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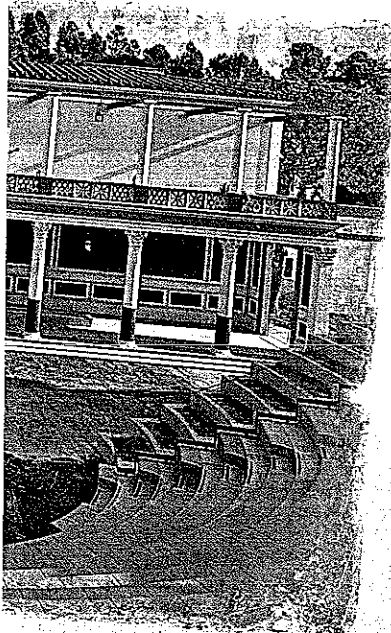
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September/October 2007

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Choosing Substrates and Installation Systems
Setting the Record Straight on Cork Underlayments



Setting the Record Straight on Cork Underlayments for Sound Control

By Larry Lyons

Sound control for hard surface flooring in multi-family construction can be a complicated and contentious topic. With the large number of condo projects being built over the last few years and the increased interest in “downtown living,” even in smaller urban markets and in suburban areas, there has been increased attention focused on this issue.

This increased attention has brought many new manufacturers and technologies to the market, in the category of “sound control underlayments for hard surface flooring” applications. Because composition cork products have been

species. For the purposes of this article, all references to cork will relate to the properties, harvesting techniques and processing of the European species of cork, *Quercus suber*.

The unique natural qualities of cork make it a most effective material for the control of impact sound transmission in hard surface flooring applications. The physical structure of cork, with nearly 200 million completely sealed air-filled cells per cubic inch, makes it a very effective acoustic insulating material. This same physical structure also provides cork with the ability to be repeatedly compressed and yet recov-

same. Just as you would not choose the least expensive grade of plywood for an underlayment application, one should not choose a “cork” product based solely on cost. The quality providers of cork underlayments, like AcoustiCORK and WE Cork, have very specific standards for their underlayment products. The particle size, density (weight per cubic foot), binders and compression and recovery characteristics are very carefully controlled for these products. The result is products that are consistent from one run to the next and that deliver consistent performance in the field. These products have documented

The granular structure of cork underlayment provides the function of crack suppressing, by allowing the sub-floor and the tile to move, in plane, at different rates. A qualified cork underlayment product combines the resilience necessary for acoustical performance, with the structural stability required for direct bond tile applications. Many millions of square feet of cork underlayment products have been successfully installed under tile and a wide variety of other finished flooring materials in projects all over the world.

used successfully for many years in these types of applications and represent the single largest share of the market in direct bonded applications, cork is often the target of competing manufacturers. In the interests of leveling the “playing field,” I would like to provide a few facts, just to set the record straight.

The material that we know as cork consists of the bark of the cork oak tree. The European variety has the species name *Quercus suber*. There is also a distant cousin of the European cork oak grown in China and other parts of Asia with the species name *Quercus variabilis*, also known as the Chinese cork oak. Although the fleshy bark is referred to as “cork,” the Chinese cork material has very different properties than the European

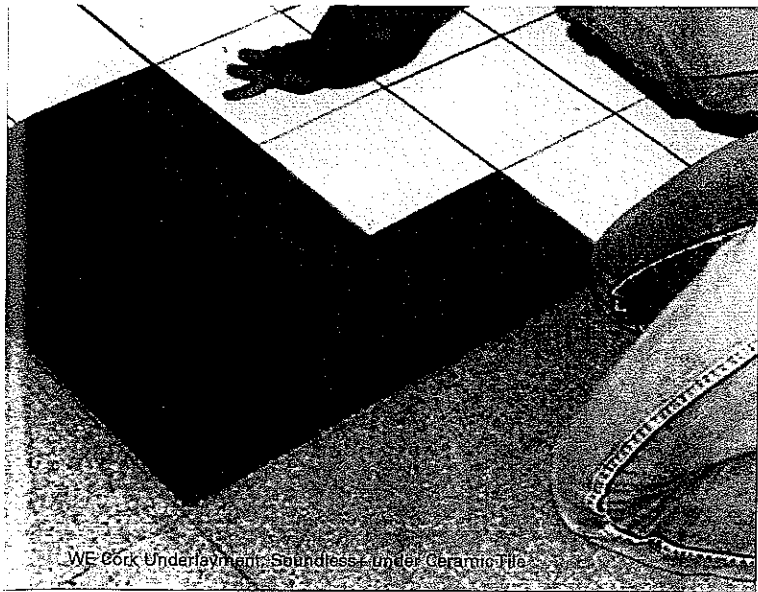
or nearly 100% of its original shape and size. These combined benefits make cork an ideal and time-tested choice for sound control underlayment applications.

