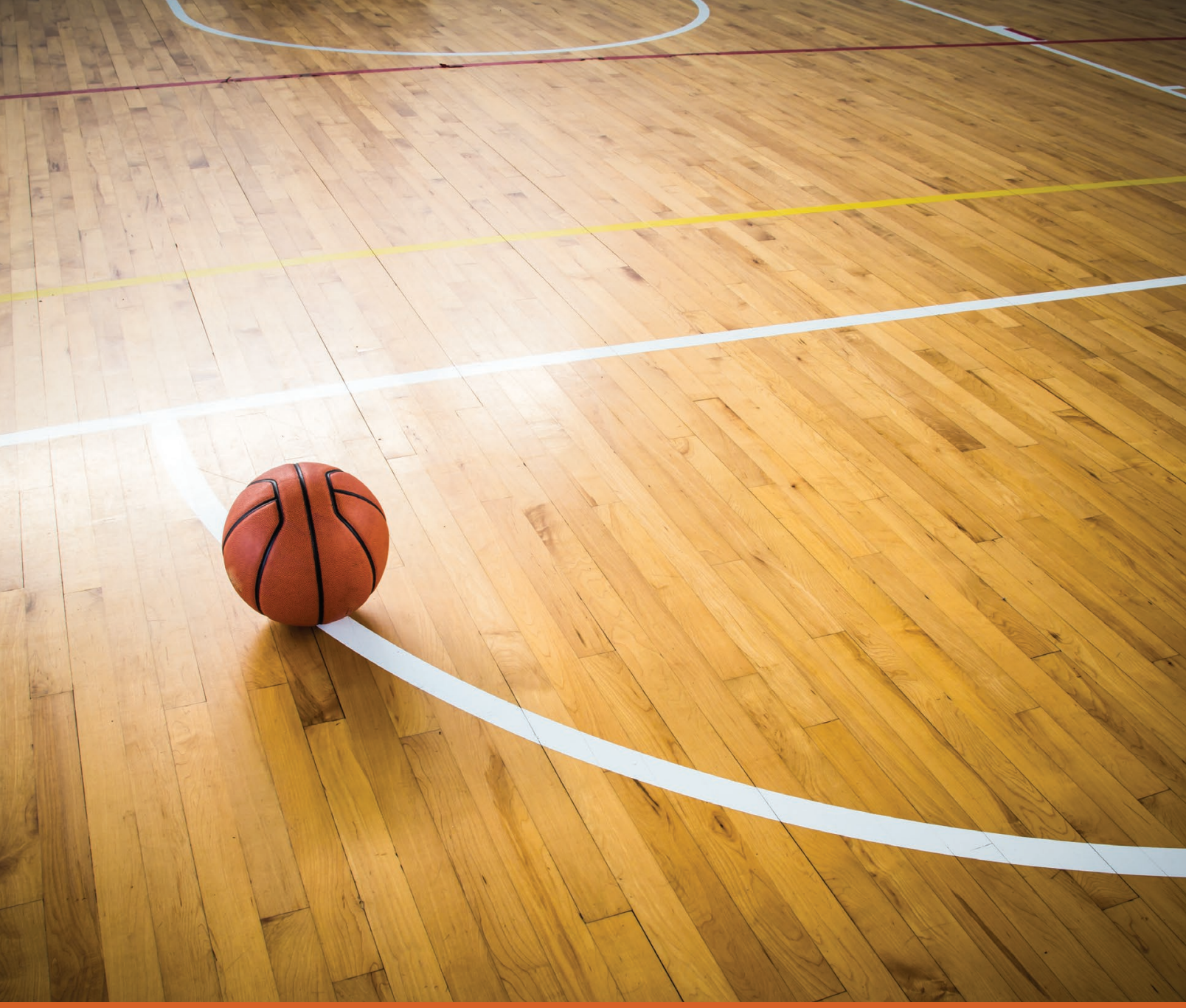

by Grete Heimerdinger

How Wood Floors are Affected by Wood Moisture and Relative Humidity

Wood floors have been placed in buildings for centuries. They are used in every gymnasium for their comfort when students are walking, running, and jumping. If taken care of properly, wood floors can last for many, many years.

The "climate" inside a building can ruin the most beautiful floor with cupping, cracking and other visible defects. Wood floors are more prone to show moisture-related defects when the relative humidity fluctuates once the floor is installed and the building is in use.

