

ECO-FLOORING

Sustainable & Innovative

a comprehensive exploration



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Hempcrete & Hempwood



Image 1: Hempcrete - image via boheco.wordpress.com

Image 2: Hempwood - image via hempwood.com

Hemp isn't yet as ubiquitous as other building materials, and it's relatively expensive and not readily available, but the future of hemp is still very bright.

- Because the hemp plant is mildew and pest resistant, farmers don't need much fertilizer or pesticides. It also requires little water to thrive. Also, hemp grows to maturity in six months, unlike trees, which take years to harvest.
- Hemp can be used in the manufacture of various items, including plastics and biofuel. It can be used as a sustainable flooring material as well.
- Hempwood is the most sustainable lumber product on the market. It's harder than oak and twenty percent stronger. The facilities used to make hempwood are reusable, making this an eco-friendly alternative to traditional building materials.
- Hempcrete is incredibly strong, cheap to manufacture, and moisture resistant, making it an ideal flooring material. Traditional concrete is everywhere, but it's quite expensive and we use a lot of it. Replacing it with hempcrete promotes environmental sustainability.
- Hempcrete can be 3D printed, reducing construction costs and time.

Materials: \$9 to \$11 per square foot

Labor: \$6 to \$9 per square foot

Source numbers: 5, 6, 7, 8, 9, 10

Bamboo



Bamboo flooring example - image via commons.wikimedia.org

Bamboo flooring is a grass that grows much faster than trees. It's another wood-like option that is long lasting and easy to care for, and it comes in a variety of colors. Bamboo is becoming increasingly popular as a building material, and it's a sustainable choice.

- Bamboo reaches maturity in about five years, whereas traditional sources of wood can take 50+ years to harvest.
- The smoothness of bamboo makes it ideal for people who suffer from allergies because it doesn't collect dust, and it's simple to clean with a broom.
- The process of carbonizing bamboo darkens its color without introducing harmful stains. Plus, bamboo comes in many grain design styles depending on the process used to manufacture the planks.
- While bamboo is resistant to moisture, humidity can cause the planks to crack and warp. Dehumidifiers can counteract this problem.

Materials: \$3 to \$12 per square foot

Labor: \$6 to \$9 per square foot

Source numbers: 1, 3, 4, 5, 11

Linoleum



Linoleum flooring example - image via homeadvisor.com

Many people assume that all linoleum is made from plastics and vinyl, but it can be made from natural materials, including linseed oil, cork dust, tree resins, wood flour, and ground limestone. Linoleum was once common, and it's regaining its popularity as a renewable and cheap flooring material because it can be made from materials that are nontoxic and durable. Linoleum comes in beautiful colors and patterns and won't off-gas. It also has anti-microbial benefits.

- Linoleum is naturally waterproof due to its sheeted design, making it easy to clean.
- Because the color of a linoleum sheet is consistent throughout, scratches and small gouges can be buffed out and resealed without significantly changing its appearance.
- Because the raw materials are natural, linoleum is biodegradable.
- Most linoleum warranties last upwards of 25 years, and with proper care, linoleum can survive for 40 years or more.

Materials: \$1 to \$7 per square foot

Labor: \$2 to \$7 per square foot

Source numbers: 1, 2, 3, 5, 12, 13

Cork



Cork flooring example - image via worldfloorsdirect.com

Cork flooring is newer than some other flooring materials. It comes from the bark of cork oak trees, and it makes for a lovely kitchen. It has a natural bounce, so it's easy to stand on while cooking for hours. Cork isn't as water resistant as other flooring options, and it needs special treatment to increase its longevity. In spite of the upkeep challenges it poses, it's eco-friendly and inexpensive.

- Cork flooring is a great insulator for colder climates, and it acts as a sound insulator in cavernous rooms, reducing echoes.
- Its material cost is similar to bamboo, but DIY cork installation is easier than bamboo, reducing installation costs.
- Cork is naturally pest resistant thanks to the compound suberin, a hydrophobic wax on the cork cell walls.
- While it's easy to install and clean, cork needs to be resealed periodically to maintain its water and stain resistance. Spills must be wiped up immediately as well.

