FLOORING

The Secret to Maintaining Wood Floors It's All About Moisture Content

BY LIGNOMAT

Well-maintained wood floors and other interior wood products set the tone for a room or entire building. The look is timeless, sophisticated, and a great choice for a wide variety of settings on campus.

Maintaining their natural beauty can be challenging, however—and it's all about moisture content. If the moisture content of wood products stays within acceptable limits, maintenance is relatively easy. But managing wood's natural response to changes in moisture content can be complex. Buildings often contain many wood components—from gymnasium floors, wooden stairs, and moldings to doors, cabinets, and wall or ceiling panels. Like most building materials, wood is hygroscopic, meaning it absorbs or releases moisture depending on the surrounding environment.

At the time of installation, it is generally assumed that wood products are within an acceptable moisture content range. According to industry guidelines, wood floors, cabinets, and doors should typically have a moisture content between 6% and 9%, which corresponds to an indoor relative humidity (RH) of 30%–50%. Maintaining this RH range consistently is critical. Because wood continually reacts to its environment, fluctuations in humidity can lead to long-term performance and aesthetic issues.

This basketball hardwood maple floor (above) had big problems that originated from too much moisture coming through improperly insulated walls during the wet winter months. The Ligno-VersaTec allowed checking for relative humidity and measuring the elevated moisture levels of the floor plank. The only remedy was to replace the floor because the floorboards were cupping.

Using a moisture meter and a thermo-hygrometer is considered best practice to ensure proper conditions are maintained. These tools help verify that wood floors, doors, cabinets, and wall panels remain stable and visually appealing for many years. A versatile instrument, such as the Ligno-VersaTec moisture meter with thermo-hygrometer, allows maintenance personnel to detect and track potential moisture-related issues throughout a building.

One of the key advantages of owning a moisture meter is the ability to record and compare measurements over time. Changes in moisture content can serve as early warning signs that a problem may be developing. Identifying these changes early enables maintenance teams to address issues before they escalate into costly repairs or structural damage. This preventative role is one of the most important functions of moisture measurement.

Moisture problems can originate from multiple sources, including elevated indoor relative humidity or moisture intrusion

Equilibrium Moisture Content Chart (EMC)

T		Relative Humidity																		
°C	°F	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
-1	30	1.4	2.6	3.7	4.6	5.5	6.3	7.1	7.8	8.7	9.5	10.4	11.3	12.4	13.5	14.9	16.5	18.5	21.0	24.3
4	40	1.4	2.6	3.7	4.6	5.5	6.3	7.1	7.8	8.7	9.5	10.4	11.3	12.4	13.5	14.9	16.5	18.5	21.0	24.3
10	50	1.4	2.6	3.6	4.6	5.5	6.3	7.1	7.9	8.7	9.5	10.3	11.2	12.3	13.4	14.8	16.4	18.4	20.9	24.3
16	60	1.3	2.5	3.6	4.6	5.4	6.2	7.0	7.8	8.6	9.4	10.2	11.1	12.1	13.3	14.6	16.2	18.2	20.7	24.1
21	70	1.3	2.5	3.5	4.5	5.4	6.2	6.9	7.7	8.5	9.2	10.1	11.0	12.0	13.1	14.4	16.0	17.9	20.5	23.9
27	80	1.3	2.4	3.5	4.4	5.3	6.1	6.8	7.6	8.3	9.1	9.6	10.8	11.7	12.9	14.2	15.7	17.7	20.2	23.6
32	90	1.2	2.3	3.4	4.3	5.1	5.9	6.7	7.4	8.1	8.9	9.7	10.5	11.5	12.6	13.9	15.4	17.3	19.8	23.3
38	100	1.2	2.3	3.3	4.2	5.0	5.8	6.5	7.2	7.9	8.7	9.5	10.3	11.2	12.3	13.6	15.1	17.0	19.5	22.9
43	110	1.1	2.2	3.2	4.0	4.9	5.6	6.3	7.0	7.7	8.5	9.2	10.0	11.0	12.0	13.2	14.7	16.6	19.1	22.5
49	120	1.1	2.1	3.0	3.9	4.7	5.4	6.1	6.8	7.5	8.2	8.9	9.8	10.7	11.7	12.9	14.4	16.2	18.6	22.0

The values shown in the table above represent moisture content of wood in %

through walls, roofs, ceilings, or subfloors. Excess moisture migrating into floor coverings can significantly affect performance. That is true for wood floors, carpet, tile and even LVT floor coverings.

