What is Relative humidity?



The timber will adjust in size to the relative humidity in the room. To high causes expansion and too low causes shrinkage. Too low can also cause dry cupping because the timber pulls on the surface causing upward movement



How Relative Humidity affects Timber

The table below provides EMC values for a fairly representative range of atmospheric conditions that wood is likely to be exposed to. Values in this table are applicable to wood of any species for most practical purposes.

Relative Humidity %	Ambient Air Temperature - degrees Celsius and Fahrenheit (Celsius rounded to nearest degree)										
C:	-1	4	10	16	21	27	32	38	43	49	54
F:	30	40	50	60	70	80	90	100	110	120	130
5	1.4	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.1	1.1	1.0
10	2.6	2.6	2.6	2.5	2.5	2.4	2.3	2.3	2.2	2.1	2.0
15	3.7	3.7	3.6	3.6	3.5	3.5	3.4	3.3	3.2	3.0	2.9
20	4.6	4.6	4.6	4.6	4.5	4.4	4.3	4.2	3.0	3.9	3.7
25	5.5	5.5	5.5	5.4	5.4	5.3	5.1	5.0	4.9	4.7	4.5
30	6.3	6.3	6.3	6.2	6.2	6.1	5.9	5.8	5.6	5.4	5.2
35	7.1	7.1	7.1	7.0	6.9	6.8	6.7	6.5	6.3	6.1	5.9
40	7.9	7.9	7.9	7.8	7.7	7.6	7.4	7.2	7.0	6.8	6.6
45	8.7	8.7	8.7	8.6	8.5	8.3	8.1	7.9	7.7	7.5	7.2
50	9.5	9.5	9.5	9.4	9.2	9.1	8.9	8.7	8.4	8.2	7.9
55	10.4	10.4	10.3	10.2	10.1	9.9	9.7	9.5	9.2	8.9	8.7
60	11.3	11.3	11.2	11.1	11.0	10.8	10.5	10.3	10.0	9.7	9.4
65	12.4	12.3	12.3	12.1	12.0	11.7	11.5	11.2	11.0	10.6	10.3
70	13.5	13.5	13.4	13.3	13.1	12.9	12.6	12.3	12.0	11.7	11.3
75	14.9	14.9	14.8	14.6	14.4	14.2	13.9	13.6	13.2	12.9	12.5
80	16.5	16.5	16.4	16.2	16.0	15.7	15.4	15.1	14.7	14.4	14.0
85	18.5	18.5	18.4	18.2	17.9	17.7	17.3	17.0	16.6	16.2	15.8
90	21.0	21.0	20.9	20.7	20.5	20.2	19.8	19.5	19.1	18.6	18.2
95	24.3	24.3	24.3	24.1	23.9	23.6	23.3	22.9	22.4	22.0	21.5
98	26.9	26.9	26.9	26.8	26.6	26.3	26.0	25.6	25.2	24.7	24.2

2

Measuring Relative Humidity in Concrete



A new concrete floor.

1.11







Water evaporating out of slab when it is warmer and dryer at the surface.



RH increases as temperature drops. Because it is cooler below it stays wetter.

3

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(m) 😡

Measuring Relative Humidity in concrete



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Tests by a Swedish university found that the tests taken at 40% depth of a new slab are similar to the surface of the slab after it is covered by a floor covering.





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Measuring moisture

1.11

- 5.2 Hygrometer Measures the amount of moisture moving out of a concrete slab Relative Humidity (RH).
- 4.4 **Resistance meters** (Pin Meter)- measure the moisture content (MC) in timber.

https://youtu.be/o3Ghv9WLyUs



Capacitance test

00:00

SELECT MODE

PSYCHROMETRICS

OISTURE METER

AUTION



Measuring moisture in concrete

Hygrometer -

First grind/chip the concrete surface to open up the pores



1. Hood test-a casing sealed to the concrete surface. A plug inserted into a cavity of air that is readable by a digital meter.

2. Drill and plug—a sleeve inserted into the concrete surface. A plug inserted into a cavity of air in a sleeve that is readable by a digital meter.

Key points

- Relative humidity is a mixture of moisture vapour and air and is also relative to the temperature. Water vapour condenses when the temperature lowers. Vapour-Water-Snow-Ice
- Moisture Testing in concrete is recorded in Relative Humidity % (RH); vapour emitting out of the concrete. The is a called Hygrometer (device) test
- Moisture Testing in Timber is recorded in Moisture content % (MC); moisture resistance measured between pins inserted into the timber. The device is a Pin test or Resistance test
- Relative Humidity in a room affects timber floor coverings; the dryer = more shrinkage. More moisture = more swelling
- A customer can control there house RH with a HAVC system (heat, air, ventilation and cooling, airing the house out, ventilate/sun protection when locking up for long periods etc).



Moisture Treatment Systems

- Penetrating sealers A liquid when applied that penetrates the concretes pores and locks in the moisture. It can not be measured for effectiveness so must be applied correctly.
 - Concrete surface ground/opened up. Allowed the recommended time to purge before installation e.g 24 hours. No excess allowed to sit on the top of the concrete.
- Membrane moisture barrier an applied membrane (like a thick paint). It can be measured for effectiveness after application. Also must be applied strictly to the manufacturer's specifications





Key points

- Common reasons for a concrete floor to exceed 75% RH:
 - Not sufficient time for moisture to leave the slab
 - Not enough time allowed between the close in stage of a building and the timing of the flooring installation
 - Moisture penetrating the concrete slab from another source e.g. water run off from a hill into the concrete foundation (hydrostatic pressure), excess water from gardens next to a garden foundation
 - A damaged plastic vapour membrane beneath the concrete slab
 - An older floor that may not have a plastic vapour membrane beneath the concrete slab
 - Leaking pipes in a concrete floor

Key points

- Common reasons for a timber floor to exceed 15% MC or whatever the MC content of a timber floor covering should be:
 - Lack of cross flow ventilation, a vent blockage or from a concrete slab added
 - Not enough time allowed between the close in stage of a building and the timing of the flooring installation (it rains before the roof goes on)
 - Leaking pipes beneath the floor