heat is introduced or employed has an effect on the finished product. If everything functions as it should the end result is a flooring material that is stable and balanced. If there are deviations in the heat it can have a detrimental effect on the flooring material. This is where you'll get product that is unstable when the result can be expansion, contraction, and changes in the products physical form. All vinyl plank flooring products are multi-layered – up to seven layers in some products. Each of these layers must be stabilized to control the steadiness of the finished product. If not, the result can be dimensional and planar instability which would be inherent in the product.

Thermoplastics are polymers that become moldable at a certain elevated temperature and solidify upon cooling. The application of heat facilitates the alignment of the polymer chains, allowing them to be shaped into the desired form. As the material cools, these chains begin to solidify but retain the ability to soften again with heat. This property is crucial for both the manufacturing process, where the material is formed into tiles or planks, and for its recycling potential, allowing for re-melting and re-shaping. However, this thermal sensitivity also means that thermoplastics can undergo thermal expansion and contraction, which can lead to dimensional changes in response to temperature variations.

Let's look at where the influence of heat can affect the product.

Vinyl tile and plank flooring undergo a process of heat, rolling/heat and pressure, pressing, layering, and annealing.

The Temperature itself of how the product is put together may vary in consistency and uniformity which would affect how stable the finished product is. Remember, we're talking about multiple layers that, if not stable and balanced, can be fighting within the product trying to find equilibrium and creating

stresses that can cause a physical reaction of the material after it is installed. Passing over or through heated rollers can stretch the individual vinyl layers and at some point, the material will want to return to its original state wherein the search for that point can result in the product shrinking. Since the layers are laminated together any of them not balanced can create havoc with the product, even if it has a stabilizing layer.

Speed of line is how fast or slow the manufacturing line runs in various steps of the manufacturing process where the product is influenced by heat. An alteration in the line speed could subject the material to more or less heat which would impart an inconsistency in the material causing it to react. You'll see this in carpet tile with a sensitive polyolefin backing where more or less heat can cause the product to be unstable creating lifting, cupping or curling sometime after the product is installed where the planar instability is random throughout the installation. Polypropylene has the lowest glass transition temperature of any thermoplastic used to make flooring products and is therefore sensitive to heat. But you'll also see this with vinyl tile and plank if there is a random lifting throughout an installation.

Distance of heat source to the surface of the vinyl material again can impart more or less heat to the product creating potentially inherent instability with the product. This would be heat applied to the top or bottom of the product as it passes through the production line.

Hot Press or continuous press annealing. Hot press, where the product is stacked and the layers are pressed together, can have varying degrees of heat from top to bottom or the press rack creating flooring that can exhibit random stability issues after it's installed. This was mentioned a couple paragraphs up as random lifting of the flooring material.

Annealing is a controlled process of heating and then slowly cooling thermoplastic materials to reduce internal stresses and improve their dimensional stability and mechanical properties. During the manufacturing of flooring, after the thermoplastic material is heated and formed into its final shape, it undergoes annealing to ensure that it maintains its shape and size over time and under varying environmental conditions. The process of annealing allows the polymer chains to relax and arrange in a more stable configuration, minimizing residual stresses that can cause warping, or distortion. By carefully controlling the cooling rate, manufacturers can ensure that the flooring material is not only aesthetically pleasing but also structurally reliable.



### **THE COMMERCIAL FLOORING REPORT**

**Lewis G. Migliore—President**

**P: 706.370.5888 or Email: [lgmtcs@optilink.us](mailto:lgmtcs@optilink.us)**

**Just Click Here to Go to Our Website for All CFR Articles**

**[LGMANDASSOCIATES.COM](http://LGMANDASSOCIATES.COM)**

# **LGM and Associates**

**Experts in Everything Flooring  
From Substrates to Surfaces**

**No Issue is too Big, too Small or  
too Far Away for Us to Handle**

**Complaint Determination, Consulting,  
Resolution of Flooring Issues  
Concrete/Moisture Issues and  
Certified Product Testing  
Dispute Resolution, Legal/Litigation  
Assistance, and Proffered Expert Witness  
Project Assistance  
Develop Flooring Specifications and  
Product Sample Evaluation**

*"When No One Else has Answers,  
We Do"*

*Just click the image below or search under  
Lew Migliore and let's connect on LinkedIn!!*



Page Layout By: Anita S. Drennon

Layers can each have their own level of stability and will typically be allowed to cool and stabilize after being heated and rolled. The heating, cooling and stabilizing process can occur several times in the manufacturing process depending on the product.

