



SOLID HARDWOOD FLOORING ACCLIMATISATION

Timber is a natural product that expands and contracts with seasonal changes and is affected by the moisture content of the air. The moisture content of timber is the percentage weight of water present in the timber compared to the weight of the timber with all water removed.

Moisture content varies with changes in humidity and temperature in the surrounding air. Small seasonal changes in timber flooring are considered normal and small gaps that open up during dry periods are not considered a defect. To minimise the movement of a hardwood floor caused by swelling on moisture uptake and shrinking on moisture loss, it is important to lay and fix a timber floor that is close to the average moisture content of the environment in which it is to be laid. This guide outlines the procedures required to assess the site and acclimatise solid hardwood timber flooring for the best results.

SITE ASSESSMENT

Every site requires climate assessment prior to the installation of a timber floor. It is important to know the long term relative humidity for the area where the floor is to be installed. Relative humidity is the major influence determining whether solid timber flooring will absorb moisture from the air and swell, or whether it will lose moisture and shrink. If the moisture content of the timber floor is close to the average long term relative humidity for the area then subsequent seasonal changes will be minimal. However, if the long term relative humidity for the area is significantly different to that of the timber flooring, seasonal changes in the moisture content of the floor needs to be considered. Solid hardwood timber flooring is kiln dried to 9 to 14.0% moisture content as per AS 2796.1. See figure 1.0. Onsite relative humidity is measured with a Hygrometer. It is a good idea to record relative humidity and temperature levels prior to and during installation. The local site climate can be assessed using data from the Australian Bureau of Meteorology website at www.bom.gov.au/climate. Approximate average equilibrium moisture content (EMC) is provided for each

climate in Australia. EMC is the moisture content that timber will reach under set conditions of relative humidity and temperature. Where seasonal variations are greater, seasonal movement (shrinkage and swelling) can be expected to be larger also. Areas that experience high levels of seasonal variation require greater allowance for floor expansion at the time of installation. Adequate subfloor ventilation is an important factor in the performance of hardwood timber flooring. The sub floor moisture & under floor humidity must comply with BCA & AS 1684.2 requirements. Where humidity remains high beneath a floor, the boards will absorb the moisture & expand.

IMPORTANT ISSUES ABOUT SUBFLOORS

1. The sub floor moisture & under floor humidity must comply with BCA & AS 1684.2 requirements.
2. Air vents should always remain unobstructed.
3. Number of air vents & size should meet or exceed BCA requirements.
4. Ground level below flooring should be well drained.
5. The subfloor ground should be flat, level & clear of any debris.

It is recommended that the ground below the subfloor be sealed with an impervious membrane, such as 200 micron plastic or vapour barrier. The plastic should be taped continuously with a 200mm overlap.

INTERNAL MICRO CLIMATES

The internal environment should also be assessed before installation. Within a dwelling, a number of climates may develop, causing areas of flooring to respond differently within the same dwelling. These include large expanses of glass, fireplaces, fridges, air conditioners and any appliances that vent warm air, the aspect of the house and two-storey construction. All of these can have an effect on the dimensional movement of the boards. When floors are exposed to direct sun through large glassed areas, protection should be considered before, during and after construction. Evaporative coolers add moisture to the air and raise the relative humidity, resulting in moisture contents in the flooring that are higher than under ambient conditions.

The likely movement of the floor after installation should also be a consideration when assessing the site. Small differences in moisture content between boards at the time of manufacture (5% is allowed by Australian Standards) together with variable conditions within the house (such as a west-facing room compared to a south-facing) will cause further variation in board width. For this reason, it can be expected that small gaps will occur at the edges of most boards, particularly during the drier months. These gap sizes may differ across the floor.

In cases where shrinkage may occur after installation, wider solid strip flooring boards such as 130mm will result in larger gaps at board edges when compared with narrower board widths eg. 85mm. Air conditioning that does not have a humidity control system, which is installed after a floor has been laid, may increase the size of shrinkage gaps, as it changes the relative humidity in the area.

Some movement occurs after laying timber floors as the timber adjusts to the climate. Although some floor finishes may reduce moisture content changes, they will not prevent this kind of movement. In cases where greater movement is expected after installation, such as from seasonal changes, the use of wider boards or from air conditioning installed after installation, particular care should be taken to ensure that the flooring finish does not act as an adhesive by bonding a number of boards together. With subsequent shrinking, wide gaps between groups of four or five boards may occur, or boards may split.

