



## CUPPING AND CROWNING

Cupping and crowning are two unfortunate results of excessive moisture in maple flooring.

All moisture content increases cause wood products to expand. Due to the cellular structure of flat-sawn maple flooring, expansion takes place primarily across the width of each strip. When flooring strips in a maple system take on enough moisture to expand and eliminate all available horizontal expansion space, individual boards will expand upward at the edges causing the surface condition commonly known as cupping. Cupping is caused by a moisture imbalance through the thickness of the maple — moisture contents in each strip of flooring are higher at the bottom than on the surface.

If cupping is severe enough, a condition known as "compression set" can occur. Compression set is caused by severe expansion pressure from excessive moisture causing individual boards to crush each other. Individual cells on the edges of each maple strip are permanently deformed or crushed, leaving excessive cracks and ragged edges when the material returns to its normal moisture content.

Crowning is the opposite of cupping. The center of each flooring strip is higher than its edges. Moisture imbalance is sometimes the cause of crowning if excessive moisture is introduced on the top of the floor due to roof leaks, spills or improper maintenance procedures. However, crowning is more commonly caused by sanding a cupped floor before the moisture content in the maple returns to a uniform and normal condition top to bottom.

Sanding while the flooring is still cupped will result in the loss of flooring material on the edges of each board. Once all excess moisture works its way out of the flooring materials, the maple will return to a flat condition - except where the original edges of the strips were sanded off, leaving voids at the edges of each flooring row.

Some slight cupping and/or crowning may occur naturally and is acceptable. The "bark" side of a maple log will shrink/swell more than the center of a maple log, and this minor expansion/contraction variation is more noticeable in areas of the country that experience significant seasonal moisture content changes and on floors containing wider face-width maple strips.

MFMA and all its member manufacturers have published specifications which prescribe optimum temperature and humidity ranges to ensure proper flooring performance and reduce the likelihood that cupping or crowning will ever develop on a maple floor.

MFMA recommends maintaining indoor temperatures between 55 and 75 degrees and indoor relative humidity level between 35 percent and 50 percent year round. If the flooring materials are properly acclimated, a 15 percent fluctuation in indoor relative humidity will not adversely affect the maple. Excessive shrinkage and/or expansion may occur with indoor relative humidity variations in excess of 15 percent.

If you have additional questions, please contact MFMA's Technical Director at 847-480-9138.

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