Wood is a hygroscopic material, which absorbs or loses moisture until an equilibrium between the wood moisture and the relative humidity of the surrounding air has been reached. Moisture problems such as cupping or shrinking occur, when wood and the air around it are not in an equilibrium.

The relationship between wood moisture, air humidity and temperature determine what wood will do: expand, shrink or keep its dimensions. Changes in floor moisture are occurring slowly over time, since floors are sealed and only one side of the floor plank is open. Wood is considered stable when it does not shrink or expand. Then, it has the equilibrium moisture content EMC. Measuring wood moisture and the relative humidity will tell you whether or not the floor is stable.

Did you ever ask yourself why wood floors should be between 6-9%? The answer has to do with the relative humidity in buildings where people live and work. Inside buildings, the comfortable,

recommended relative humidity range is between 30-50% at a temperature of 60 to 80 degrees Fahrenheit. If the relative humidity is 30-50%, then wood is stable, if its moisture content is 6-9%.

Delivering a flawless floor, which stays beautiful for many years, is the installer's responsibility. Next, comes the property owner's responsibility to keep the floor in good condition.

The installer needs to make sure the floor has the correct moisture content and the building is at the correct relative humidity and temperature. Floors don't cup, crown or get out of alignment unless the moisture content of the floor planks changes. If the floor was installed at a moisture content not in an equilibrium with the relative humidity at the facility, then the floor moisture content will change until an equilibrium has been reached. For example, if the floor was installed at around 6% and the average relative humidity is very high at 55%, then the floor will slowly absorb moisture and swell. The wider the individual floor planks and the larger the area, this change in moisture could already cause visible deformations of the floor planks. The best work and installation skills will not produce the expected results if the moisture content is not right.

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Steps Installer Must Take to Avoid Problems

Accepting the floor. Once the floor is delivered, the moisture content should be confirmed with a moisture meter. This should happen at the time of the delivery. The supplier should be informed quickly if the floor is not within specs. If the time between delivery and measurements is too long, the supplier may say the problem happened during storage at the facility.

Proper acclimation at the right relative humidity. Acclimation only works when the floor is kept at the same conditions as there will be once the building is occupied. If you want to track acclimation, measure the same floor piece every week in the same spot. The acclimation time is over when the moisture content in the floor does not change anymore and is within the moisture range specified by the floor manufacturer. A data logger for relative humidity and temperature can keep track of day and night conditions during acclimation.

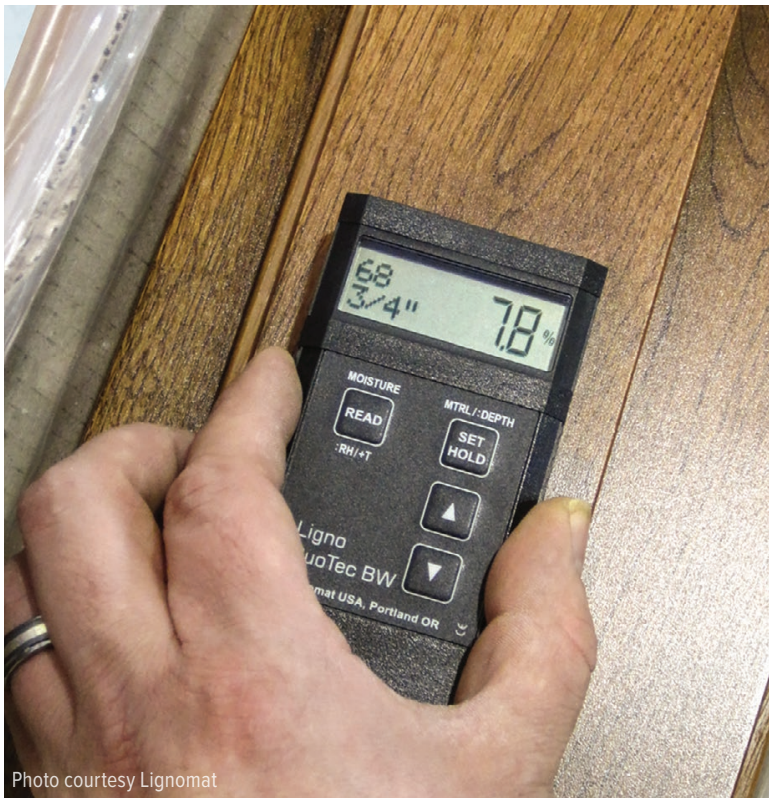


Photo courtesy Lignomat

Make sure the sub floor and the concrete underneath are dry enough not to release extra moisture into the floor covering. This can cause problems within the first few months after the installation has been finished.

