

Introduction

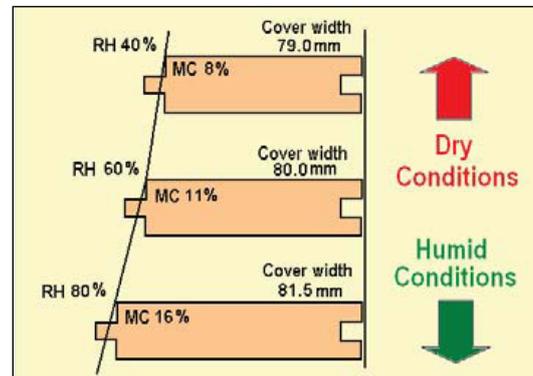
Ever since there have been timber floors, seasonal movement has been observed where floors would shrink during drier weather and expand during more humid weather. Although flooring products have progressed a long way in terms of their manufacture and construction, there is still a need to adequately provide for floor expansion and this is in all timber related flooring products including solid T&G, engineered, bamboo and laminate. This information sheet will explain this movement and provide a general outline of the requirements for the different flooring types including both fixed and floating installations.

Relative Humidity, Moisture Content and Expansion

The relative humidity is a measure of how moist the air is and the higher the percentage value, the moister the air. When the relative humidity is high, moisture in the air is absorbed into the flooring causing the moisture content of the flooring to increase. An increase in flooring moisture content is accompanied by swelling.

This is shown in the adjacent diagram for solid timber flooring which has greater seasonal movement in board width than other products. A floor's response is usually relatively slow and we may only see minor changes from month to month or with floating floors we may see only minor observable movement. However during prolonged wet periods all flooring types do expand. The moisture in the air is absorbed into the boards and swelling results.

To cope with this natural expansion movement allowance must be provided at the time of floor installation and failure to adequately provide for this swelling has resulted in many performance issues.



Do I really need an expansion joint through my floor?

Firstly, expansion allowance is not an option with these flooring products, it is a necessity. Industry standards and manufacturer installation instructions for all products require that floors are installed with expansion allowance. With all the flooring types being considered here, an expansion gap is to be provided to the perimeter of the floor and is hidden by the skirting or by beading. Also depending on the type of flooring being installed, the design of the dwelling and both the width and length of the floor then additional expansion joints may also need to be fitted within the floor. What is required not only differs between product types but will also differ within a product type. As such it is necessary to determine what is required for the specific flooring being installed.

What are the possible consequences of not installing adequate expansion allowance?

When floors have been installed with insufficient expansion allowance some of the consequences are visually, very apparent but others, which include the likes of squeaking or crackling noises from the floor cannot be seen but still affect the floor's performance.

Provided below are a number of examples demonstrating where the allowance for expansion has been insufficient.



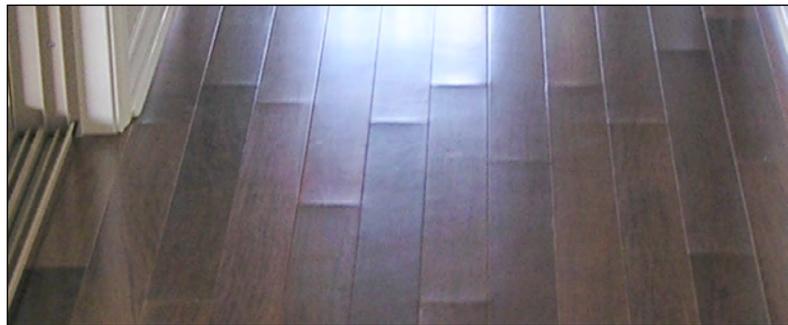
Buckling of a solid timber floor on plywood



Buckling of a floated bamboo floor



Peaking at board edges in a laminate floor



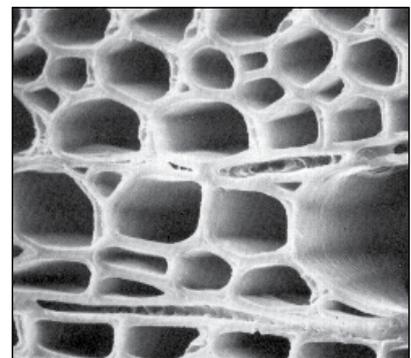
Peaking at board ends in an engineered floor

It is the flooring contractor who decides if expansion joints are required within a floor and although there may in some instances be negotiation as where they will be placed, there isn't the option to not have them if it is decided by the flooring contractor that they are needed. Simply, a friend's floor not having them is not sufficient reason as the design of the dwelling, the locality and the product used are all likely to be different and therefore two installations cannot be compared.