INSTALLATION MOISTURE CONTENT AND ACCLIMATISATION

Solid hardwood timber flooring is kiln dried to 9 to 14% moisture content as per AS 2796.1.

Where the average supplied moisture content of the flooring is near the expected average in-service moisture content, acclimatisation of the hardwood boards is not necessary.

Where conditions are drier, such as inland areas or air conditioned buildings, or where conditions are humid, such as in coastal areas or elevated regions, flooring may need to be acclimatised on site.

Acclimatisation is the process of allowing partial equalisation of the moisture content of the hardwood timber flooring when supplied, to the moisture content of the surrounding environment in which the timber is to be installed. Please note that the rate of moisture uptake varies from species to species.

Acclimatisation relies on each individual board being exposed to the in-service atmosphere so packs must be opened and restacked in a way that allows air to flow freely between each board.

Acclimatisation can only be effective in dry locations during dry periods or in an air conditioned building if the air conditioning is operating at the time.

Acclimatisation is only complete when the moisture content of the timber flooring is equal to the relative humidity in the environment. This usually takes about 14 days for 19mm flooring, but the time may vary depending on the species used and the weather conditions. To check that the timber flooring has reached this point it should be moisture tested with an appropriate timber moisture meter. This reading can then be compared to the relative humidity using the graph below (1.1).

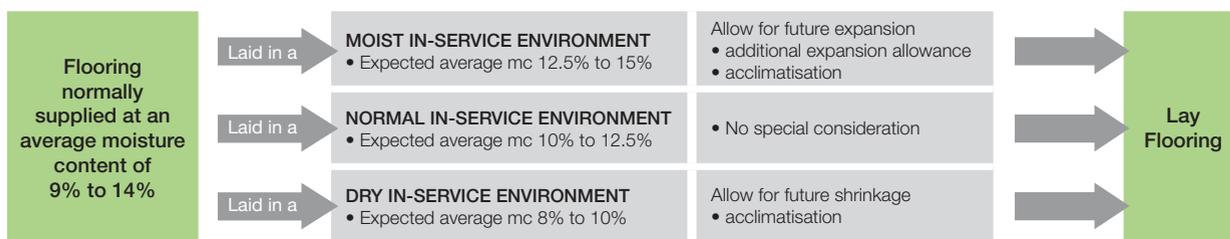
SPECIALTY FLOORING PRODUCT ACCLIMATISATION

Slimwood and parquetry may be acclimatised after the installation process has been complete. The flooring is left unsanded until its moisture content is equal to the relative humidity in the environment around it. This may take 7 - 14 days.

In a dry in-service environment this type of acclimatisation may lead to gapping between the boards. If required, these gaps can be "trowel filled" using an appropriate timber flooring putty, such as Timbermate.

In a moist in-service environment this acclimatisation method should be used with caution and extra expansion gaps will be required to take up the expanding boards.

1.0 - A simple guide to whether acclimatisation is necessary is provided in the flow chart below



Some of the information regarding acclimatisation has been sourced from the FWPRDC document 'Timber Flooring' version one December 2005.

1.1 - Moisture content of wood at various temperatures and relative humidity readings.

Temperature (C)	Relative Humidity (percent)			
	40	50	60	70
10	7.9	9.5	11.3	13.5
16	7.8	9.4	11.1	13.3
21	7.7	9.2	11.0	13.1
27	7.6	9.1	10.8	12.9
32	7.4	8.9	10.5	12.6
38	7.2	8.7	10.3	12.3

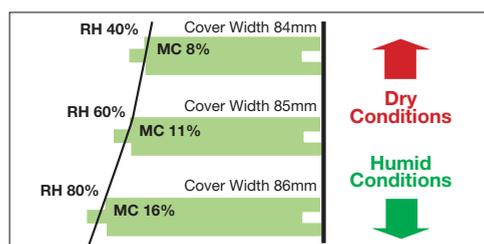


Chart taken from Wood Handbook: Wood as an Engineering material, (Agriculture Handbook 72), Forest products Laboratory, US Department of Agriculture.

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