
TECHNICAL BULLETIN

Kiln-Dried Versus Air-Dried Decking

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Kiln-drying is the method in which most wood species are stabilized by removing the free moisture in the lumber by accelerating the lumber drying process to what would be the natural ambient equilibrium moisture level of the woods service environment. For example, lumber used for flooring and indoor furnishings is typically kiln-dried to a moisture content of between 6% and 8%. The equilibrium is generally controlled through heat and air conditioning to this range. Lumber for outdoor use is typically kiln-dried to a moisture content of between 12% and 14%, as outdoor climates' natural ambient equilibrium levels fall within this range.

Therefore, virtually all wood decking species require kiln-drying to create dimensional stability, except Ipe. Ipe, or *Tabebuia* spp – Lapacho group, is unique as a wood species in that it is incredibly stable as it acclimates to ambient equilibrium, which is why Ipe is sold as both air-dried and kiln-dried decking. Ipe is tough to kiln-dry, which is why lumber 2 inches or thicker is only available air-dried.

Air-dried decking is packaged for export with drying sticks between layers, which may or may not leave sticker marks and dirt stains on the decking. These sticker marks are normal in air-dried decking and can be removed by light sanding or weathering over time. Kiln-dried decking is dense-packed and plastic-wrapped for export and, as such, will not be subject to sticker marks or dirt stains.



Air Dried Ipe Packaged on stickers



Sticker Stain



Kiln Dried Ipe Dense Pack and Plastic Wrap

So, if Ipe is so stable, why should I buy kiln-dried Ipe decking?

Some mills saw their own logs and process their own decking. This means that their air-dried decking is, in fact, what we call green and has a moisture content of typically between 30% and 40% when run to the decking profile.

Some mills are finishing mills that buy their sawn molding blanks from a sawmill, which means their decking will be run from partially air-dried lumber that could have a moisture content of between 25% and 35%.

TFP mills provide the option of kiln-drying the rough sawn decking blanks to 12-14 percent or pre-stabilizing the decking blank to equilibrium before molding.

As an example, all three mills have run 1x6 deck boards to a net of .75" in thickness and 5.5" in width.

Kiln-dried decking has the advantage of being pre-stabilized at the top end of the equilibrium moisture content for outdoor applications. It will roughly maintain its starting thickness and width before, during, and after installation or experience minor shrinkage in a climate with extremely low equilibrium.

The air-dried (green) decking will typically reach equilibrium after installation, with the partially air-dried decking shrinking less than the green decking. By experience, this shrinkage runs between 1/8 and 3/8 inches in width. This is typically not a problem when face-fastening Ipe but can become problematic when using hidden fastening systems. This becomes even more problematic in arid climates where equilibrium may be in the 8% to 10% range.

40% to 10% is significant, particularly when installed using hidden fasteners as decking may shrink beyond the clip's ability to hold the decking or when installed in very sunny and hot climates as moisture may be drawn rapidly from the face of the board, causing it to cup. In air-dried decking, it's all about the thickness to width ratio. For example, a 5/4x6 air-dried board is less likely to cup than a 1x6 air-dried board. Kiln-drying also reduces the potential of cupping by equalizing the moisture inside the board before it is milled to its final dimension.



Kiln-Dried 1x6 Ipe Decking at 12% Equilibrium



Kiln-Dried 1x6 Ipe Decking at 12% Equilibrium

Again, Ipe is dimensionally very stable from green to dry, so warp, twist, and bow are not significantly impacted by selecting air-dried vs. kiln-dried Ipe decking.

Width consistency and reduced potential for cupping are the benefits of kiln-dried decking. It is important to note that kiln-dried decking can shrink when the equilibrium on site is below 12%. It will, however, shrink much less than air-dried. Kiln-dried decking, which is dried below the equilibrium of the installation site, will equally be subject to expansion at the time of installation unless the wood has been allowed to acclimate.