

# CFR The Commercial Flooring Report

For the Commercial Floor Covering Industry

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## THE EVOLUTION OF LVP

This month's issue is by guest columnist Tim McAdoo. Tim has spent 43 Years in the Resilient Flooring Industry and has a great knowledge of manufacturing and installation of products. Tim has worked in manufacturing, product development creating installation systems and product recommendations, and as an installer. Tim created and had a patent for the Armstrong S-761 Seam Adhesive. Tim previously worked for Armstrong Flooring and now is the Installation Specialist for JJ Haines and Belknap White flooring distributors.



Since the introduction of Luxury Vinyl Plank and tile in the late 1970's, vinyl flooring took on a new form: planks that somewhat resembled traditional hardwood floors. Plastic Wood.

Changes in Luxury Vinyl Plank and Tile are now happening faster than ever before and faster than anyone can keep up with. We went from glue down LVP installation, to floating LVP that used a tape system to keep it together and now locking tongue and groove systems. Solid vinyl plank and tile products have progressed to WPC (Wood Polymer Core) structure and now to the SPC (Stone/Solid Polymer Core) structure that, supposedly, can withstand direct sunlight and extreme temperature changes that previous vinyl plank products could not deal with. And let's not forget the water proof factor.

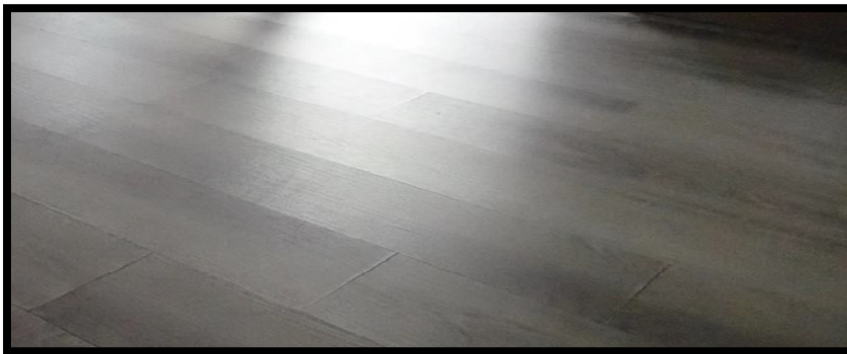
Many of these Locking WPC/SPC Floors with attached Foam Padding will offer a glue down option. Do this with a risk, as the adhesive does adhere to the attached pad, and the bond between the pad the flooring structure may be minimal. Any shear effect with the subfloor and the bond of the pad to the structure can be compromised. And if there's moisture intrusion from above or from the substrate there will likely be further compromise of the adhesion.

When LVP first hit the flooring world, the product was a wet set installation either using hard set adhesives or epoxy adhesives. I wrote up the initial installation instructions for Armstrong Natural Creations, which required a wet set installation. Why Wet Set Now? Let us look at this another way. We buy an LVP product for \$0.69 cents a square foot that is made across the world, shipped across the ocean for 6-8 weeks in a container, sold through a broker/distributor and it is still only \$0.69 cents a square foot. What exactly are we getting and what the heck is in it? Then, on top of this we use a low-cost pressure sensitive adhesive and wonder why the product is gapping 2 months later. When you have a flooring

product with dimensional stability issues and then you choose a low-cost adhesive, you have a bad scenario of gapping LVP. The low-cost adhesive does not have the strength to contain the stability issues of the LVP. In fact, a high cost pressure sensitive will not have the strength to contain the stability issues of the flooring product. But remember, most importantly, that adhesive will not correct any instability in a flooring product; don't believe otherwise. And, if the planks or tiles are not flat coming out of the box, do not install it. Flooring instability will not self-correct; this is another fallacy preached.



**Stability Issues**



We now have LVP Adhesives that go up to 100% Relative Humidity in the concrete and some that do not even require concrete moisture testing and are also excellent with LVP in direct sunlight. The caveat with these 100% RH/Sunlight/Dimensional Stability LVP Adhesives, is that they are a wet set installation, not a dry to touch installation which is totally different than what LVP installers are used to today.

