

TECHNICAL BULLETIN

CERAMIC TILING FIBRE-CEMENT SHEETED TIMBER FLOORING

(SELECTED DUNLOP C TYPE ADHESIVES WITH S1 AND S2 RATINGS)

INTRODUCTION & SCOPE

A common industry practice has been to cover timber floor substrates with fibre cement sheet underlays prior to adhesive fixing of ceramic tile finishes. The key to success when installing ARDEX tiling adhesive products on a flexible surface like 'timber'; is to achieve a good bond between the substrate and the flooring cover, but also to minimise the vertical movement that occurs between the floor joists.

QUALIFICATIONS

This recommendation only applies to:

A) internal timber floors and not to any external decking or verandah

B) domestic applications for new build houses or extensions

- a) The types of timber that the subfloor is made from must be certified as correct for flooring and can include T&G strip timber, particleboard (Structaflorä) and structural plywood. Timber frame constructions must also comply with the requirements of AS1684 Residential timber-framed construction.
- b) Floors covered with hardboard (c.f. 'Masonite'), strip timber or MDF sheet are not acceptable surfaces.
- c) Moisture sensitive and natural stone tiles require spe-

cial consideration as there are no DUNLOP adhesives specifically designed for sensitive stone tiles.

- d) This bulletin does not cover the installation of thin (3-4mm thick) large format porcelain sheet tiles onto timber floors.
- e) This bulletin does not preclude the need for waterproofing on floors that are subject to the requirements in AS3740 and the BCA for Class 1 building wet areas.

STRUCTURAL CONSIDERATIONS

Owners must take responsibility for the long term and short term stability of the flooring system, and tilers need to confirm that the floor is suitably rigid for tiling themselves. The subfloor should be solid and fixed to provide a rigid base and any boards exhibiting movement should be re-nailed.

The floor shall be fibre-cement sheeted with ceramic tile underlay (CTU) sheets *of a type specified to be used in this application by the sheet manufacturers* (min. 5-6mm thick). In other words, substituting wall or façade sheets for the correct underlay sheet is not acceptable. The sheets shall be installed in strict accord with the manufacturer's recommendations.

The maximum vertical deflection in the sheeted subfloor permitted when measured at a position centrally between floor joists (using a straight edge which exceeds the joist span in length) shall not ex-

ceed the figures shown in the table on the next page. This does not include any additional deflection of the whole floor that may occur between the bearers of the joists.

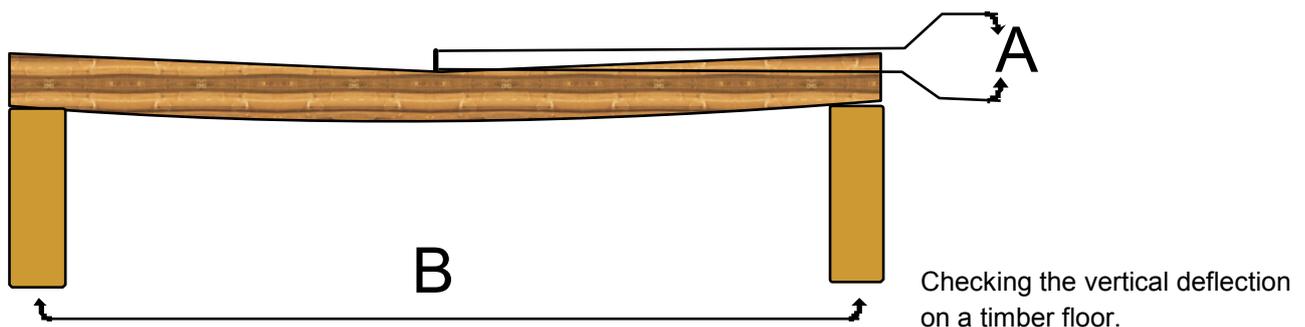
There is no standard test for this, but it is recommended that the floor be loaded with an 80kg weight to simulate an 'average' person (figure based on those for 19yrs males in the United States National Health and Nutrition Examination Survey, 1999–2002). This can easily be simulated by placing four 20kg bags of adhesive on the floor next to the straight edge. A set of feelers gauges or steel rule can be used to measure the deflection. Where the measured floor deflection exceeds the values shown in the following table, the floor is deemed to be too flexible for these adhesives and requires other forms of stiffening. There is a table of acceptable deflections for differing size tiles on the next page.

Qualitative indications of problems with floor deflections include things such as:

- i) creaking and flexing,
- ii) rattling of objects such items in cabinets when someone walks past,
- iii) cracked existing tiles,
- iv) cracked and broken up grout,
- v) opening and closing of timber floor joints in the Z axis

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Floor Joist Centres → Tile size ←	300mm	400mm (~16")	450mm	600mm (~24")
<100mm shortest edge length (small)	No recommendation	No recommendation	No recommendation	No recommendation
100mm-350mm edge length (medium format)	1/360 0.8mm	1/360 1.1mm	1/360 1.3mm	1/360 ≤1.5mm (maximum value)
>350mm edge length (large format)	1/500 0.6mm	1/500 0.8mm	1/500 0.9mm	1/500 1.2mm



$$A < (B \div 360)$$

The placement of fibre-cement sheeting will reduce the deflection, but will not cure problems with chronically unstable floors, such as ones that have insufficient number or reduced size of joists, loss of joist packing and rot or termite damage. Fibre-cement sheet primarily provides a more suitable type of surface for the cement based adhesive to get a 'bite' to.

JOINTS IN THE TILING SYSTEM

The installation of movement joints in the tile surface must com-

ply with the recommendations in the ceramic tiling standard AS3958.1-2007.

