

TECHNICAL BULLETIN

Wood Product Samples

This bulletin provides insights into how environmental factors influence wood samples beyond their visual appearance and quality attributes.

Wood products naturally balance their moisture content to match the humidity levels of their environment. They achieve this by absorbing or releasing moisture as environmental temperature and humidity change. When wood absorbs moisture, it expands, and when it loses moisture, it contracts. It is also common for wood to develop surface checks or cracks as it acclimates to project site conditions. These checks and cracks do not compromise the wood's strength or durability; they are a natural reaction to the drying process.

Wood dries through the movement of free water within fiber cavities and the movement of water vapor through the wood. Because wood is not uniform, it shrinks more along the growth rings (radial) than across them (tangential). Tangential dimensional change is often nearly double that of radial movement for most wood species, and longitudinal (length) dimensional change is almost always negligible. These shrinkage variations may cause wood movement or checking. Wood movement will cease as its moisture content approaches equilibrium with the environment. Checking will often self-correct, with the checks closing once the timber's core reaches equilibrium. However, this cannot be guaranteed for every piece. Each wood piece will have unique shrinkage or swelling patterns in these three planes. The larger the wood dimensions, the longer this process takes.

To minimize shrinkage, warping, checking, and splitting in the finished product, lumber must be acclimated to the midpoint of the expected in-use moisture content range before installation. This can be achieved through:

Air-Drying (natural process/slow): Air-dry moisture content for wood products generally ranges from 18% to 35%. All air-dried Black Label™ wood products will have a moisture content between 18% and 25%.

Kiln-Drying (artificial process/accelerated): Kiln-dry moisture content for Black Label™ Decking and Cladding generally ranges from 12% to 14%.

In much of the United States, thoroughly air-dried lumber's exterior moisture content equilibrium is 12% to 15%. For seasonal EMC levels in your region, consult the US Forest Labs website www.fpl.fs.fed.us. Search for the "Equilibrium Moisture Content of Wood in Outdoor Locations" document.

Indoor environments present a unique challenge to wood as equilibrium drops to 6% to 8%. Naturally durable wood products are typically designed for exterior applications, so naturally durable wood samples exposed to indoor environments may react inconsistently and exhibit movement and checking that would not occur in an exterior application. Such movement is not indicative of the product's long-term performance, for which its superior performance is intended and well documented.

Color and Grain Variation

Color and grain variation are natural characteristics of wood and contribute to the beauty that distinguishes natural products from manufactured ones. This is particularly true for wood products, although some species exhibit more color variation than others. When examining wood samples, this should always be considered (see color/grain variation technical bulletins).

Some color consistency can be achieved by either staining wood or allowing it to weather or grey out.