These new wet set adhesives are not pressure sensitive. They do not get tacky when dry to the touch, in fact, when they dry to the touch, they have set up. They do not have any pressure sensitive properties. These new wet set adhesives are trying to compensate for all the high moisture subfloor conditions, excessive direct sunlight, and Dimensional Stability (shrinking) issues we encounter with LVP today. When wet



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*Lew Migliore - President*  
 P (706) 370-5888 or Email: [lgmtcs@optilink.us](mailto:lgmtcs@optilink.us)  
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setting an adhesive, you are gaining the absolute maximum bond strength of the adhesive. You place the flooring into the wet adhesive, and the adhesive flows out covering probably 95% + of the back of the LVP which gives maximum bond. When you allow the adhesive to dry to the touch, you are only bonding to the top of the adhesive ridge which is covering about 60% of the back of the product and achieving minimal bond. The concern now, is that installers will not take the time to follow the instructions and they will use these wet set adhesives as a pressure sensitive and achieve little to absolutely no bond. Now, you will have to install the LVP like glue down hardwood. Trowel 2-3 feet of adhesive, wet set your LVP, tape it together, roll it with a 100-lb. roller, and wipe up any adhesive squeeze up. Welcome back to the good old days!



**Wet Set Adhesive**

**Wet Set Adhesive  
that has Dried to  
Long**

**Dry Too The Touch**



Traditional Pressure Sensitive Adhesives can and will still be used, but there are a few facts that still need to be followed with these adhesives.

1. Most Pressure Sensitive Adhesives do not have a 24-hour working time. In fact, most working times for LVP Adhesives are about 3 hours. If you treat the open time of the Pressure Sensitive Adhesives like VCT Adhesives, you are not maximizing the bond strength of the adhesive and there could be

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**See Page 7 Regarding Excess  
Inventory Offer**



an adhesive failure with movement of the LVP.

2. These are Pressure Sensitive Adhesives, and they do require the flooring to be rolled with a 100-lb. Roller during the installation. For some reason, installers have forgotten about this very critical component of the installation process.

From Glue Down LVP, we evolved to floating LVP and then WPC Products. With this, someone invented the term, "waterproof" flooring for the end user to dive headfirst into thinking their facility can flood and the flooring will miraculously be unfazed by disaster. If these "waterproof" floors are so waterproof, why are they suggesting subfloor moisture level requirements much less than standard LVP Adhesives, and the use of a 6-mil poly film beneath them on a concrete subfloor? After reading some manufactures warranties, the explanation of waterproof is - the structural integrity of flooring will not degrade due to contact with moisture/water. Bottom line, it will not degrade, but it could curl or cup and that will not be covered by the warranty.

Other issues that come with floating LVP and then WPC Products is exposure to sunlight. These products contain vinyl. Vinyl expands when exposed to sunlight which will cause it to physically distort. Many manufacturers of these products will warn you that - The use of drapes or blinds is recommended during peak sunlight exposure.

Subfloor flatness is another issue we encounter with floating floors. Some manufacturers went out of their way to say you can go over almost anything, but their subfloor requirements in the installation instructions say something quite the opposite and the subfloor requirements were no different than that of a floating Laminate or Hardwood floor.

Now, we have evolved into the SPC (Solid/Stone Polymer Core) category. These products have replaced the vinyl with Limestone and are supposedly not affected by sunlight or temperature changes. So, we have a Resilient Flooring product that can go in enclosed 3 Season Rooms. Cutting of these products became a little more challenging because of the density and hardness of the core material. They do not quite flex like the WPC or Floating LVT products. Although SPC products can see extreme conditions that some suggest Environmental Conditions should be maintained at -20°F - 140°F, you do not want to install at these temperatures. Installation temperatures should be 55° - 85°F or an average temperature of 70°F. These products will become very brittle at lower temperatures. The products are very dense and have an attached pad which is generally a foam pad or cork underlayment (1mm - 1.5mm thick). The use of additional underlayment's with products with an attached pad is not recommended and this greatly increases the deflection of the flooring product and can cause issues in installation as well as separation and joint breakage once installed and is not warranted in an installation with additional padding. The underlayment's themselves can react to moisture and sometimes with the adhesive used to install them.

With the development of Locking Floors came new locking systems, some which installers have no knowledge of. Today, we have the Unilin Locking System which is an Angle/Angle system and has been around for many years with Laminate and Floating Hardwood. The Välinge 2G Lock which is an Angle/Angle Lock used with Laminate and Floating Hardwood. The Välinge 5G Lock, the boards are locked on the long side with a traditional angling method. On the short side, when the flooring is folded down, a flexible plastic tongue is pushed into a tongue-groove. As the panel reaches its final position, the locking tongue snaps out into a wedge groove. A new Locking System has come onto the scene, the I4F Drop and Tap system which has many installers confused. The Planks are locked on the long side with an angling method. On the short side, the end joint is tapped into place using a rubber mallet. Each of these Locking Systems are slightly different from one another and if installed incorrectly, it will damage the lock and the joints will fail and open up. The Locking Systems on most of these products are very thin. They are not made to flex and bend, or they will break as they try to span over an uneven subfloor.

