

## What are the causes for delamination of underlayments?

When underlayments and floor covering materials delaminate from the substrate, contractors are at a loss to explain what went wrong. Although they've followed the installation method that has always been successful for them, they cannot understand why the floor now sounds hollow or has cracked or why the flooring has 'mysteriously' popped up from the substrate.

Since floor coverings (and the substrates they're adhered to) don't have minds of their own, some investigation must be done. A good place to start is at the very beginning. Basically the problems center on three main areas: the type of substrate and its condition, its soundness prior to underlayment application, and how it was prepared to receive the underlayment and flooring material.

Concrete is the most widely used substrate and quite often calls for the application of self-leveling underlayments for its proper preparation before receiving floor covering. Unfortunately, with the shortened timeframes that contractors are asked to complete their installations, a few of the "concrete facts" may be overlooked. Remember, Rome wasn't built in a day.

Being pressured to adhere to a rigid time schedule is no excuse for applying self-leveling underlayments over green concrete (under 28 days old). There are too many cases where cracks caused by the normal volume changes that take place during cement hydration at early ages or in green concrete telegraphed through the underlayment. This process can sometimes cause the underlayment to shear from the concrete. Wait until the concrete has fully cured! Any static cracks present in the substrate after 28 days of curing should then be repaired with an approved cementitious product or epoxy before applying a self-leveling underlayment.

During the winter months, curing a concrete slab using a forced air heating system is quite popular. The exhaust these systems emit must be well vented. If not, a weak layer of calcium carbonate could result on the surface of the concrete as a result of a process called carbonation. This would be considered a bond barrier and should be removed prior to the self-leveling underlayment application. If the concrete shows any signs of spalling, scaling, delamination, crumbling, or laitance it must also be mechanically abraded or scarified down to a solid clean surface.

The removal of contaminants or weak concrete surfaces through scarification, shot-blasting or similar mechanical methods is preferred. Another popular method is acid washing (acid-etching). Although effective, it can be risky if the contractor cannot control and fully remove the contaminant to achieve

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proper neutralization. Any acid penetrating the concrete pores will affect the long-term integrity of the sub-floor. Our Technical Department has seen this a number of times from samples we have received of delaminated underlayments showing acid residue on the bottom (at the bond line between the underlayment and the concrete substrate). Typically, we recommend mechanically scarifying the concrete, testing for acid residue and then resurfacing with the desired underlayment system. Removal must be deep enough to eliminate all penetrated contaminants.

The questions received concerning wooden sub-floors and smooth, non-porous substrates (well bonded ceramic tile, VCT, VAT, and non-cushioned sheet vinyl) are not as frequent; however, many of the same recommendations are applicable. Wooden sub-floors must be solid, well attached, sound and designed not to deflect greater than  $L/360$ .

This is absolutely vital to the flooring's (self-leveling underlayment) success. When considering which self-leveling underlayment to use, be sure to follow the underlayment manufacturer's guidelines for preparing these surfaces.

Improper substrate preparation is the first factor to consider when dealing with a bonding problem. The successful application of a self-leveling underlayment will achieve a good bond between the substrate and underlayment or topping. The material selected will only be as strong as the surface to which it is bonded. This surface must be non-deflecting, sound, clean and free from oil or grease, wax, dirt, dust, paints, or any potentially bond-breaking contaminant. Asphaltic residue (cut-back adhesive) ideally should be thoroughly removed unless a particular self-leveling underlayment manufacturer has an approved system, including primer, for going over it. Follow the manufacturer's guidelines closely in these instances.

Concrete floors must be solid. Over-watered, frozen or otherwise weak concrete must be removed (scarified) to provide a sound base.

"Sounding Out" concrete before pouring an underlayment will demonstrate deficient areas. Additionally, concrete should be evaluated for moisture. Continuously damp concrete and/or concrete subject to a hydrostatic head can experience a bevy of problems. Installing a self-leveling underlayment under these types of conditions is just asking for trouble. Lightweight concrete floors may or may not be suitable for the installation of self-leveling underlayments or toppings. The best advice here would be to consult the particular underlayment manufacturer for applicable guidelines concerning lightweight (or gypsum based) concrete.

Finally, some underlayments manufacturers promote priming all substrates with a recommended primer in order to enhance the adhesion of the topping as well as reduce surface defects in the cured product (pin holing, etc.). Installing an adequate number of properly located test sites that include appropriate priming, underlayment, floor covering, and adhesive will always yield valuable information about the anticipated adhesion and compatibility between the substrate and specified system.

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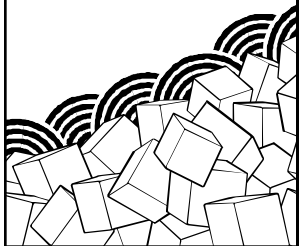
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Even though substrate preparation is the primary focus of a delaminated underlayment and floor covering problem, the mixing and application of the self-leveling product is equally as important. Follow the manufacturer's literature when working with these types of materials.

Self-leveling underlayments have experienced healthy employment in the floor covering and concrete resurfacing industries. More and more contractors are embracing this technology and are making self-leveling underlayments a way of life for substrate preparation. Paying close attention to the characteristics and physical condition of the substrate will help in material choice, substrate preparation and underlayment application.

Don't let improper planning ruin an otherwise successful installation.



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