Materials: \$3 to \$14 per square foot

Labor: \$2 per square foot

Source numbers: 1, 2, 3, 5, 14, 15, 16

Reclaimed Hardwood



Reclaimed white oak - image via bluebonnetinbeantown.blogspot.com

The boom in rustic design has made reclaimed hardwood very desirable. It creates a look that is both comforting and historic. Old hardwood is durable because it often came from the heartwood of older trees, which is harder than wood from younger trees. In contrast, monoculture forests planted simply for lumber aren't nearly as resilient to fire and pest infestations. Nor do they absorb as much carbon from the air or release as much oxygen as natural forests. These trees can take hundreds to thousands of years to produce this quality, so it can be expensive and hard to find, but it's often worth the extra effort.

- Installers can reclaim hardwood from old buildings and fences. Some companies harvest old hardwood submerged in lakes and rivers, reimagining this valuable resource.
- Tropical hardwoods like teak, mahogany, and rosewood are endangered, and the harvest of such woods contributes to deforestation. It's best to avoid hardwoods not grown domestically.
- Old hardwood flooring is in high demand nowadays. Local lumber and salvage yards can be goldmines for enterprising hardwood salvagers.

Materials: \$6 to \$15 per square foot

Labor: \$5 to \$8 per square foot

Source numbers: 1, 3, 4, 17, 18

Recycled Glass

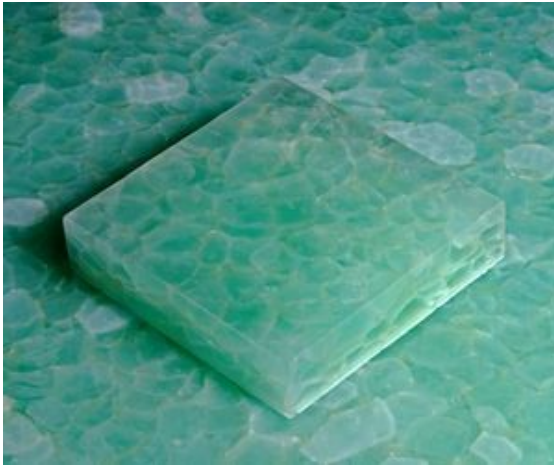


Image 1: Recycled glass tile - image via cmwmaintenance.com

Image 2: Recycled glass concrete flooring - image via houzz.com

Flooring made from recycled glass bottles is beautiful, easy to care for, and resistant to mildew. Glass tiles come in an array of colors that reflect light, giving a room an attractive glow. Glass shards can also be mixed with concrete to create a smooth, uniform, water-resistant flooring for bathrooms or kitchens. These attractive floors are worth the extra work required for installation.

- One of the biggest benefits of recycled glass is the reduction of waste in landfills.
- Cleaning glass tiles is as simple as sweeping or wiping down with a cloth.
- Glass tile is one of the most expensive flooring materials to install, especially if laid in a mosaic style.
- Cracks in these tiles pose a potential risk because they behave just like cracks in a broken cup or window. Replacing individual tiles can also be tricky.

Materials: As little as \$8 per square foot, but likely \$30 to \$40 per square foot. Mosaics can cost \$100 per square foot