Final moisture check at the time the property owner signs off on the completion of the job. Again a moisture meter is absolutely essential during that phase. The reason for these final measurements is that the installer should document the condition of the floor at this time. It also is the start point, where the responsibility for the floor is turned over to the property owner and his maintenance crew.

Steps for Maintenance Crew

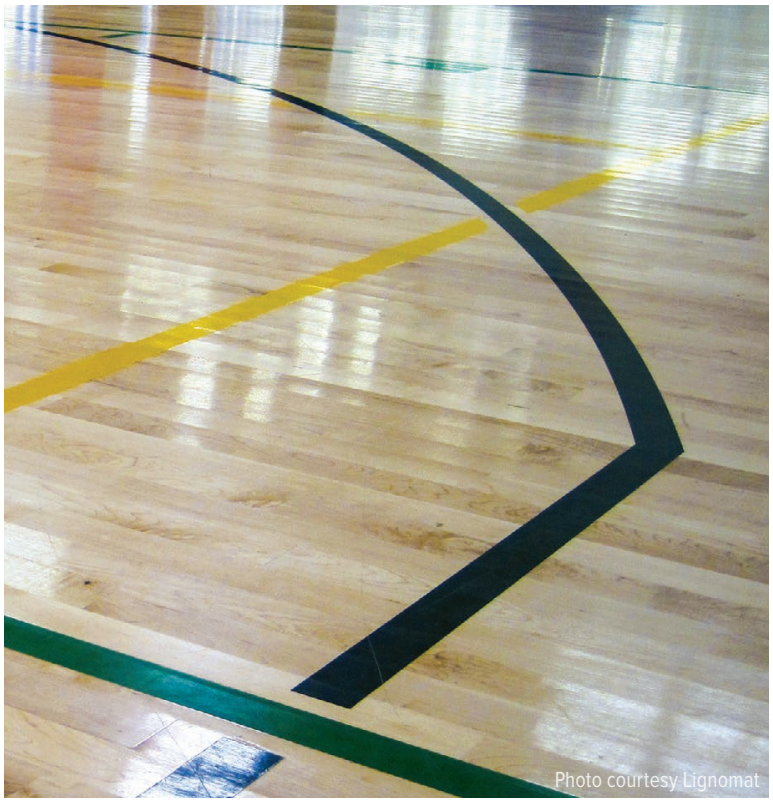
It is advisable to take moisture measurements at the time the installation is finished. Choose moisture-critical places and get several moisture measurements. If you have a dual-depth meter, take measurements with both depth settings and note location, wood species setting, measuring depth, time and date. Also measure the relative humidity with a hygrometer. Keep this documentation. In case of any moisture problems later on, comparison with the original measurements could help to find the cause of the problem. Regular maintenance should follow the guidelines of the floor manufacturer.

Monitor floor conditions on a regular basis, at least during the first year. What could happen to the floor? The floor can

shrink, cup, twist, etc. Simply said, the floor could move. As mentioned before, wood movement is always caused by changes in moisture content, which are caused by changes in relative humidity, if the floor was installed properly. There are some obvious reasons for changes in relative humidity: having no air conditioning or turning the air conditioner off. In dry, cold winters the air is extremely dry and in wet, moist summers, there is too much moisture in the air. Keeping wood floors protected requires moisture control of the relative humidity. A data logger could confirm that the HVAC is working as it should all the time every day.

The main tools for the maintenance crew are a moisture meter and a thermo-hygrometer to check both relative humidity and wood moisture. It is important to keep records of all the measurements the crew is taking. It can help prevent problems, and if a problem occurs it can help to find the cause.

ABOUT THE AUTHOR: Grete Heimerdinger has been the technical adviser for the moisture meter division for Lignomat. She graduated from the technical university in Stuttgart and started Lignomat with her husband in 1982. Lignomat now offers a full line of pin, pinless and RH meters as well as wireless monitoring devices for buildings.



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