In addition, the granular structure of cork underlayment provides the function of crack suppressing, by allowing the sub-floor and the tile to move, in plane, at different rates. A qualified cork underlayment product combines the resilience necessary for acoustical performance, with the structural stability required for direct bond tile applications. Many millions of square feet of cork underlayment products have been successfully installed under tile and a wide variety of other finished flooring materials in projects all over the world.

Contrary to popular belief in some circles, all “cork” products are not the

Sound Test data, as well as Robinson Wheel testing and Shear Bond testing that certifies their performance and suitability for tile applications.

These types of products comply with the product definition for cork underlayment noted in the ICNA Installation Handbook detail F-135-07. When you specify or install products manufactured to these exacting standards, you get a product that is designed to deliver the maximum impact noise reduction benefit, retain its dimensional stability and last through decades of service, in both residential and commercial applications. With that being said, there are a number of generic imitators providing “cork underlayment” to the market that do not meet those same standards. To create these

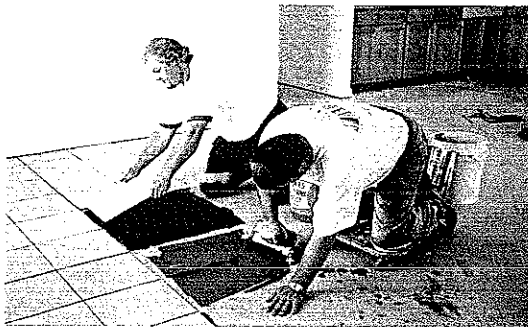


WE Cork Underlayment: Soundless Under Ceramic Tile

price point products, the manufacturers/importers often reduce the density (cork granule content) beyond the levels defined in F-135-07 or bring in products from China that are not the same species of material as European Cork. These types of products should be avoided, particularly for direct bond tile applications.

Since cork underlayments have been successfully used in sound control applications for decades, they are the target for many manufacturers of different technologies who cite "superior acoustical performance over cork." All types of claims are made in advertising and marketing materials; mostly based on manipulated installation techniques, the use of elaborate suspended ceiling

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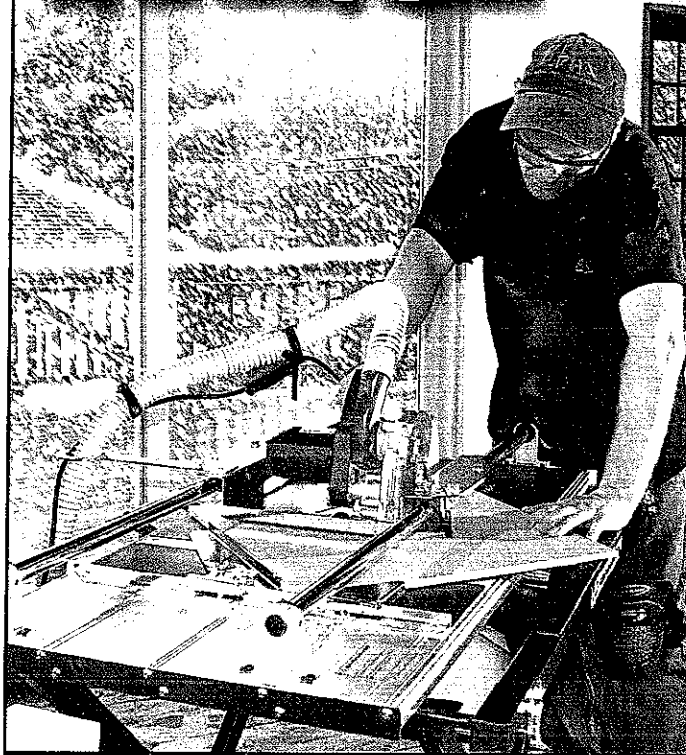


