



Natural wood
Made to last

Wood Discoloration from Weathering

If you put something outside, it's going to be affected by the climate and weather one way or another. When it comes to Kebony, it is susceptible to the elements in the same way as all other wood species. One of the ways the weather affects wood is the "graying" of the surface. This graying normally happens evenly across the wood, but sometimes it can look like staining or splotches across the board. This guide will explain the process occurring and what you can do about uneven discoloration.

Why does wood gray out?

All wood species are made up of a combination of cellulose and lignin. Cellulose is colorless, not water soluble and doesn't easily break down in UV light. Lignin has a brownish color, is water soluble and breaks down when exposed to UV light. This is true for both untreated wood and modified woods like Kebony.

When wood is exposed to sunlight, the non UV stable components of lignin at the surface level start to break down. Even though UV exposure is breaking down the lignin it stays on the surface, so the color doesn't change dramatically. However, when the surface is exposed to water, the water soluble parts of lignin travel along with the water and begin to wash away the color on the surface.

When enough water is hitting the surface, the lignin is washed off the wood's surface as it breaks down. This colored runoff water is usually too little to notice but can sometimes be seen at the bottom of wood siding or cladding installations because there is a larger surface concentrating in a smaller area.

Since the cellulose is not water soluble, it forms a white microscopic fibrous layer that masks the brown color of the lignin below the surface. The more eroded the surface becomes due to UV breakdown and water rinsing, the thicker the white top layer becomes, creating a "gray" look on the surface when dry.

Because only the surface is exposed to UV and water, the rest of the wood will retain its original color. For this reason, you can bring back the brown color of the wood by sanding that surface layer off. Because the discoloring process needs both UV and water exposure, wood products in climates that have little rain and a lot of sun may see the graying process happen slower than in areas with consistent rain and sun.

How is discoloration different in Kebony?

The short answer is not much. During Kebony's modification process - called furfurylation - raw wood material is infused with a mixture of water and furfuryl alcohol. This bio-based liquid surrounds the wood cell walls making them thicker. Next the wood is heated up and the furfuryl alcohol polymerizes and interweaves into cellulose-lignin, essentially changing the wood's cell structure.

Furfuryl alcohol is completely colorless and fully water soluble, however, as soon as it polymerizes it becomes dark brown/black in color. Since the polymerized FA is more intensely colored than lignin, the process gives the wood the distinctive brown Kebony color.

Just like raw wood species, the same lignin breakdown and color runoff due to water happens with Kebony, especially with cladding and vertical surfaces. Kebony's colored runoff water is both the natural lignin in wood and the polymerized furfuryl alcohol attached to this lignin, so it's darker than the original lignin. This runoff water has gone through ecotoxicity testing and nothing concerning was found.

Why does the wood look discolored or stained?

Like dust, dirt, or anything else that water picks up, the lignin will remain where the water stops and eventually dries up. If a UV-exposed surface receives only small amounts of water that slowly moves on the surface due to geometric and/or wicking effects, the broken down lignin may move then collect in certain areas. This is the cause of uneven coloring/graying on the surface.

How a surface is affected by water, of course, has to do with climate (rain, sun, wind) along with all of the details of the construction, especially as it relates to roof overhang sizing.

How do I fix the discoloration?

A combination of the following factors are the biggest cause for uneven color change:

1. Non UV stable components in the wood
2. UV from natural light hitting the surfaces of the product
3. Rainwater that affects the exposed surfaces in varying degrees

When natural water rinsing isn't consistent or in enough volume to create the desired aesthetic, the concentrated lignin areas can usually be removed by a thorough rinsing with water and/or cleaning with mild cleaning agents. It is important to point out that even though this will even out the discoloration, it doesn't affect, change, or stop any of the three points above, so over time the discoloration could come back. This is true for both untreated wood and Kebony.