Labor: \$7 to \$24 per square foot

Source numbers: 3, 5, 19

Ceramic Tiles

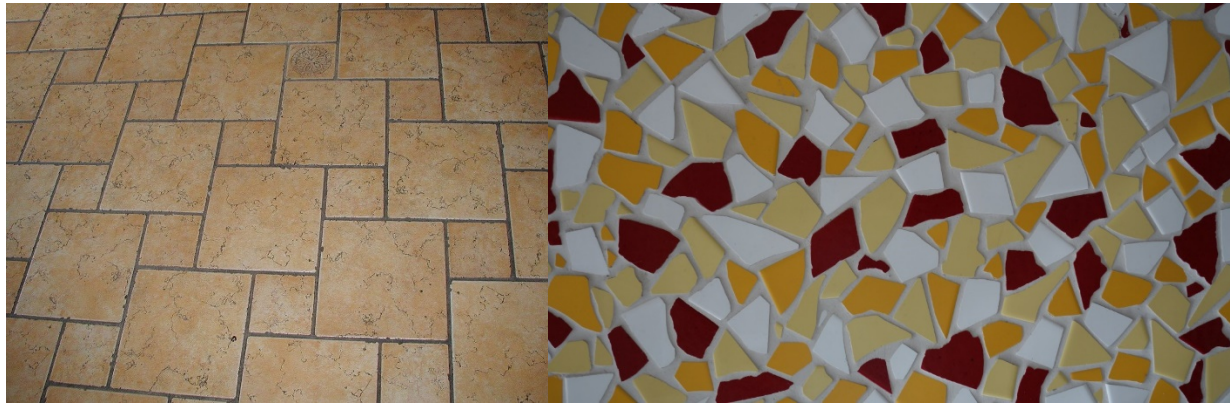


Image 1: Reused ceramic tile pieces - image via pxhere.com

Image 2: Ceramic tile flooring example - image via simple.wikipedia.org

Ceramic tiles usually aren't sustainable, but green manufacturing and recycling can make it a durable choice. They can be glazed to meet a variety of design needs. They are resistant to dirt and staining, and they don't require heavy detergents to clean. Best of all, no trees or plants need to be harvested in the production of ceramic tiles. Typically, ceramic tiles work best in bathrooms and kitchens, but they can be adapted for any living space.

- While no plants are required to make ceramic tiles, firing the clay is an energy-intensive process.
- Much like glass tiles, the installation costs and time can be high.
- Ceramic clay is typically not recycled for purity reasons, so if you want the most sustainable and environmentally friendly ceramic, purchase from a manufacturer that uses recycled materials.
- Local salvage and recycled-materials warehouses typically have large tile sections for any use.

Materials: \$5 to \$7 per square foot

Labor: \$7 to \$12 per square foot

Source numbers: 3, 5, 20, 21, 22

Concrete



Sealed concrete floor - image via Brett and Sue Coulstock on flickr.com

Concrete remains one of the most earth-friendly products on the market. Made from limestone and other waste products, concrete is the most abundant minerals on the planet. Many people make mosaics or place other decorative features in concrete while it's still wet. Its sleek, industrial look is popular, and it's also easy to clean.

- One of concrete's biggest selling points is its ease of installation. A single-pour installation increases cost and prep time significantly.
- Much like glass or ceramic, it's easy to care for, and it resists water, stains, and pests.
- If concrete experiences drastic changes in temperature, it can crack. Installing radiant heating with the concrete can reduce cracking.
- While concrete is hard to walk on, it's great for furniture that damages other types of flooring.
- The resource cost of concrete is high, given the machines needed to collect limestone and the plants needed to mix the materials.

Materials: \$2 to \$6 per square foot for a basic design. \$7 to \$14 for a mid-range design.
\$15 to \$30 for a high-end, customized floor

Labor: \$3 to \$12 per square foot

Source numbers: 1, 3, 23, 24

Natural Stone



Marble flooring - image via commons.wikimedia.org

People have been using natural stone like granite and sandstone as a building material for millennia. Quarries have become much greener over the past decades, and they are often turned into parks once the material has been mined. Natural stone doesn't require petroleum products for binding, and it's completely recyclable. It lasts a long time and comes in a variety of beautiful colors and textures.

- Like concrete, natural stone is smooth and durable, and it comes in a variety of designs. Unlike concrete, however, it doesn't require mixing, making it slightly more eco-friendly.
- The complete naturalness of stone gives each piece a unique look.
- The durability of natural stone varies by type. Some natural stone chips easily and is difficult if not impossible to repair.

Material: \$5 to \$10 per square foot

Labor: \$4 to \$12 per square foot

Source numbers: 25, 26, 27, 28, 29

Rubber



Rubber flooring tile example - image via thespruce.com

Rubber flooring made from recycled tires has become increasingly popular in bathrooms and kitchens in recent years. It's easy on the knees and ankles, and cleaning it is simple. It comes in a variety of colors and designs, and it's exceptionally versatile. Recycling old tires also reduces landfill waste.

- The natural cushion of rubber flooring makes it ideal for home gyms, standing offices, or any other activity that demands foot comfort and grip.
- Rubber flooring is naturally resistant to water, although cracks in its surface can promote microbe growth and reduce its lifespan.
- Though rubber can be gouged and torn, replacing tiles or even sheets is fairly simple.
- Cleaning rubber is easy and quick, but avoid acidic substances, turpentine, or acetone-based cleaners, which wear away the rubber.