Movement joints in tiled floors are installed to separate the tiled surface from fixtures such as columns and walls (all wall-floor junctions must have perimeter joints installed to isolate the tiled surface from the wall), subdivided large areas of tiled surface into smaller sections to allow for induced strains (the recommended areas are specified in the standard), and to interrupt the tiled sur-

face where subfloor construction and movement joints are positioned.

The fibre-cement sheets shall have bond breaker tape used over each sheet joint to help resist problems with the adhesive and grout over these joints if they move, see 2) in next section.

MOISTURE

Timber floors must have excellent underfloor ventilation to eliminate vapour condensation. Underfloor moisture levels must be stable

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during the life of the flooring system with effective cross flow ventilation.

Free water sources must not be allowed under timber floors otherwise dimensional stability of the flooring will be compromised. It is not feasible to use a 'moisture barrier' to isolate an installation from moisture coming through a timber subfloor. Installing such a barrier is likely to lead to failure of the subfloor itself due to rot. Dampness also encourages vermin and termites.

Where moisture is found to be a problem this must be corrected by other means before any tile systems can be installed. Typically, this includes increasing ventilation, identification of leaking plumbing, or preventing lateral movement of moisture from other areas.

PRIMARY SURFACE PREPARATION AND ADHESIVE APPLICATION

- 1) All fibre-cement sheeted floors that have been contaminated during installation or other building works (plaster residues, paint and coatings splashes, dust or other adhesive rubbish) must be sanded with 80 grit paper, vacuumed and primed with DUNLOP PRIMER AND ADDITIVE or DUNLOP MULTIPURPOSE PRIMER. Dust suppressed equipment must be used, and in all cases the recommendations of the sheet manufacturers shall be followed. Sheets that are heavily contaminated with old adhesive resi-

2)

dues should be replaced.

A bond breaker tape should be used over all joints between the fibre cement sheets and the adhesive. This is normally 50mm wide PVC tape.

3)

Adhesive application and final tile placement shall be done to ensure a continuous unbroken 2.5mm minimum bed of adhesive under each tile. This can be accomplished by applying the adhesive with a 12 to 15 mm notch trowel held at 60° angle to the horizontal (i.e. nearly vertical) which results in adhesive notch lines about 6mm high. Then the tile is placed firmly and moved slightly back & forth across the adhesive notch lines to fully bed the adhesive and remove any notch voids.

4)

The achieved adhesive contact coverage to both the tile back and substrate are recommended to be >90%, but in all cases must exceed the recom-

mended minimum in AS3958 of >80% coverage for floors in residential situations. Where the correct coverage is not achieved the strength and resilience of the bed is reduced.

- 5) Application of tiles over tiles on this type of flooring substrate is feasible, however the underlying tiles must be sound and well bonded and the grout intact and not cracked.

These instructions apply for the applications of the cement based adhesives tabled above.

GROUT APPLICATIONS TO TILE JOINTS

Grouting between the tiles shall be done with a modified C class grout mixed with DUNLOP PRIMER & ADDITIVE diluted 1:1 with water to increase flexibility.

DUNLOP COLOURED GROUT

DUNLOP WIDEJOINT GROUT

Where the booster is not used with C class adhesives there is a risk of the grout cracking and falling out.

Adhesive	Class
DUNLOP TILE ALL	C2TS2
DUNLOP MULTIPURPOSE MASTIC	C2TES1
DUNLOP TRADE RESAFLEX*	C2S1
DUNLOP UNIVERSAL*	C2TES1
DUNLOP WALL & FLOOR FLEXIBLE	C1ES2

*Note 1: Trade Resaflex and Universal adhesives require floor deflections not to exceed 1/500 of span.

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The premixed grout DUNLOP READY-TO-GO COLOURED GROUT can be used in this application.

It is also possible to use the R class epoxy grouts such as DUNLOP EASY CLEAN Epoxy Grout.

NOTES

Always refer to the product data sheets for specific usage details.

The information contained herein is to the best of our knowledge true and accurate.

No warranty is implied or given as to its completeness or accuracy in describing the performance or suitability of the product application.

Users are asked to check that the literature in their possession is the latest issue.

It is the responsibility of the users to confirm that all products are suitable for the application and system, and are compatible with products in the application.

More detailed technical advice can be obtained by ringing DUNLOP on free call using the numbers shown below or via email from the contact us page at the DUNLOP DIY website.

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GLOSSARY

Bond breaker— A material applied over a joint between sheets, commonly a plastic tape or smeared sealant intended to allow the substrate to move independently of the surface materials.

C-Class adhesive—Cement based adhesives conforming to ISO13007. The adhesives has standard classifications C1 or C2 and then subsidiary properties such as F fast cure, S deformable, E extended open time

C-Class grout—Cement based grout conforming to ISO13007.

Contact coverage—The amount of adhesive directly in direct contact with the tile and substrate; considered to be full thickness beds, not partial thickness. For domestic internal floors this figure has to be greater than 80%.

Fibre-cement Ceramic Tile Underlay sheet— This specifically refers in this case to sheets made from cement, ground sand and non-asbestos fibres specifically for use as underlay sheets for tiling on. It does not refer to wall sheets misused in this way, or hardboard sheets such as 'Masonite' or MDF.

Movement joints— Are gaps be-

tween tiles and also between tiles and other features such as walls which allow for expansions and contractions. They are filled with flexible materials such as silicone sealant.

R-Class grout—Two component reaction resin grout conforming to ISO13007. Can be a three component system with a filler.