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assemblies, field test data from very favorable sources or installations, loose interpretation of test data and/or comparison of test data that is not based on the same types of construction details. There are even some manufacturers who have had their underlayment tested for IIC performance, without a floor covering installed over it, just to have the highest possible number to put on a product data sheet. On a millimeter per millimeter thickness comparative basis, a quality acoustical grade cork underlayment is as, or more effective, in impact (IIC) sound reduction than any other material on the market

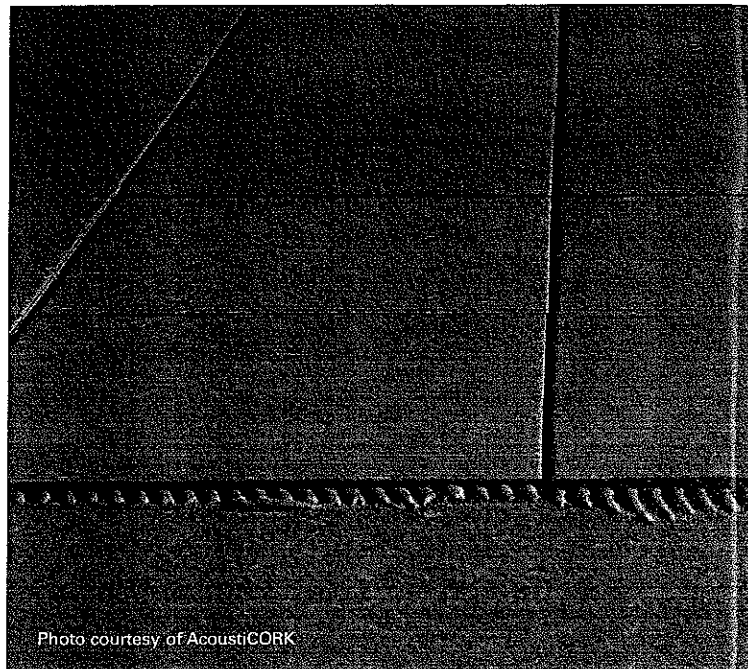


Photo courtesy of AcoustiCORK

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28 | TileDealer September/October 2007

The 2007 ICNA Handbook has an advisory regarding Sound Rated Floors (pages 77 & 78) As one of the primary authors of this industry consensus document, I can attest to the quality of information that it provides. In addition, if you would like more information on the topic of Sound Rated Floors, I would suggest checking out the AIA-CEU course that our company provides on the topic, which is hosted on the website www.AECDaily.com. It is an objective look at the topic, the code issues, the challenges in meeting the code requirements in different construction details, and the range of solutions available, with their relative strengths and weaknesses. The course meets the AIA guidelines and is not an "infomercial" for our products

Cork also has some environmental benefits that most other products cannot match. It is a truly renewable and sustainable resource. Unlike solid wood, composite wood products, paper and other renewable resources; no trees are cut down to make cork products. In fact, cork oak trees in Portugal, Spain and most other producing countries in the Mediterranean area are protected by law. To harvest cork, the bark is stripped from about 1/3 of the tree every 9 to 12 years. This process actually enhances the life span of the tree. The manufacturing process of cork products also produces a near zero waste stream and results in no toxic emissions.

Cork products meet many of the key criteria of the organizations that promote and support green building initiatives. The use of qualified cork products in a project can help it qualify for credit points under the LEED™ GREEN BUILDING RATING SYSTEM in the following areas:

Photo: AcoustiCORK

Common Misconceptions

Cork is a highly misunderstood material in the US market. Since it has an appearance similar to particleboard in some ways, many people assume that it has similar characteristics. We'd like to take this opportunity to dispel any misconceptions.

Cork will absorb water like a "sponge" if it gets wet.

