

DECKING LUMBER OPTIONS



If you are thinking of building a deck, you face many choices including what decking boards to use. There are many factors to consider, and there is no perfect option. Considering the pros and cons of each product will help you decide which decking board to use.

This fact sheet briefly describes each type of decking material and discusses some of the pros and cons of each. Some of the important factors in choosing decking boards for your project include price, availability, construction flexibility, maintenance and environmental impact. Each of these factors will be addressed in the discussion of each material.

There are three main types of boards that can be used to make decks: preservative-treated wood, naturally durable wood and wood/plastic composite (WPC) lumber. Untreated, non-durable wood such as pine is not recommended for building decks. In some parts of the country untreated wood can last for a few years; but in the warm, humid climate of Tennessee, untreated wood will quickly rot and won't last long enough to justify any cost savings.

Treated wood

Preservative chemicals can be added to otherwise susceptible wood to make it resistant to decay fungi (rot) and insects. Wood protection treatment is achieved by forcing chemicals deep into wood using a combination of vacuum and pressure. Pine is often used for this in the southern United States because it is strong, inexpensive and is usually well penetrated by the chemical solutions. The result is treated wood that is protected from rot and fungi for many years. Preservative-treated wood for decking is widely available at most retail outlets. It is often green in color. Many people are familiar with it because it is so commonly used. Brand names for treated wood include Yellowwood, Preserve and Wolmanized lumber.



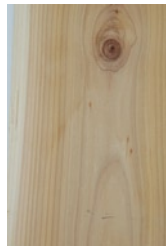
*Preservative-treated
Southern pine*

You have many options when choosing lumber for a deck.



Naturally durable wood

Some tree species grow wood that is naturally resistant to attack by insects and fungi. This durability is due to chemicals deposited in some parts of the tree (the heartwood) as it grows. Redwood, cypress and cedar are examples of species with naturally durable wood. It is important to note that only the heartwood (the inner-core wood from the living tree) is durable; the sapwood of all species is susceptible to rot and insect attack. The heartwood in most naturally durable species is darker in color than the sapwood, which is generally white or tan.



Western redcedar — a naturally durable wood

Wood/plastic composite (WPC) lumber

WPC material is a combination of wood flour (or other natural materials such as rice husks) and plastic shaped into decking lumber.

WPC lumber is a relatively new product and is often better known by its various brand names: e.g. Trex, ChoiceDek, Eon or Smart-Deck – or as composite lumber. Lumber made entirely from plastic with no wood flour added – plastic lumber – is also available but is not as commonly used for decking projects. WPC lumber can be manufactured in a variety of colors, shapes and sizes and with different surface textures.



An example of wood/plastic composite decking

Factors to consider

Cost

For many people, price is the single most important factor. Prices continually change, but in general treated wood is the least expensive option, while WPC is the most expensive. There are a variety of naturally durable woods available; and some, particularly imported species, may cost even more than WPC products.

Because many people are not yet familiar with working with WPC, there may be a slightly higher cost for installation. However, after installation, it may require less maintenance than wood (see Maintenance below).

Availability

Treated wood is the most common decking material, and it is widely available in many dimensions. WPC lumber is also becoming widely available, but retailers usually carry only one manufacturer's brand. If you are looking for a particular type or color of WPC, you may have to shop around. Naturally durable wood is a less common choice for decking. While many retailers carry it, the dimensions or species that you prefer may have to be ordered.

Maintenance

This is another very important factor for many people. In truth there is no maintenance-free option, but the requirements vary with both the products and your expectations for the look of the deck over time. Research suggests that many decks are removed from service after only a few years because they look bad. But beauty is in the eye of the beholder, and different people will accept different looks for their decks.

For treated wood and naturally durable wood, general



Only the heartwood of naturally-durable species is durable. In this eastern redcedar post, most of the light-colored sapwood has been destroyed by insects and decay. The reddish-colored heartwood portion is still sound.

recommendations are to maintain a water repellent finish on the surface. This slows the wetting of the wood that can lead to surface cracks (checking) and warp. These finishes should usually be reapplied every one or two years. Wood changes color when exposed to sunlight, and decks can get dirty over time. Some people will also use a deck wash (a chemical treatment) to improve the look of the wood before applying a new finish.

WPC lumber has a reputation for being maintenance-free, but this is overly optimistic. Although it doesn't require refinishing, WPC materials do fade after exposure to sunlight, get dirty and require periodic cleaning.

Convenience/Ease of Installation

Many people are familiar with working with wood. For this reason, some people will find installing treated wood or naturally durable wood easier than installing WPC decking, which is heavy compared to wood. In most ways, however, all three decking types are installed in a similar manner. WPC materials are generally screwed together and can be routed like wood. With treated wood, brushing additional preservative onto cut ends to maintain the "envelope" of protection is recommended.

Wooden decking surfaces should be planed, with the edges smoothed to avoid splinters. These steps are normally performed in the manufacturing process. WPC does not splinter, but it is not as stiff as solid wood lumber. Thus, special construction methods, including the use of wooden framing, may be required under a WPC deck. On the other hand, this flexibility can be an advantage; WPC lumber can be bent on-site to make attractive patterns. It is

available in a number of different colors while solid wood can be stained to change its color.

