How Humidity and Temperature Affect Your Products Once They Leave Your Shop

By Ric Ptak

In order for your customers to enjoy many years of function from their purchase of your wood product, there are some things both of you can do to maintain the look and durability of the natural wood. Wood is a natural product that is hygroscopic – it responds to changes in surrounding humidity and as a result, will lose or gain molecular moisture (water) as relative humidity (RH) fluctuates. This will cause the wood to shrink as RH drops, and swell as RH increases.

Under normal use conditions, all wood products used for millwork in kitchens and furniture are never completely moisture free. Woodwork products are manufactured from wood that has been kiln-dried to an average moisture content of 7% to 8% and maintained at that moisture content until the time of delivery to a woodworking shop. Even finished products that have been kiln-dried and coated with a protective finish will gain or lose moisture depending on the environment it is placed in.

The movement of moisture to and from wood from the surrounding environment continues to take place as the RH changes, whether this is due to seasonal changes in climate and/or building related conditions.

To avoid product failure or quality issues, it is recommended that in low humidity regions such as Alberta, an interior RH of between 30% and 45% be maintained. Other regions of Canada may require different RH levels. Uncontrolled RH extremes below 25% or above 50% will likely cause problems. In new home construction where there has been recent concrete work, drywall taping, mudding and painting, excessive moisture is often released into the building. In these environments, the heating system may not be operating yet or the heat may be set at high levels (above 30 C or 86 F) to speed the drying process of the aforementioned operations. Placing your finished wood products into these harsh conditions could lead to problems that could affect the warranty of your installation.

Even in older homes during the coldest winter months, if proper humidity and temperature controls are not maintained, panels in doors may shrink and some unstained areas may be exposed. As the wood shrinks, joints may open slightly, and stiles and rails on doors may not remain flush. . In summer if there is excessive rain, swelling of joints may take place. Cracks in the surface finish or the veneer may also occur due to the dimensional changes as the moisture content fluctuates. These are not defects but simply an inherent natural property of wood.

History has shown that wood products perform with complete satisfaction when correct design, construction techniques and use are followed. Manufacturing plants take every effort to control the RH and temperature of their facilities. They also make sure their raw material suppliers have followed proper storage and handling procedures.

While conditions were maintained during manufacturing, once the product is shipped to the site, it becomes more difficult to control the surrounding environment and stay within the product specifications.

Depending on the final location of your wood product, it is recommended that the RH and temperature be maintained in the range of 30% to 45% RH and 18C to 22C (65F to 77 F) so that your customers can obtain many years of trouble free use from your product.

For more information on this topic, or to learn about ways in which you can minimize the affect of the environment on your products, contact Ric Ptak, ric.ptak@fpinnovations.ca

Sources of information

Understanding Wood, by R. Bruce Hoadely

Architectural Woodwork Standards (AWMAC) Edition 1, 2009

Diagnostic Guide for Evaluating Surface Distortions in Veneered Furniture and Cabinetry USDA General Technical Report FPL-GTR-143, by A.W. Christiansen and M. Knaebe

Cabinetmaking and Millwork Second Edition, Revised by Freirer