How products differ in their requirements for expansion allowance

It is important to understand that the expansion requirements differ significantly between product types and with the likes of engineered flooring there are so many different constructions that there can be significant differences between products.

Timber is made up of a number of tubular cells and swelling occurs when moisture is absorbed back into those cells making the tubes larger in diameter but with no appreciable increase in the length of the cells. It is for this reason that with solid timber floors, swelling across the width of the board is significant and needs to be catered for and if expansion problems occur in these floors then it is invariably associated with swelling in the width of the floor.



With engineered flooring many products are manufactured by cross laminating the timber layers. Through

this process the natural width movement of each layer is restrained and a floorboard is created that is more stable in width movement resulting from moisture content changes. Although the cross laminating does significantly reduce the width expansion compared to solid timber flooring, it does introduce a small amount of lengthwise movement in the board with changing moisture content that needs to be catered for. Hence with this type of construction there is a need to cater specifically for expansion in both the width and length.



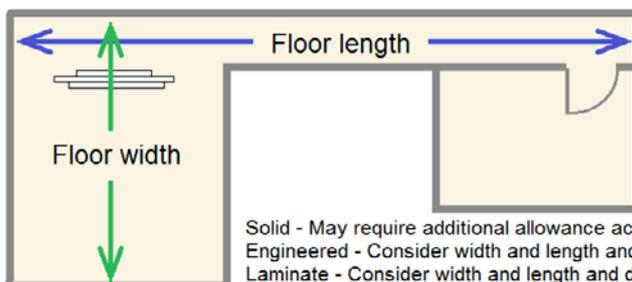
Cross laminated engineered flooring

The type of cross lamination also differs markedly between products. Some have a plywood core and base layer as indicated in the photo, but in other products a rubber wood core and spruce base layer is quite common. Not all engineered flooring is of this cross laminated type of construction with some products having a fibre board core similar to laminate. As such, due the differences in timber species used and the number of layers or the use of fibre board in the core, the expansion characteristics also vary between products and therefore the provision needed to accommodate expansion also differs. Due to this it is important to follow the expansion allowance requirements set out in the product manufacturers' instructions.

Laminate flooring is manufactured with decorative and melamine layers on the top of a fibre board core and then a stabilisation layer beneath this. Due to the core layer being fibre board, the wood fibre is not orientated in any particular direction and therefore boards expand at an equal rate in both their length and width. It is therefore equally important to accommodate expansion in both the width and length of laminate floors.

The diagram provides a summary of what has been outlined above. With engineered and laminate flooring the floor width before intermediate expansion allowance is needed is wider than for solid timber flooring. Down longer hallways with solid timber floors there is no need to provide more than the usual expansion allowance in the length of the floor.

However with engineered flooring and laminate flooring, expansion in the length of the floor must be considered and depending on the floor dimensions and product used it may necessitate expansion joints where the hallway links into a larger room and also where hallways pass by rooms leading off them. With floating floors, in particular, if the floor areas are not broken up correctly with expansion joints then as well as the possibility of introducing squeaking, boards can move out from beneath skirtings.



Strand woven bamboo has not been referred to in the above. This product is manufactured by cutting the bamboo into strands and then gluing the strands together under intense pressure. The characteristic of this product, although not cross laminated, is that there is expansion not only in the width but to a lesser degree also in the length of the product. Therefore, it has similar characteristics and needs similar considerations to cross laminated engineered flooring. The photo clearly shows movement in this floated strand woven bamboo floor which has expanded under the skirting across the width of the boards and where the floor has also moved lengthwise out from beneath the skirting.



