How Wood Flooring Reacts to Moisture

Hardwood flooring associations have described the parameters regarding relative humidity levels which should be maintained in order to protect your investment. The following statement comes directly from these organizations and other flooring literature.

Most Solid hardwood flooring as well as engineered flooring leaves manufacturing factories at a moisture content level of 7 to 8.5%. The following is a demonstration of the equilibrium moisture content (EMC) in wood based on a normal indoor temperature of 70°F at given relative humidity readings:

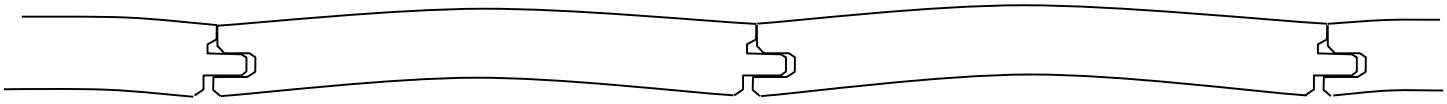
Temperature 70°F	Relative Humidity	Moisture Content in the Wood
70°F	5%	1.3%
70°F	10%	2.5%
70°F	20%	4.5%
70°F	30%	6.2%
70°F	40%	7.7%
70°F	50%	9.2%
70°F	60%	11%
70°F	70%	13.1%
70°F	80%	16%
70°F	90%	20.5%

The following is an illustration of what to expect from a wood product when installed and maintained outside these parameters.

80% Relative Humidity: (The flooring has increased 100% in moisture content)

Problem: Wood will absorb excess moisture due to high relative humidity and manifest this through crowning, buckling, tenting; expanding in width until the expansion space is exhausted. Severe buckling and lifting may occur.
Solution: Install de-humidifier and reduce R.H. to 40% for a period of 90-120 days; then restore condition to normal R.H. range of 40%-60%.

End view of boards: Moisture content of boards is approximately 16%

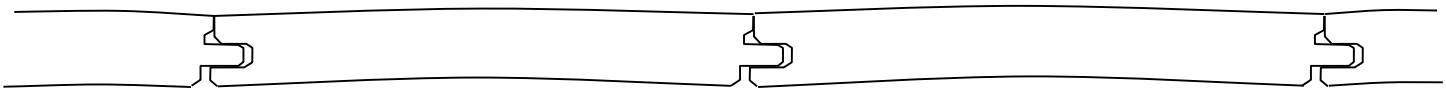


70% Relative Humidity: (The flooring has increased 65% in moisture content)

Problem: Wood will absorb excess moisture in higher relative humidity. The result is possible crowning, buckling, and tenting and an increase in side pressure against other flooring planks. Some buckling and lifting may occur.

Solution: Install de-humidifier and reduce R.H. to 40% for a period of 40-90 days; then restore condition to normal R.H. range of 40%-60%.

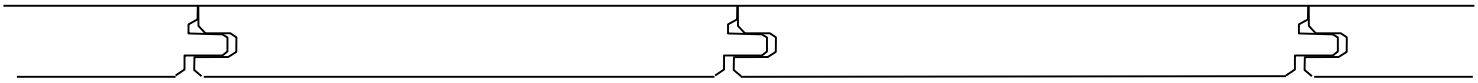
End view of boards: Moisture content of boards approximately 13%



40% to 60% Relative Humidity:

Wood will move very little in all directions, this is to include all furniture within the dwelling. Hardwood floors will maintain a flat, tight appearance as long as this range of humidity is maintained year around.

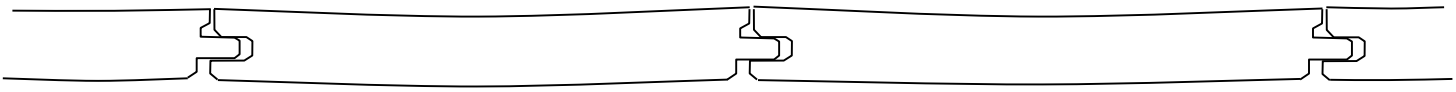
End view of boards: Moisture content of boards approximately 8%-8.5%



30% Relative Humidity:

Problem: (The flooring has decreased 25% in moisture content) Wood will start to shrink, expelling moisture possibly manifesting, slight cupping, and gapping. Some waviness in the floors appearance may occur.
Solution: Install a humidifier and increase R.H. to 50% for a period of 45-90 days. Then restore condition to normal R.H. range of 40%-60%.

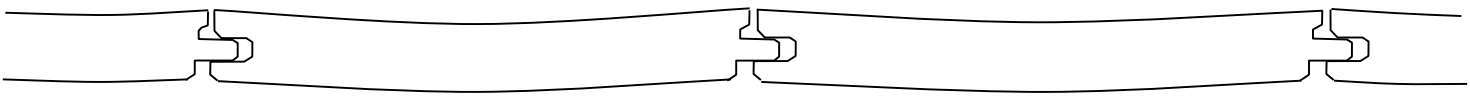
End view of boards: Moisture content of boards approximately 6%



20% Relative Humidity:

Problem: (The flooring has decreased 45% in moisture content) Wood will shrink, expelling more moisture possibly manifesting cupping, gapping up to the thickness of a quarter on edge. Waviness in the floors appearance may occur.
Solution: Install a humidifier and increase R.H. to 55%-60% for a period of 90-120 days. Then restore condition to normal R.H. range of 40%-60%.

End view of boards: Moisture content of boards approximately 4.5%



Moisture content of wood equilibrium with stated dry-bulb temperature and relative humidity

	Relative Humidity - Percentage																			
Temp. °F	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**80**	**85**	**90**	**95**	**100**
30	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	26.9
40	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	26.9
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	26.9
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	26.8
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	26.6
80	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	26.3
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	26.0
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	25.6

From the: US Department of Agriculture "WOOD HANDBOOK Wood as an Engineering Material".