

## Floor Shrinkage & Expansion

We deal with many technical topics at Basic, but the one that generates the most heat with the least light is floor shrinkage and expansion.

There are very strong opinions about the movement of wood flooring installations but very little factual information. If you don't want a floor to shrink, you have two alternatives.

You can (1) Maintain a constant relative humidity in your environment; or (2) Don't use wood.

If the wood moisture content (Equilibrium Moisture Content or EMC) changes, wood will change dimensions. Even if you maintain constant relative humidity, the wood may shrink or expand if the wood has not had time to properly acclimate to ambient humidity level before being installed.

Another major factor is the moisture content of the material beneath the wood floor itself. Moisture moved into a wood floor from the air above and the substrate below.

A little change in moisture may not seem like a big deal. But it is! A 12-foot wide room, done with plain-swan oak or maple is likely to expand or contract by as much as three inches under the humidity swings commonly experienced in much of the United States.

But, Hey! Finishes are supposed to seal the wood so moisture won't penetrate the wood, right? Wrong! Most floor finishes are good barriers to penetration against the movement of water in vapor form.

A coating's inherent resistance to water vapor transmission is considerably less important than the film thickness characteristic of the different types of coatings. Once finished boards separate and break the integrity of the surface film, surface resistance becomes even less of a factor. Or, if

the floor is open to space below, such as a basement, the coating on top of the floor becomes less important.

A lot of people believe, and rightly so, that water-based finishes have films that are very tough, yet very elastic. So tough and so resilient that they won't allow the integrity of the film to fail, right? Wrong again! Even though water based finish components have outstanding strength and elasticity, the finish thickness is only about .003 of an inch. Consequently, this is the total force created by nailing. Nailing forces are the magnitude required to split the wood.

Flooring is usually installed so tightly that if a closed crack opens just 1/32 of an inch, it will stretch the coating over the crack by several hundred percent. Eventually the film of coating will split, allowing the board to separate even further, which is considered normal floor movement. Understanding the normal movement of wood floors and the causes for it will help you and your customers understand these natural forces of nature.

If you want to check some of these things out, we suggest you take a look at some handy reference books. One is ***Understanding Wood – A Craftmans Guide to Wood technology*** by R. Bruce Hoadly (The Taunton Press, Inc.). Also useful as reference material are Volume IV of the Handbook ***of Materials Science*** by Robert Summit and Alan Sliker (CRC Press, Inc.) and the ***Wood Handbook: Wood as Engineering Material*** by the U.S Forest Products Laboratory, U.S Government Printing Office, stock number 0100-03200.

These are both interesting and useful to people who love wood and like to work with it. Knowing more about the material you work with will help bring out its inherent beauty, durability, and functionality.