Also with floating floors the first of these two photos shows unevenness in the floor surface of this floated floor due to insufficient expansion allowance. This introduces excessive vertical movement when walking on the floor and can often introduce squeaking. The second photo indicates where length expansion in this bamboo floor has begun dislodging the moulding around the door frame.



Floating floor uneven due to insufficient expansion allowance

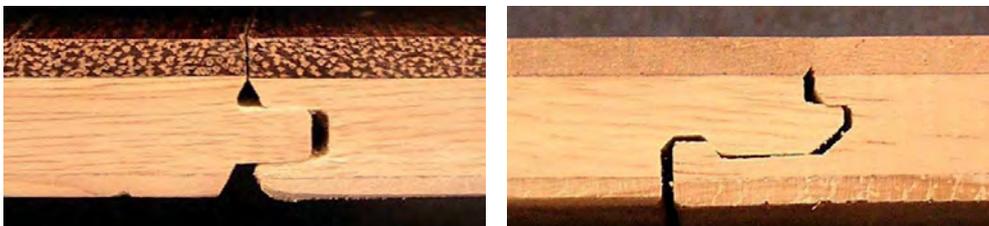


Length expansion dislodging moulding

Expansion allowance around fixed objects

Above we have considered expansion allowance to the perimeter of the floor and also within and between floor areas. It is also important to note that expansion allowance is also to be provided at or around all fixed objects, including internal columns, pipes and other floor surfaces such as ceramic tiles. This is irrespective of the flooring type or whether the floor is floated or not. The only exception being with board ends (not edges) of solid timber flooring at doorways etc where it may transition into say another flooring type where a small caulked gap can suffice. This is because length expansion in solid timber is sufficiently small to not cause problems.

Floating floors are not fixed to the subfloor and their expansion movement is not restrained and therefore it will be greater than if the product was fixed. Note that engineered and bamboo floors may be floated or adhesive fixed whereas laminate floors are always floated. Generally adhesive fixed floors will have a T&G profile (first photo below) whereas a floating floor will either have a glueless joining system (second photo below) or if a T&G floor is floated the boards will be glued one to another in the T&G joint.



T&G and glueless joining systems

The nature of a floating floor is that it rests on a foam underlay that will deform a little when walked on and the floor is able to expand and contract with seasonal weather changes in all directions. For this reason its movement cannot be restrained by heavy benches and the like and this necessitates that the flooring is laid around island kitchen bench and the like, whereas with solid timber floors the bench would be fixed on top of the floor. Due to this, floating floors require expansion allowance around benches and the gaps are covered with beading.

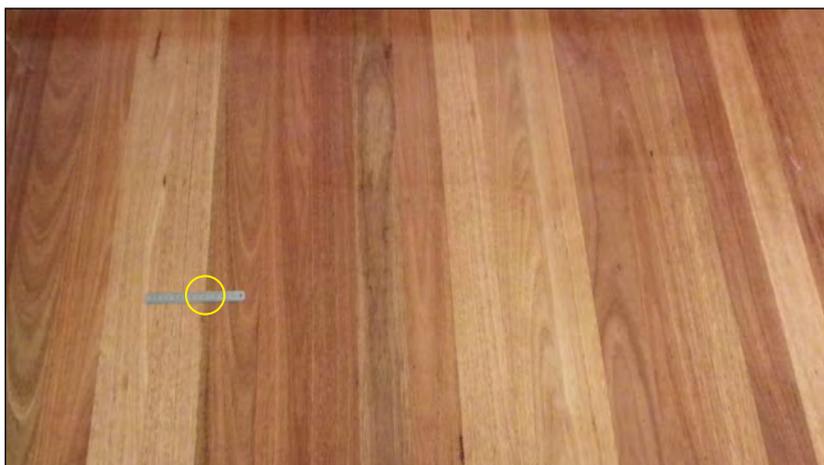
Expansion joints and trims commonly used

