

# EQUILIBRIUM MOISTURE CONTENT (EMC)

The moisture content of wood below the fiber saturation point is a function of both relative humidity and temperature in the surrounding air. When wood is neither gaining nor losing moisture, equilibrium moisture content (EMC) has been reached.

The ideal average moisture content for flooring installation can range from extremes of 4-13% depending on many variables, including geographic location and time of year. Additionally, a wide range of conditions can be experienced between individual jobsites in the same locale, such as an ocean-front or lakeside home versus one that's a few miles inland. Before installation, the flooring product should be identified as being compatible with the area in which it is to be used.

Wood flooring will perform best when the interior environment is controlled to stay within a stable environment and the wood is installed at a moisture content corresponding to those interior conditions. Most wood flooring manufacturers dry their flooring to 6-9% MC, which directly coincides with a relative humidity range of 30-50% and a temperature range 60 to 80 degrees Fahrenheit. This 6-9% range is likely to be the average of all types of wood products used in a normal household environment, assuming common heating and cooling equipment is used to ensure human comfort.

The table below indicates the predicted equilibrium moisture content of wood at any given combination of temperature and relative humidity.

Using this table is a simple way to tie EMC and relative humidity together; for example, at 70°F, a relative humidity of 25% gives an EMC of 5.4%, and a relative humidity of 75% gives an EMC of 14.4%. A 50% swing in relative humidity produces an EMC change of about 9%. How this affects wood flooring depends on its cut, width and species as described and calculated in previous chapters.

Wood flooring is constantly exposed to both long-term (seasonal) and short-term (daily) fluctuations in relative humidity and temperature of the surrounding air. Thus, it is always undergoing at least slight changes in moisture content. These changes are usually gradual, and short-term fluctuations tend to only influence the surface of the wood flooring. The rate at which a wood flooring product reacts to these changes varies by species and construction. Note that moisture content changes can be slowed, but not entirely prevented by protective coatings.

## MOISTURE CONTENT OF WOOD AT VARIOUS TEMPERATURE AND RELATIVE HUMIDITY READINGS

Fahrenheit Celsius	Relative Humidity (percent)																			
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	
30 -1.1	1.4	2.6	3.7	4.6	5.5	6.3	7.1	7.9	8.7	9.5	10.4	11.3	12.4	13.5	14.9	16.5	18.5	21.0	24.3	
40 4.4	1.4	2.6	3.7	4.6	5.5	6.3	7.1	7.9	8.7	9.5	10.4	11.3	12.4	13.5	14.9	16.5	18.5	21.0	24.3	
50 10	1.4	2.6	3.7	4.6	5.5	6.3	7.1	7.9	8.7	9.5	10.4	11.3	12.4	13.5	14.9	16.5	18.5	21.0	24.3	
60 15.6	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	
70 21.1	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	
80 26.7	1.3	2.4	3.5	4.4	5.3	6.1	6.8	7.6	8.3	9.1	9.9	10.8	11.7	12.9	14.2	15.7	17.7	20.2	23.6	
90 32.2	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	
100 37.8	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	
120 48.9	1.1	2.1	3.0	3.9	4.7	5.4	6.1	6.8	7.5	8.2	8.9	9.7	10.6	11.7	12.9	14.4	16.2	18.6	22.0	
140 60	0.9	1.9	2.8	3.6	4.3	5.0	5.7	6.3	7.0	7.7	8.4	9.1	10.0	11.0	12.1	13.6	15.3	17.7	21.0	
160 71.1	0.8	1.6	2.4	3.2	3.9	4.6	5.2	5.8	6.4	7.1	7.8	8.5	9.3	10.3	11.4	12.7	14.4	16.7	19.9	