How large of an area can I install with these Floating LVP/WPC/SPC Floors. This number of allowable square footage varies greatly. I have seen numbers as high as up to 6,000 square feet, and some give no limitations. This square footage is generally meant for a large square or rectangular room, not an

entire space that has hallways and many doorways, which is where a floating floor will get pinched and create issues. I know no one wants a Multi-Purpose Trim piece in their doorways, but it breaks up the flooring installation and allows sections of the floor to move independently from one another. You should be treating these floors like Laminate Flooring and honor the required expansion zone. One piece or section that is fit too tight can cause a very large area to fail.

With all the categories of floating LVP structures, glue down LVP came out with underlayment's that would allow them to float the underlayment, and glue down the LVP to the underlayment. The best of both worlds, a glue down product that floats over the subfloor. These Floating Underlayment's can solve some issues, but they can also have their own challenges. Floating Underlayment's are generally held together with a Packaging Tape, and the tape sometimes can pull away from the Underlayment.

Floating Underlayment's can be made of dense foam, coated felt paper, and rubber. Not all Underlayment's are created equal. Crumb rubber or recycled rubber underlayment are not compatible with Vinyl Flooring Products (PVC); they react badly. The issue with Crumb and Recycled Rubber is that the PVC (Poly Vinyl Chloride) in the vinyl flooring and SBR (Styrene-Butadiene Rubber) in the crumb rubber underlayment are incompatible chemistries which react. This reaction can distort the vinyl material and instigate plasticizer migration, which will occur. Black Vinyl Foam Underlayment's use a carbon pigment for color. Adhesives do not like to stick to these materials. Cheaper is not always better. There can be adhesion challenges with other types of underlayment's as well.



This is a black vinyl foam underlayment where the adhesive just disappeared. The bubbles are from moisture in the slab which then buckled the LVP.

There are limitations to all these products. These underlayment's are not designed to cover up a bad subfloor even though a manufacturer may state that in their marketing piece, so read the subfloor requirements. The last I looked, they all still say Clean, Dry and Smooth. Subfloor must be flat to within 1/4" (some say 3/16") in a 10-foot span, no bumps or low spots. Subfloors should not slope more than 1" per 6 ft. You are only as good as what you go over.

You go over crap; you're going to have scrap. Float-

ing underlayment's should not be used in areas with rolling loads. If the underlayment has too much resiliency (cushion) you can have indentation issues not covered by a warranty. If the LVP is installed in an area with a moderate amount of sunlight, the LVP can expand and create buckling issues. The underlayment could be stable, but the LVP with exposure to sunlight is not, and it creates a failure as shown in the photos below. Read the instructions and the warranty of the floating underlayment. What is covered. How should it be installed, and what the limitations of the product are.



We are now starting to see a surge in PVC Free Flooring. These products feel and handle differently than Vinyl products. With many of these PVC Free Floors, you must use an Acrylic Wet Set Adhesive. As stated above, these Acrylic Adhesives have little to no working time if they go dry to the touch. PVC Free Flooring can react with residual plasticizer in the substrate from previously installed vinyl flooring adhesive and abatement chemicals, so your floor prep will be critical to the installation. Thank you, Tim.

**Lew's 2 cents**—The evolution of LVP has been a boom to the industry and a bane. At no time in the history of the flooring industry has one product so dominated and changed the landscape. So dominant is LVP, that everybody and their brother has jumped into the fray to grab a piece of the action. The market is flooded with all kinds of products and at lower price points which means there's a lot of flooring out there that won't keep the promises made by the people selling them. And quality is all over the place.

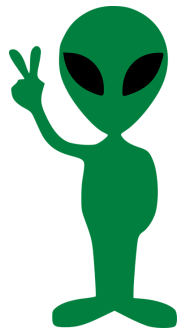
The problems with luxury vinyl plank and tile flooring are pervasive and of epidemic proportions. The question is not if you've had problems with these products but when you will. And make no mistake, you will. It's like playing Russian Roulette. Sooner or later the loaded chamber is going to come around and your going to get your brains blown out. The results of these failures may make you wish the pain was that fast.

If you have questions, need help or have a flooring failure that no one can figure out – we can – always. LGM & Associates can keep you out of trouble or let you know, credibly, what went wrong, why and how to fix it. There's no one else like us in the industry.



An example of the reaction between SBR crumb rubber underlayment and PVC vinyl plank.

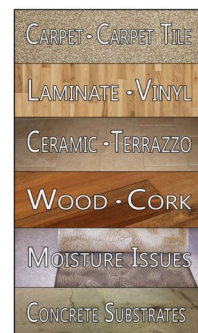
A saying from famed astrophysicist Neil DeGrasse Tyson, "Perhaps we've never been visited by aliens because they have looked upon Earth and decided there's no sign of intelligent life."



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