Incorrect. Think of the most common use for cork, wine stoppers. Cork has been used for wine stoppers for hundreds of years primarily because it does not absorb water or liquids. Cork has also been used for years in buoys, lifejackets and other floatation devices, again because it does not absorb water and can remain buoyant for years. A cubic inch of solid cork immersed in water for 48 hours will gain less than 3% in weight due to water absorption. A cubic inch of solid wood or unglazed clay-bodied ceramic tile would gain many more times this percentage in weight of water if immersed for 48 hours.

Composition cork material will fall apart if it gets wet after it has been installed.

Incorrect. That may have been the case over 25 years ago when animal protein binders were used, but not anymore. Since the early 1980's non-water-soluble polyurethane binders have been used to adhere the granules together to make quality composition cork products. These polyurethane binders also produce no post-installation off gassing and do not leach into ground water supplies. Products constructed with these types of binders can be totally immersed in water for 30 days or more and show no signs of structural deterioration.

Cork will "swell" with exposure to moisture and cause finish floor coverings to fail.

Incorrect. Because cork absorbs so little water, it is very dimensionally stable. When exposed to 100% Relative Humidity conditions for 30 days the dimensional change in the grade of materials used to manufacture certified underlayment-grade product is less than 3%. In a 6mm thick piece of material this would represent an increase in thickness of less than 1/120 of an inch.

Cork will compress and crumble under heavy loads and traffic.

Incorrect. Unlike open or even close-celled synthetic foam materials, cork consists of an interlocking structure of 14-sided polygons called tetracadehedrons. These totally sealed gas-filled cells have a very tough outer surface that is almost impossible to break. Because of this unique natural attribute, cork has a compression/recovery rating of close to 100%. Unlike many foam and fiber-based products, it will not collapse over time with traffic. The binders used to adhere the granules of certified underlayment-grade cork products together are designed to create a permanent structural bond between the particles.

Cork will support the growth of mold and mildew if used in a moist environment.

Incorrect. Going back to the traditional use of cork in wine stoppers, solid cork is used for sealing fine vintage wines precisely because it does not readily support the growth of mold and other biological agents that can cause spoiling of the wine. Additionally, the granules of cork used to make certified underlayment-grade products are coated with a polyurethane binder, which enhances their natural microbial resistance.

"Cork is cork" and all cork underlayment products are the same.

Incorrect. Properties such as density, particle size and consistency of particle size are very important and vary widely from one manufacturer to another. Density affects the structural stability of the product and the sound attenuation quality. A product that lacks density will be too delicate to use as an underlayment and a product that is too dense will have poor sound attenuation characteristics. A product that has too large of particle size or a wide range of particle sizes in the mix may lack the structural integrity to be effectively used as an underlayment.

- MR 4.1 5% Recycled Content of total building materials (post consumer + ½ of post industrial)
- MR 4.2 10% Recycled Content of total building materials (post consumer + ½ of post industrial) (Most cork products are approx. 85%+ post industrial recycled content by weight)
- MR 6 Specifying rapidly renewable building materials for 5% of total building materials
- MR 7 The Use of a minimum of 50% of wood-based materials certified in accordance with the Forest Stewardship Council guidelines.
- EQ 4.1 Low Emitting Materials Adhesives & Sealants (Adhesives Specified meet SCAQMD Rule 1168)
- EQ 4.4 Composite wood or agri-fiber products must contain no added urea-formaldehyde resins.

In addition, some suppliers can now offer 100% FSC certified (chain of custody) material for specific projects or applications.

Successful sound control applications require the presence of a resilient material in the floor assembly to attenuate IIC (Impact) Noise. A quality cork underlayment can provide the resilience required for code complaint IIC noise reduction and the stability required for a responsible and quality tile installation. Different types of assemblies have different types of needs, and there is no single product or solution that is appropriate for all types of assemblies. For the best results, look for a manufacturer who can supply acoustical testing data that most closely matches the floor covering choice you will be installing and the construction detail that the materials will be installed in. Many suppliers have only one tested assembly that may not correlate well with a real world installation. If they do not have a tested assembly that best approximates your conditions, you may be better served finding a supplier who does. ❖

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