Every production run is different when the product is made and even the best controls if they vary a few degrees, or the line speed runs just a bit faster or slower, or a nob is tweaked just a bit, could create an instability in the finished product.

Incorporating recycled materials into the production of thermoplastic flooring products presents both opportunities and challenges. While the use of recycled content aligns with sustainability goals and reduces the demand for virgin materials, it introduces variability in the physical and chemical properties of the input materials. Recycled thermoplastics may contain a mix of polymers, additives, and residual contaminants, which can affect the consistency, stability, and performance of the final flooring product. For instance, variations in the melt flow index, tensile strength, and color of recycled materials can lead to inconsistencies in the manufacturing process and the finished product. Quality control becomes paramount, requiring stringent testing of recycled materials to ensure they meet the specifications necessary for high-quality flooring. The well-known saying in the plastics industry, "Crap in, crap out," highlights the importance of the quality of input materials.

Reaction of different compositions such as the use of varying amounts of recycled content whether post or manufacturing scrap can create a difference in the product.

And if the recycled feed stock materials are not controlled or uniform, can cause instabilities in the finished product. The carpet industry had a big problem years ago with carpet tile using recycled content that created havoc. Just an added fact that PVC free products with bio-based plasticizers, that incorporate post recycled content are not PVC free, since the recycled content likely contains PVC and phthalate plasticizers. The addition of recycled content, post recycled content, and manufacturing trim or waste, can also affect the integrity and stability of the vinyl flooring.

Heat can cause an alteration of color in the product or sheen variation when the polyurethane wear layer is applied and cured if there are inconsistencies in the application or the curing.

**LGM and Associates**  
 TECHNICAL FLOORING SERVICES

**The Floorcovering Experts**

519 Oxford Street Dalton, GA 30720 P (706) 370-5888 F (706) 270-0482  
 Email: [lgmtcs@optilink.us](mailto:lgmtcs@optilink.us) Website: [lgmandassociates.com](http://lgmandassociates.com)

**Guidance, Consulting, Determination Legal Assistance and Resolution of Flooring Issues:**

- Onsite Physical Investigation - Product Sample Evaluation
  - Identifying Substrate, Concrete And Moisture Issues
- Certified Product Testing - Insurance Loss Evaluations
- Dispute Resolution, Litigation Assistance and Proffered Expert Witness

**Right Product in the Right Place: Get it in the Door; Keep it on the Floor**


- Construction/Renovation Project Assistance to Determine Suitable Flooring
- Develop Flooring Specifications - Installation Assistance
- New Flooring Product Development and Marketing
- Educational Seminars (Corporate and Personal/Individual)

**"WHEN NO ONE ELSE HAS ANSWERS, WE DO"**

**Click Photo to view the LGM website.**

**Commercial Flooring Report**

Ad Size and Pricing 519 Oxford Street•Dalton, GA 30720—lgmtcs@optilink.us—706.370.5888

CFR Provides the most Coverage and Best Value for Your Advertising Dollar  
 Link to Your Website is Embedded in Your Ad  
 All Three Ad Sizes Can be Customized to Your Liking  
 Free to Recipients - Sharing and Posting to Your Website is Encouraged  
 Pertinent and Relevant Information in Each CFR Issue  
 Totally Green - No Paper Used for Publication  
 Over 100,000 plus Readers and Growing  
 Archived on [LGMandAssociates.com](http://LGMandAssociates.com) and other Websites  
 Just Click Here 

<p>Ad Size—1" x 2"</p> <p>\$ 4,000—12 Issues</p> <p>\$ 335—per Issue</p>	<p>Ad Size—5" x 3.5"</p> <p>\$ 9,600—12 Issues</p> <p>\$ 800—per Issue</p>
<p>Ad Size—3.5" x 3.5"</p> <p>\$ 6,000—12 Issues</p> <p>\$ 500—per Issue</p>	

**Click Photo to view the Archived CFR's.**

Reaction of different thermoplastics – polypropylene backing, polyurethane wear layer, polyurethane compositions, if the polyurethane used is a thermoplastic and not a thermoset elastomer.

