



Cupping, Crowning, Compression Ridging & Compression Set

All of the above conditions result from significant changes in wood moisture and generally appear as “Ripple-Like” distortions within the surface of an installed hardwood floor. These conditions may be minor to severe in nature depending on the amount of change in moisture or imbalance of moisture through the thickness of the flooring. Wider width flooring and reflective lighting can accentuate the severity of appearance of even minor acceptable conditions, especially when the reflective light source is perpendicular to the flooring direction.

CUPPING and CROWNING – both result from an imbalance in wood moisture within the thickness of flooring boards, e.g., a difference in wood moisture content from the top surface compared to the bottom surface of the flooring.

CUPPING – describes the condition wherein the surface of the flooring boards have a concave upward shape across the width of the face, wherein each edge of a flooring board is elevated with respect to the center of the board's face.

Causes: Cupping results from a moisture imbalance between the top and bottom surfaces of the flooring boards, wherein the wood moisture in the bottom portion of the boards exceeds the wood moisture in the top portion of the boards. There are a number of conditions conducive to creating the moisture imbalance that causes cupping, including; extensive heating/dry air above the flooring, drying the surface; migrating moisture under the floor increasing moisture on the bottom of flooring boards, wet mopping where water accesses gaps between flooring boards gaining access to the underside of flooring, etc. Each of these conditions create an imbalance of moisture with higher moisture on the bottom side compared to the top side.

In some situations, cupping may be attributable to undue expansion and associated forces that exceed the resistance of flooring boards to remain flat. Cupping in this case is generally the result of prolonged exposure to high moisture. Note, cupping due to excessive expansion may lead to Compression Ridging or even Compression Set, see below.

Solution: Depending on the exact cause, too dry air above or excess moisture below, eliminate the source causing the imbalance of moisture and allow floor to equalize in moisture. Always allow the flooring material to equalize prior to performing any remedial action to avoid harming the floor. If cupping remains after full equalization re-sanding may be necessary to bring the floor back to a flat state. Note; equalization will oftentimes eliminate cupping without the need for any remedial action.

CROWNING – describes the condition where the surface of the flooring has a convex upward shape across the width of the face, wherein the center of the flooring board is elevated with respect to the edges of the board face.

Causes: Crowning results from an imbalance of moisture between the top and bottom surfaces of the flooring boards, wherein the wood moisture in the bottom section is lower than the wood moisture in the top section of the boards. The underlying causes of crowning include; prolonged high relative humidity with a floor that has adequate to ample spacing between boards, exposure to surface moisture that remains on the floor surface, wet mopping with moisture remaining on the top of flooring; etc.

Solution: Eliminate the source of excess moisture and allow the floor to equalize. Always allow the flooring material to equalize prior to performing any remedial action to avoid harming the floor. The addition of humidity control may prevent recurring issues. If crowning remains after full equalization re-sanding may be necessary to bring the floor back to a flat state. Note; equalization will oftentimes eliminate crowning without the need for any remedial action.

COMPRESSION RIDGING – describes the condition where the extreme edges of the flooring appear bulged upwardly above the balance of the board face, giving rise to a “Ripple-Like” surface appearance.

Causes: Compression Ridging is typically due to a substantial increase in wood moisture giving rise to over-expansion within a wood floor, e.g., a condition wherein expansion of wood exceeds the free space available between flooring boards. It is generally associated with prolonged extreme moisture conditions via high relative humidity, migrating moisture, or inundation. This condition may affect portions of or the entire floor depending upon the situation.

Solution: At first sign of tightening and ridging, take steps to reverse excess moisture condition and return wood floor to its normal equilibrium wood moisture content. Address the cause and allow flooring to equalize prior to performing remedial action. The addition of humidity controls may prevent recurring issues if the situation is caused by excessive relative humidity.

COMPRESSION SET – is a permanent compression of wood fiber at the edges of flooring boards, arising from severe expansion and Compression Ridging. This may occur when expansion forces exceed the compressive strength of wood fiber in the flooring boards. Compression Set is generally not detectable until after a floor has returned to its normal equilibrium wood moisture content. Depending upon severity, mild to extreme gapping may occur between flooring boards. Compression Set is permanent.

Revised 03/16
© 2016 MFMA

Disclaimer: MFMA provides general information to architects, specifiers, and consumers. MFMA, its members, officers and agents disclaim any responsibility whatsoever for the accuracy or applicability of these guidelines under all circumstances and conditions.

Maple Flooring Manufacturers Association

888/480-9138

mfma@maplefloor.org

www.maplefloor.org