Special corrosion resistant fasteners should be used with all decking materials. These include galvanized, ceramic coated or stainless steel screws and nails. The new preservative formulations are very corrosive to some metals, so it is especially important to use suitable fasteners with treated wood. However, durable fasteners are also important when installing naturally durable wood or WPC lumber to avoid rusting and discoloration.

Health & Safety

People often wonder if it is safe to let children crawl on treated wood or whether it is OK to walk on treated wood with bare feet. These are reasonable concerns; after all, preservative treatments in effect poison the wood in order to protect it against fungi and insects. However, treated wood has been used for many years in residential decking, and there is no evidence that it is dangerous, either to work with or when installed. Despite this long history of safe performance, the wood preservative industry



Corrosion of galvanized steel hinge attached to ACQ-treated wood. New preservative formulations can be very corrosive to metal. It is important to use the recommended fasteners when building a deck.

recently withdrew the most widely used wood preservative — chromated copper arsenate (CCA) — for decking applications amid concerns over the presence of arsenic in the environment. New treatments, which do not contain arsenic, have been developed as substitutes for CCA. These treatments — copper azole” or alkaline copper quat (ACQ) — contain copper and other biocides, leave the wood with a green color and are usually used with pine lumber in the southern United States. There is no reason to believe these new chemicals will not be as safe as the traditional, treated wood products.

People are generally less concerned with the safety of naturally durable wood or WPC products, and there is no reason to suspect that any of these decking materials are unsafe. Wearing gloves and eye protection when working with treated wood are the same safety precautions that are recommended when installing naturally durable wood and WPC lumber. Naturally durable wood contains (naturally occurring) poisons that protect the wood. Sawdust — including that from WPC lumber — can be irritating to your lungs or skin.

Durability

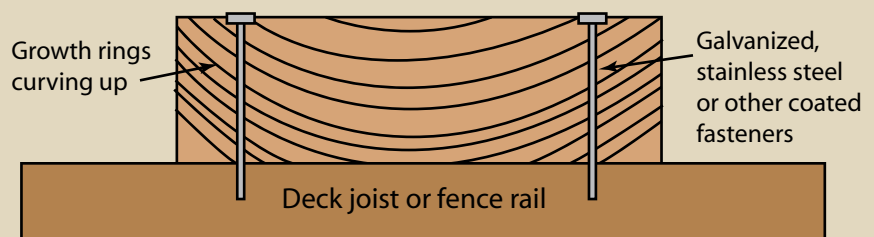
Building a deck can be an expensive and time-consuming project. Once built, most owners want their deck to last forever. A number of factors will determine the longevity of your deck, but each of the decking materials discussed here should provide many years of satisfactory performance.

Treated wood and naturally durable wood have long histories of proven performance. As mentioned, there have recently been changes in the preservatives used for treating wood, but testing indicates that these new products

Installing wood decking

Wood is a good choice for building decks or fences. Either preservative-treated or naturally durable woods can provide years of performance because they resist attack by insects and wood-rotting fungi. However, research shows that many decks are removed after only a few years — not because they are rotten but because they look bad. There are a couple of simple things that can help preserve the good looks of wood exposed outdoors and, thus, increase the longevity of a deck.

Wood outside is exposed to periodic wetting and drying. This can result in surface cracks (checking) that look bad to many people. A simple way to reduce the risk and severity of surface checking is to install the boards with the bark side down (see Figure). Wood’s natural tendency is to shrink and swell unevenly, and in flat-sawn lumber this makes boards cup toward the side that was closest to the bark side of the log. Orienting deck or fencing boards with the growth rings curving upward or outward means that the board will try to cup toward the back. The result is less checking.