Materials: \$2 to \$10 per square foot

Labor: \$6 to \$7 per square foot

Source numbers: 2, 3, 30, 31, 32

Recycled/Sustainable Carpet



Wool carpeting - image via [freebie.photography](https://www.freebie.photography)

Carpet is one of the most common flooring materials for homes. It's manufactured from various materials and compounds, which means that it can be hard to know which carpet is eco-friendly. Some carpet manufacturers use both recycled materials and recycled carpets as the base for new carpet rolls. A new carpet material called Sonora SmartStrand is made with corn sugar, and it's much more durable than PET polyester. Materials like wool are even more sustainable, and their increased durability makes up for their increased cost.

- Plastics such as vinyl, PET, and nylon can be recycled into carpet fiber pads, making for a firmer design than traditional carpet.
- Most "recycled" carpets aren't 100% recycled. Some companies, such as Interface, blend old carpet backing with vinyl to create a more recyclable end product.
- Nylon is the most sustainable of synthetic carpet fibers (as compared to polyester and olefin), and it has the best wear resistance as well.
- Due to its natural elasticity, wool carpeting can last a lifetime if cared for properly. It's able to recover much better from furniture compression and pulling. However, it's likelier than synthetic fibers to hold stains permanently.
- While less appealing for home spaces, carpet tiles are a great way to reduce waste because less material needs to be cut to fit a room and to replace damaged sections.

Materials: \$2 to \$15 per square foot for synthetic fibers. \$5 to \$26 per square foot for wool fibers

Labor: \$7 to \$12 per square foot

Source numbers: 3, 5, 33, 34, 35, 36, 37, 38, 39, 40

RADIANT HEAT TO REDUCE ENERGY USE



An example of hydronic radiant heating - image via tingeypumbing.com

The natural rise of heat is the principle behind radiant heating flooring systems. Using electric or hot water pipes buried under a floor is a much more energy efficient way to heat a home than forced-air heating systems. A traditional heating system might make your head feel warm, but it usually leaves your feet feeling cold. Because radiant heating warms surfaces, those surfaces don't steal heat from your body. Such systems maintain a steady ambient temperature. There are a variety of products and companies to choose from. While it's more expensive to install, the energy savings over time more than make up for up-front costs. It's typically better if installed in a new floor rather than a renovation.

- There are two main systems for radiant floors: electric and hydronic (water).
- Electric options (e.g., wire grids) have a smaller profile than hydronic heating. This allows for a more subtle rise in floor height, but it requires more energy to heat cables, so it isn't recommended for heating an entire house.
- For wooden floors with an accessible subfloor, a hydronic system can be installed on the underside of the floorboards to reduce building costs and damage.

Sanding & Refinishing Existing Hardwood Floors

In older homes and apartment buildings, new floor coverings such as carpet or linoleum often hide beautiful original wood floors. That wood often comes from old-growth trees, and it retains its value over time. Simply refinishing original floors may be the most eco-friendly and the least expensive DIY option for flooring. That said, there are other factors to consider.

Newer coverings are applied with adhesives. The first step to refinishing original wood is sanding off the adhesive and any previous stains or finishes. Before sanding, determine the thickness of the wood because it may have been sanded repeatedly over the years. If you are confident that the wood is at least $\frac{3}{4}$ ", you can begin stripping. A DIY-er typically pays \$300 to \$400 per day to rent a sander. Sanding creates much dust, so be sure to wear a high-quality respirator. You should also consider how humidity will affect the new finish. Experts recommend that you refinish on a low-humidity day.

The next step is applying the stain or finish. There are several sustainable products on the market. When deciding on a product, consider the space's expected foot traffic. For low-traffic areas, all-natural products like linseed or beeswax yield beautiful results and no fumes. For high-traffic areas, various vendors offer earth-safe oil- and water-based finishes. For an even look, refinish an entire home or apartment all at once rather than room by room. The whole process can usually be finished within a few days.

If you're lucky enough to have hardwood flooring hiding in your home, consider refinishing the wood to save time and money on your DIY project.

Stain: \$80 a gallon

Labor: \$50 to \$90 to cover 700 square feet for a DIY job. \$600 to \$900 per 700 square feet if paying for a professional

Source numbers: 45, 46

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