With solid timber floor expansion is catered for in a number of ways. Firstly, by assessing the product moisture content and the conditions where the floor is to be laid the degree of possible expansion can be estimated by the flooring contractor and it may be decided to acclimatise the flooring prior to laying. In humid localities the acclimatisation process, pre-swells the flooring prior to laying and therefore the standard expansion provisions can be incorporated with the installation. These include providing an expansion gap under the skirtings and aluminium trims at external sliding doors. With wider floor widths and in humid locations intermediate expansion allowance is also provided. This may be in the form of cork expansion

joints or small gaps at regular intervals at board edge joints. Cork joints particularly if stained blend well with floors as shown in the overall view and close up view of this Rose Gum floor.



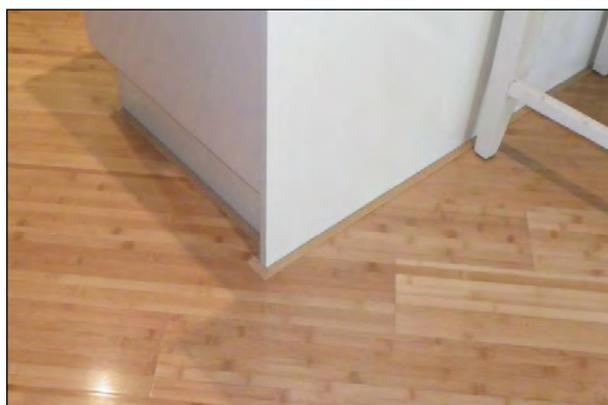
Cork expansion joint in solid timber floor



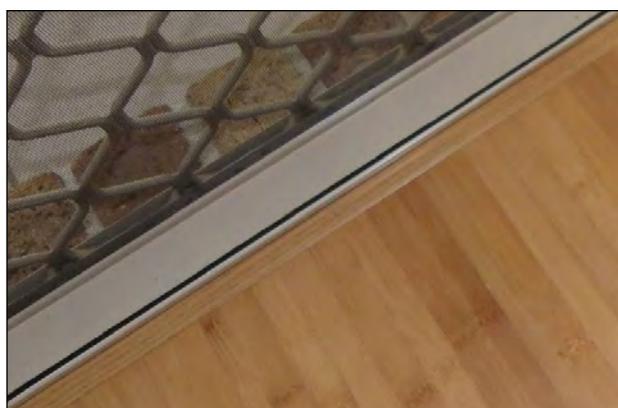
With engineered, bamboo and laminate floors perimeter expansion allowance may be covered by skirtings. In floated installations, beading is often used to cover expansion gaps and is fixed to skirtings. Products used for beading and trims may be timber, bamboo or aluminium coated to blend in with the floor. A range of profiles are available including trims for joints within the floor, doorway transitions as well as beadings. Provided below are some examples of the use of expansion trims and beads.



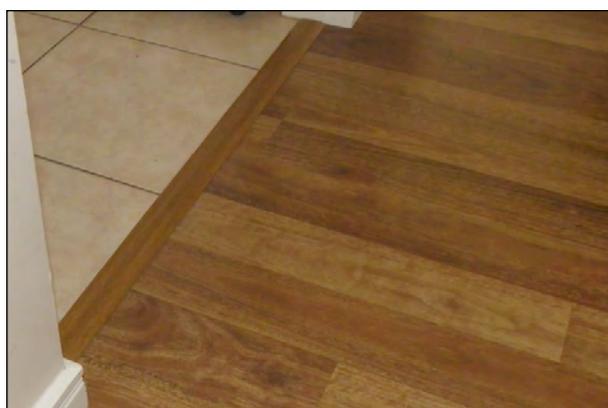
Timber expansion trim separating hallway and lounge room in this engineered floor.



Bamboo beading around the kitchen island bench in this horizontally laminated floated bamboo floor.



Aluminium expansion trim at an external patio doorway in this bamboo floor.



Aluminium expansion trim transition to tiles with this 'Spotted Gum' appearance laminate floor.



Beading to skirtings in this floated engineered floor.



Plastic skirting system providing for floor expansion and the added benefits of a concealed cable channel (see inset).