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TECHNICAL BULLETIN

Kiln-Dried Versus Air-Dried Decking

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Kiln-drying is a process used to stabilize most wood species by accelerating the removal of free moisture, bringing the lumber to the natural ambient equilibrium moisture level appropriate for its service environment. For example, lumber intended for flooring and indoor furniture is typically kiln-dried to achieve a moisture content of 6% to 8%, matching the equilibrium maintained by indoor heat and air conditioning. For outdoor applications, lumber is usually kiln-dried to a moisture content of 12% to 14%, aligning with the natural ambient equilibrium levels found in outdoor climates.

Most wood decking species require kiln-drying to ensure dimensional stability, but Ipe is an exception. Ipe, or Tabebuia spp – Lapacho group, is a uniquely stable wood species that naturally acclimates to ambient equilibrium, allowing it to be sold as both air-dried and kiln-dried decking. Kiln-drying Ipe is challenging, which is why lumber 2 inches or thicker is generally only available air-dried.

Air-dried decking is prepared for export with drying sticks placed between layers, which can leave sticker marks and dirt stains on the decking. These marks are common in air-dried decking and can be removed through light sanding or natural weathering over time. In contrast, kiln-dried decking is dense-packed and plastic-wrapped for export, preventing sticker marks or dirt stains.

Air Dried Ipe Packaged on stickers

Sticker Stain

Kiln Dried Ipe Dense Pack and Plastic Wrap

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Why Choose Kiln-Dried Ipe Decking if Ipe is Already Stable?

Even though Ipe is known for its stability, the decision to purchase kiln-dried Ipe decking is still important. The difference lies in how mills process their decking. Some mills saw and process their own logs, resulting in air-dried decking that is actually "green," with a moisture content typically ranging from 30% to 40% when it is profiled into decking.

Other mills, particularly finishing mills, buy sawn molding blanks from sawmills. These blanks are partially air-dried and can have a moisture content between 25% and 35% before they are molded into decking.

At GMX Products mills, there is an option to kiln-dry the rough-sawn decking blanks to 12-14% moisture content, stabilizing the decking blanks to equilibrium before they are molded. For instance, all three types of mills might produce 1x6 deck boards with a net thickness of 0.75 inches and a width of 5.5 inches.

The key advantage of kiln-dried decking is that it has been pre-stabilized at the higher end of the equilibrium moisture content range for outdoor use. This allows it to maintain its original thickness and width more consistently before, during, and after installation, or it may experience only slight shrinkage in areas with extremely low equilibrium moisture content.

In contrast, air-dried (green) decking reaches equilibrium after installation. Partially air-dried decking will shrink less than green decking, typically experiencing a width reduction of between 1/8 and 3/8 inches. While this may not pose a problem with face-fastening Ipe, it can lead to issues when using hidden fastening systems, especially in arid climates where equilibrium moisture content may be between 8% and 10%.

A shift from 40% to 10% is significant, particularly when using hidden fasteners, as the decking may shrink beyond the clip's ability to hold it securely. Additionally, in very sunny and hot climates, moisture can be rapidly drawn from the board's surface, leading to cupping. The thickness-to-width ratio is crucial in air-dried decking; for example, a 5/4x6 air-dried board is less likely to cup than a 1x6 air-dried board. Kiln-drying helps reduce the likelihood of cupping by equalizing the moisture content inside the board before it is milled to its final dimensions.

Kiln-Dried 1x6 Ipe Decking at 12% Equilibrium

Kiln-Dried 1x6 Ipe Decking at 12% Equilibrium

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Kiln-Dried vs. Air-Dried Ipe Decking: Stability and Considerations

Ipe is inherently dimensionally stable from its green state to a dried condition, so whether you choose air-dried or kiln-dried Ipe decking, issues like warp, twist, and bow are not significantly affected. However, kiln-dried decking does offer advantages in terms of width consistency and a reduced risk of cupping.

It's important to keep in mind that kiln-dried decking can still shrink if the equilibrium moisture content at the installation site is below 12%, but it will shrink considerably less compared to air-dried decking. On the other hand, kiln-dried decking that has been dried below the site's equilibrium moisture level will be prone to expansion during installation unless the wood is given time to acclimate to the local conditions.

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