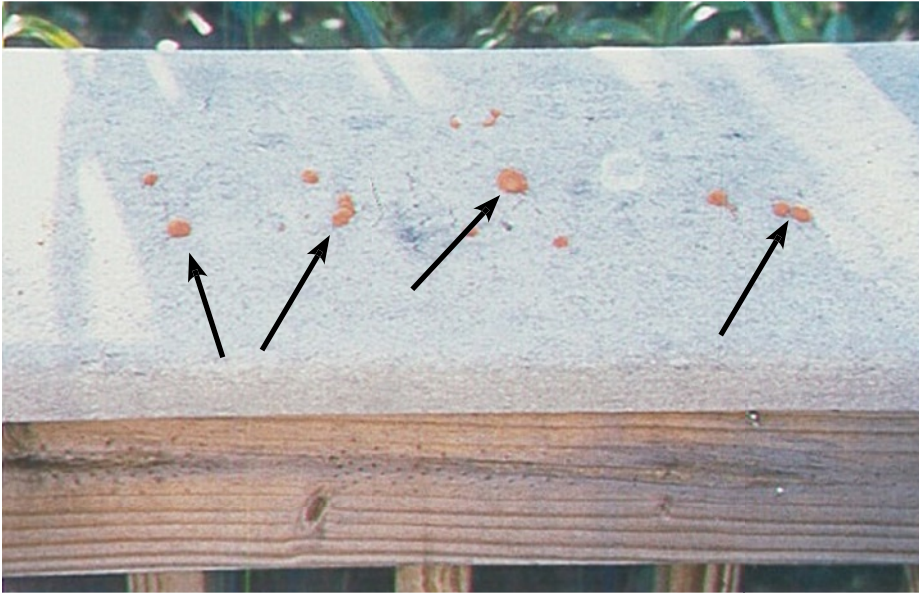


Suggested orientation of a deck or fence board, with the barkside down

Using recommended types of fasteners will help maintain the good appearance of wood decks or fences. Hot-dip galvanized, stainless steel and other coated fasteners are available. This is especially important with the new wood preservative formulations, which can be very corrosive to some metals. The correct fastener will last for years and won’t stain the wood.

Good maintenance can also do a lot to prevent checking and maintain the good looks of outdoor wood. Regular application of a water-repellent finish will help the deck or fence shed rain, which helps reduce the wetting and drying cycles that cause checking. Preservative treated wood may contain a built-in water repellent, but manufacturers still recommend applying a fresh water repellent finish every year or two. Decks, including those made with WPC lumber, may also benefit from periodic cleaning with a power washer or special cleaners.

Wood remains a popular and appropriate choice for building decks and fences. A little care when installing the boards, combined with regular maintenance, will help keep your deck looking good for years.



The wood in WPC decking can be susceptible to fungal attack. Note the fruiting bodies of a wood-decay fungus growing out of this WPC handrail. Photo courtesy of Paul Cooper, University of Toronto and Paul Morris, Forintek.

should perform about as well as the previous formulations. Naturally durable wood has also been used for decking for many years.

There is some concern that the younger and smaller trees that now being used for naturally durable lumber might not be as durable as the older trees that were used in the past, but this has not been well documented.

WPC is a relatively new product; thus its potential durability is not well understood. It is often advertised as being rot-proof because the plastic encapsulates and protects the wood fibers. However, research and experience have demonstrated that the wood component of WPC can mold and rot.^{1,5} In addition, there are many types of WPC on the market, and formulations are changing over time. Only time will tell how durable WPC really is.

Environmental impact

This might be the hardest factor to evaluate, but it is becoming an increasingly important consideration for many people. Treated and naturally

durable products are both made from trees. So, depending on your viewpoint, this might be good (trees are a renewable resource that come from forests, which provide many other benefits) or bad (trees were killed to make the product). In both cases, relatively young trees are used to make the decking lumber, not “old-growth” trees.

For treated wood, there is concern over what happens to the waste material or the old lumber after it is removed from service. Currently the only options are reuse for a similar application or disposal in a landfill. Treated wood should not be burned.

WPC is touted as having environmental benefits because it is made from sawdust (a by-product of wood manufacturing) and recycled plastic. It should be noted, however, that many brands contain significant amounts of virgin plastic. WPC production also requires large amounts of energy. WPC is theoretically recyclable; it could be re-melted and re-formed into new decking lumber. However, no recycling of this new

product is currently underway; and the collection, cleaning and transportation of old WPC decking to a recycling center for remanufacture is likely to be prohibitively expensive.

In summary, each material has environmental impacts. These impacts need to be considered along with the other factors.

References

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Summary of decking lumber options

**There are many factors to consider when choosing decking lumber.
This table lists some characteristics of the major decking options.**

| | Price | Availability | Maintenance | Durability | Ease of construction | Healthy & Safety | Environmental impact |
|--------------------------------|---|--|--|--|--|--|---|
| Treated wood | Low | Widely available in many sizes. | <p>Periodic cleaning.</p> <p>Application of water-repellent coating every 1-2 years.</p> <p>Water-repellent coating should be reapplied when water no longer beads on the surface of the wood.</p> | <p>Can check or warp - especially lower grades of wood.</p> <p>Treated portions of treated wood and heartwood of naturally durable wood are resistant to insects and fungi for many years.</p> | <p>Typical wood construction.</p> <p>Use of corrosion-resistant fasteners is recommended.</p> | Safe — contains synthetic preservatives. | <p>Wood from relatively young (often pine) trees.</p> <p>Contains copper and organic preservatives.</p> <p>Waste must be landfilled.</p> |
| Naturally durable wood | Medium. Some grades and species may be high cost. | <p>A few species widely available.</p> <p>Some species and dimensions will require special orders.</p> | | | | Safe — contains natural preservatives. | <p>Natural product made from relatively young trees (in the United States) or from tropical trees.</p> <p>Waste can be burned.</p> |
| Wood/ Polymer Composite | High | Widely available, some colors/textures may require special orders. | Periodic cleaning | <p>New product — durability is expected to be high.</p> <p>Wood component can mold and rot.</p> | <p>Heavy and not as stiff as wood.</p> <p>May require special construction details.</p> <p>Use of corrosion-resistant fasteners is strongly recommended.</p> | Safe | <p>Combination of (virgin and) recycled plastic and wood sawdust, formed using heat and pressure.</p> <p>Waste is theoretically recyclable.</p> |