One of my mentors who schooled me for years on polyurethanes was Carl Poteet, he had a saying I love about the manufacture of flooring materials, “either you control the product, or the product controls you.” Unfortunately, in our business we see a lot of uncontrolled products. With the market flooded with vinyl tile and plank flooring products, produced by hundreds of manufacturers around the world, and the race to the bottom for pricing that is a bane of the flooring industry, there are corners cut and processes altered to cut pricing to try and gain market share. If you’re not buying from a reputable manufacturer, even though most don’t manufacture all of the vinyl tile and plank they sell, you’re gambling with what you get.

### Some additional Information for You

If a product has different run dates, especially if they are months apart, it is going to be different because it was made at different times and you’re never going to get the exact same conditions twice. That’s why for example, carpet manufacturers will tell you that if you order the exact same product twice in the same color it’s not going to match. In fact, if you get a product that is continuous dyed the color may not match within the same roll due to variations during the dying process. Check the run dates and lot numbers on any vinyl plank or tile flooring you receive. If they vary, the product is going to vary which is why you may see random shade, sheen, or stability variations in an installation. You can’t create physical changes by installing the product, nor does anything in the environment or a condition of the substrate have any influence on an inherently unstable flooring product.

Know that there is no such thing as a “dye lot” in vinyl plank and tile production because there are no dyes, it’s a picture, unless dye is actually used such as rotogravure or digital printing. It’s a run, not a dye lot. The term dye lot refers to carpet that is dyed, not vinyl flooring.

You must understand these products to be able to determine what may be wrong with them when they go haywire on the floor. The reaction may be blamed in installation, moisture, temperature variations, acclimation or whatever, when in fact it may just be the flooring itself reacting to inherent conditions within it. There are also a multitude of manufacturing processes and manufacturers – uniformity can be elusive in runs and between runs. There will be more issues with flexible vinyl tile and plank than solid core products but that doesn’t mean the same issues can’t affect solid core products as well. And with the rapid and continuous changes and evolution of the materials used to make vinyl flooring, such as core materials, PVC free and the move away from phthalate plasticizers to bio based, you have no idea what you may be getting. And for that matter, neither do many of the firms providing these products to the market, by their own admission.

It’s our job to know these products as intimately as possible and we strive to do that on a daily basis. It’s one of the reasons we’re based in Dalton, Georgia, the flooring capital of the world. If you have questions, need help with a flooring issue or need guidance before or after a project, on any type of flooring or substrate, contact us. We have the top experts in every flooring category, and we always have the answers.

I want to thank Julie Li, Ph.D. Managing Scientist | Polymer Science and Materials Chemistry for Exponent Engineering and Scientific Consulting, for her contribution to this article. Julie has extensive industrial experience in all stages of product development from formulation and compounding to manufacturing and commercialization. Julie consults on a wide variety of polymer science matters including those related to formulation - structure-property relationship, material specifications for end-use applications, polymer conversion processes and failure analysis. She has also worked in manufacturing thermoplastic materials and products. LGM is proud to announce a working relationship with Julie and Exponent.





### **Take Advantage of this!**

Are you confused by all the changes occurring in the industry? Is the onslaught of new flooring products, soft and hard, adhesives, site related conditions as well as substrate issues, overwhelming you? Do you want to stay out of trouble and avoid a flooring failure? Let us help. We can come to your business with an educational program that addresses all these issues, and more. Afterwards we can engage you and your team in a question and answer session that is sure to help clear the cobwebs of chaos.

**Call or email us to discuss your interest and for more details.**

**706-370-5888—[lgmtcs@optilink.us](mailto:lgmtcs@optilink.us)**



## **Looking to Buy All Excess Carpet Tile**



**Turn Your Old Inventory into  
Cash and Clean Up Your  
Warehouse – We Arrange  
Shipping and Pay Freight!!!!**



**Call Kolt Privett – 770.530.4709  
Overstock Floorz - [koltp.of@gmail.com](mailto:koltp.of@gmail.com)**

**DONT WAIT, WE PAY THE FREIGHT - GIVE KOLT A CALL ON PRICING**  
We Prefer No Carpet Remnants, Right Now.

402 Beamer Road SW, Calhoun, GA 30701

FCEF exists to bring awareness to the opportunities in a flooring installation career, recruit new talent, aid in the funding of the their education, and facilitate job placement into flooring industry

Here is a link to ALL of the FCEF Digital Marketing assets.

We provide all of this to retailers for free so that can promote the career and the scholarships in their neighborhood and with their network.

[At this link](#), you will find, complete social ads ready to be customized and posted, email templates, customizable fliers, social video ads. Feel free to use any of the copy you see there – and download anything you like.