Moisture-related issues typically present in two ways. First, dimensional changes occur as wood absorbs or loses moisture, leading to shrinking, warping, cupping, buckling, or delamination. Second, when wood moisture content exceeds 16%, or when relative humidity remains above 60% for extended periods, conditions become favorable for mold growth.

Spores, the start of any mold colony are present anywhere. If enough humidity is available, spores will start to develop into mold. Therefore, conditions which favor mold growth have to avoided. The only reliable way to prevent mold growth is to keep moisture levels below the critical 60% RH threshold.

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High or low humidity conditions may result from extreme outdoor weather, poor building design, or moisture intrusion through roofs, walls that are not constructed to code, or subfloors emitting excess moisture into the flooring systems. This is to be prevented for any wood floors, carpets, tiles and even LVT floors

Early detection of these issues is possible through the use of moisture meters and hygrometers. In large building envelopes, where moisture problems can originate from many locations, having a versatile moisture measurement system is essential. Lignomat's moisture and humidity measuring kits with Ligno-VersaTec allow users not only to identify moisture problems early but also to trace them back to their source—even through walls that are five inches thick or more.

These tools can be your secret weapon in preserving the natural beauty of flooring on campus and keeping buildings safe and healthy as well. The advantages are clear—protecting your floors is more sustainable and helps private universities and colleges avoid the hassle, waste and expense of replacing flooring.

Understanding the EMC Chart

The Equilibrium Moisture Content (EMC) chart (see page 15) illustrates the relationship between relative humidity and wood moisture content. Following is an example how that chart can be helpful to predict wood moisture changes: If a wood floor is installed at 6% moisture content and the building's relative humidity rises to 60%, the floor will gradually absorb moisture until it reaches approximately 11% moisture content. Depending on the wood species, this increase can cause significant dimensional changes. When hundreds of boards expand side by side, the cumulative effect may lead to floor buckling. On the other hand, if conditions persist, there is a danger of potential mold growth.

ABOUT THE AUTHOR: Founded in 1979, Lignomat designs precision moisture meters, kiln controls, and wireless monitoring solutions for wood, concrete, and humidity helping professionals prevent moisture damage with trusted German engineering and U.S.-built innovation.


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UNIVERSITY CAMPUS EXPANSION

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At a major university residential expansion project in the Southeast, collaboration and cooperation among the construction management firm, window and door manufacturer, and installation contractor resulted in a several stunning projects recreating the look of the surrounding century-old buildings. All totaled, Hope's Windows, Inc., supplied over 1,200 unique windows made from custom hot-rolled steel profiles and nearly 100 high traffic and fire-rated door assemblies made from 10 and 12 gauge cold-rolled steel.

According to Sean Farrell, senior project manager at Layton Construction, establishing collaborative relationships is key to successful construction projects. One of the best examples of this maxim is a multi-phase university project for which Layton Construction is serving as construction manager. Layton, part of the STO Building Group, is a nationally-ranked commercial contractor with ten offices around the United States. The firm specializes in healthcare, industrial, warehousing, and higher education projects. As construction manager, Layton hires the sub-contractors and manages and oversees the project as part of a team.

> "Since we were building windows and doors to make a brand new college, we needed a company with the methodology to produce the product like it was done 100 years ago."
>
> *— Sean Farrell, Sr Project Manager*
> *Layton Construction*

Hope's Brian Whalen, Vice President of Sales, acknowledges that the project was a real test of Hope's capabilities. He is especially proud that they Hope's was able to expedite the schedule even in the face of design changes and in the midst of the Covid-19 pandemic. The shop drawing approval process – including preparation of blueprints of windows and doors with all setting conditions, sizes, customized designs, and required testing – took longer than normal. Changes were made along the way that might have pushed back the delivery schedules for some, but Hope's made adjustments during the production process to deliver all materials on time. Whalen gave a nod to Joey Riggan and the team at Alexander Metals, the frame and glass installer team, saying the overall project went extremely smoothly once the frames were on site.

Says Whalen, "It was a fantastic collaboration among all the parties. Hope's worked closely as the manufacturer to fulfill the architect's design vision, and then the installer worked closely with us to make sure everything was installed executed properly."

PHOTOS: Steve Hall, © Hall + Merrick Photographers

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Hope's® Windows, Inc., is a business based on 100 percent customized work design and manufacturing, Hope's provides a specialized skillset to assist clients in design and production of unique window and door assemblies. Meeting the expectations of Layton Construction in combination with the aesthetic vision of the client and architect was definitely a challenge. The overall experience was a testament to the quality standards of the university and an honor to be a part of. In business since 1912, Hope's had the global experience to make it happen.

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