MOISTURE CONTENT IN TIMBER FLOORS

INTRODUCTION

The moisture content in timber varies with changes in humidity and temperature in the surrounding air. The effect is timber will swell with the uptake of atmospheric moisture, or shrink with moisture loss. Natural movement that occurs must be accommodated during the installation and finishing processes.

This TECHnote addresses ways movement is be taken into consideration when a floor is being installed.

MOISTURE CONTENT

The moisture content of timber is the percentage weight of water present in timber compared with the weight of timber with water removed. Timber is said to be at equilibrium moisture content (EMC) when, for given conditions of humidity and temperature, it neither gains nor loses moisture while the conditions of its environment are maintained. Under these conditions timber remains dimensionally stable.

Timber flooring products are usually seasoned to an average moisture content between 10% to 12.5%, although individual board moisture contents may vary from 9% to 14%. A major consideration with the installation of timber products is matching the product moisture content with the 'in-service environment' and the subfloor to which it is applied. The moisture content of subfloors supporting adhesive and mechanically fixed flooring should be as follows:

- Concrete: Relative humidity not to exceed 80% when tested to ASTM F2170 unless moisture vapour barriers are used.
- Sheet flooring: Moisture content to be within 2% of the installed flooring, when tested to AS/NZS 2098.1 for plywood subfloors or to AS/NZS 1080.1 for timber and particleboard subfloors.
- Joists: Seasoned joists are preferred and unseasoned joists are not to be used for secret fixing.

ACCLIMATISING

If the air in the space where the flooring is to be installed averages 65% relative humidity and 25°C, the in-service moisture content of the flooring will be approximately 12%. Therefore, when timber flooring is supplied at an average moisture content of 10% to 12.5%, acclimatising would not be required for these in-service conditions.

Acclimatising should be considered when the average EMC expected in the in-service environment is either high (e.g. 14% in the tropics) or low (e.g. 9% in inland regions or continuously air conditioned spaces). Acclimatising can therefore raise or lower the average moisture content of the flooring supplied to bring it closer to its in-service moisture content. Some species respond more quickly than others and the conditions need to be appropriate for acclimatising to be successful.

The common method of acclimatising timber flooring products is to stack them within the installation environment with spacers to allow free air movement to all surfaces. The humidity needs to reflect the desired raising or lowering of the moisture content. Alternatively, boards may be loose laid for a period. This may involve a delay with air conditioned spaces until the service is available.

ALLOWING FOR EXPANSION

In moist environments where significant floor expansion can be expected after installation, additional expansion allowance may be necessary. This is particularly so if conditions are not appropriate for acclimatising the timber when the floor is being installed.

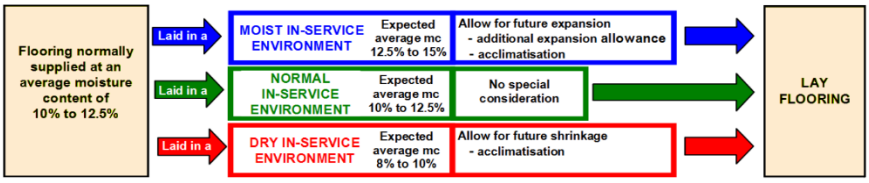

Diagram based on ATFA *Solid Timber Flooring Industry Standard*

NATSPEC provisions

NATSPEC worksections cover:

- The moisture content of milled and dressed timber products and methods of testing.
- The moisture content of subfloors and methods of testing.
- Criteria for acclimatising.

Relevant standards

AS/NZS 1080.1 *Timber - Methods of test - Moisture content.*

AS 1684.2 *Residential timber-framed construction - Non-cyclonic areas.*

AS 1720.1 *Timber structures - Design methods.*

AS 2796.1 and AS2796.2 *Timber – Hardwood – Sawn and milled products*

Part 1 *Product specification.*

Part 2 *Grade description.*

AS 4786.2 *Timber flooring – Sanding and finishing.*

Relevant documents

Australasian Timber Flooring Association (ATFA), *Solid Timber Flooring - Industry Standard.*

Relevant websites

Australasian Timber Flooring Association (ATFA)
www.atfa.com.au

Forest and Wood Products Australia (FWPA)
www.fwpa.com.au

Relevant worksections

0185 Timber products, finishes and treatment
0315 Concrete finishes
0382 Light timber framing
0383 Decking, sheet and panel flooring
0654 Multilayered board flooring
0655 Timber flooring
0656 Floor sanding and finishing