

Millwork expansion due to excessive humidity and direct sunlight



Permanent expansion to millwork panels because of HVAC system shutting down



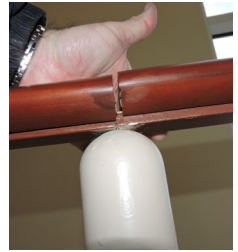
Very low humidity in the winter months created a permanent, very large gap in the railing.



Construction in the summer, in a gym that did not have the HVAC system on and open doors allowed the humidity level to exceed typical acclimated humidity levels within the gym and expanded the wood floor—this was a temporary construction issue.

Understanding the required environment for all types of casework and millwork is critical for a successful installation. Knowing when the permanent HVAC controls are being turned on, early in pre-construction and the construction schedule will allow us to properly schedule casework and millwork properly or start a discussion with the project team. If our schedule does not allow for proper storage and acclimation, we will need to review the situation with the project and team and mitigate possible casework and millwork damage before work starts. Knowing what questions to ask is key and should become part of the initial discovery of your project.

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Bulletin is based on ANSI/AWI 0641-2019 & AWI 200-2018

- Suggest supplemental humidity controls for the building when we have casework and/or millwork. If the project does not have humidity controls, review the potential casework and millwork damage that could occur.
- Humidity higher than 80%Rh and less than 20% Rh will likely cause permanent damage to the millwork.
- The millwork must acclimate to the building, which should have permanent HVAC system operational, 72 hours minimum (AWI200-2018 Section 3.2.5)
- The space where the millwork will be stored or installed must be closed in will all windows and doors installed.
- Review if a water feature is in the area of the millwork. Excessive humidity and moisture will effect the wood elements.
- Review if the millwork will have direct sunlight or a southern or eastern sunlight which will effect the wood elements
- Review if any part of the millwork will have two environments, such as hot direct sun on the front and the backside is cold which will effect the stability of the millwork.
- Review if we have a tall atrium where the temperature differences at the bottom verse the top could potentially cause thermal movement concerns. Does the design accommodate for movement somewhere in the elevation.
- Discuss with Owner if HVAC system changes in anyway after normal business hours or changes in weekend programing.
- Discuss with the Designer and/or the Millwork Contractor if any of the wood species have a need for special design considerations because of the final environment or if it has known stability concerns. Reference the following website: <https://www.awinet.org/education/materials/lumber/dimensional-stability-relative-humidity-and-moisture-content>
- Make sure that STORAGE on site is:
 - Flat, Level
 - Minimum 4" off the floor
 - No excessive hot temperatures
 - Clean
 - No direct sunlight
 - No excessive cold temperatures

- AWI and Pepper Quality strongly suggests that the building system have Rh (Relative humidity) controls. Talk to your Owner/Designer as soon as possible to get this into the building scope of work when possible, otherwise, wood damage from humidity will be the **Owner/Design responsibility**.

- AWI200-2018 Section 3.1.3.a Suggests that items omitted in design to control Rh and environmental controls, such as HVAC Rh controls, not providing millwork movement controls such as gaps and reveals and not taking the installation environment into account is assumed to be a **"Design Professional Liability"**.

- AWI200-2018 Section 3.1.3.b Suggests that improper storage and installation environment, such as Lack of permanent operational HVAC, Erratic Rh or out-of-spec Rh, or not allowing for the 72 hour acclimation time is assumed to be a **"General Construction or Construction Management Liability"**

- AWI200-2018 Section 3.1.3.c Suggests that a lack of permanent HVAC Rh controls 24/7/365, to be an **"Owner Liability"**

- ANSI/AWI 0641-2019 Architectural Wood Casework Standards, Section 3.4.1.7.j - Sheet and laminated lumber panels shall be permitted to move, float, expand, or contract as a result of ambient humidity changes. Fabricators and installers must know the requirements for proper storage & installation and should notify the team.

- Also, discuss transportation with the Contractor.

TABLE 2-001 - RELATIVE HUMIDITY and OPTIMUM MOISTURE CONTENT

Geographical Location	Optimum Moisture Content		Optimum Climate Controlled Relative Humidity
	Non-Climate Controlled Interior or Exterior Environment	Climate Controlled Environment	
Most of U.S. and Canada	9-15%	5-10%	25-55%
Damp Southern Coastal areas of the U.S. and Canadian Eastern Coastal Provinces	10-15%	8-13%	43-70%
Dry Southwestern U.S.	7-12%	4-9%	20-50%
Alberta, Saskatchewan, and Manitoba in Canada	10-15%	4-9%	20-50%



Architectural Woodwork Standards

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Recommend that we stay above and below the lowest and highest Rh by 5% to account for inconsistencies and equipment tolerances

