

PREPARATION OF CONCRETE SUBSTRATES

INTRODUCTION

Substrate is the surface to which a material or product is applied.

Concrete substrate preparation aims to:

- Maximise the adhesion of the finish system.
- Fulfill the tolerance requirements of the finished surface.

Conditions detrimental to adhesion of finishes are:

- Substrate movement.
- Excessive substrate moisture content.
- Excessive alkalinity.
- Bond inhibiting contaminants.
- Lack of keying.
- Premature application of finishes.

SUBSTRATE MOVEMENT

Concrete structures are subject to both immediate and long-term shortening or shrinkage together with creep and deflection. Increase in the extent of these movements diminishes with time.

Recommended procedures are to:

- Delay the application of finishes until after immediate movements have taken place.
- Provide movement joints in the finishes to accommodate long-term movement. This is particularly important with post-tensioned floor slabs as they may continue to shrink long after finishes are applied.

NATSPEC allows for a selection of movement joint types in the floor surfacing subgroup.

The following brittle finishes are particularly affected by movement in the substrate:

- Ceramic tiling.
- Cementitious toppings.
- Stone and terrazzo tiling.

MOISTURE CONTENT

Carpets, vinyl, linoleum and timber flooring are particularly sensitive to moisture. Some latex and adhesives may also be affected.

ELAPSED TIME – MOVEMENT CONSIDERATIONS

Application of floor finishes should be delayed. Refer to AS 3958 clause G.4.2(a) as follows:

- If either a screed or directly-bedded tiling is applied: At least 42 days.
- If a separate screed is applied: A further 21 days.

ELAPSED TIME – MOISTURE CONSIDERATIONS

Application of finishes should be delayed until the moisture content of the substrate conforms to the requirements of AS 1884 or AS 2455.1. Due to changes in design mix of concrete, admixtures and concrete surface finishing techniques, these requirements may not be met. Additional measures such as moisture barriers may be required.

BOND INHIBITING CONTAMINANTS

Bond inhibiting contaminants often present include sealers, waxes, curing compounds, form release agents, paint, dirt, grease and oils, concrete laitance (loose material) and construction dust.

Removal of contaminants can be done by mechanical abrasion (i.e. bead blasting or grinding). Chemicals or acids should be avoided as they are virtually impossible to remove and can themselves compromise the adhesive bond.

SUBSTRATE CORRECTION

Grinding off high spots:

- Check the compatibility of any proposed adhesive with the surface exposed by grinding, regarding increased alkalinity.

Filling low areas:

- Voids and hollows greater than 10 mm with abrupt edges: Sand / cement mix not stronger than the substrate.
- Depressions less than 10 mm: Scabble edges to eliminate a featheredge and apply a latex modified cementitious product. This reduces the risk of separation or curling of the filler.

Surface correction for key:

- Smooth dense concrete otherwise free of contaminants: Scabble to remove 2 mm of the surface and expose the coarse aggregate and apply a bonding treatment of cement slurry or a product compatible with the finish system.
- If a mortar bed is to follow, avoid substrate suction by damping its surface without leaving surface water.

Substrates sensitive to moisture



Damage to carpets due to substrate moisture.



Movement in substrate affects installation of ceramic tiles.



Provide movement joints at appropriate places to avoid cracks.

Relevant standards

AS 1884 *Floor coverings - Resilient sheet and tiles - Installation practices.*

AS 2455.1 *Textile floor coverings - Installation practice - General.*

AS 3958 *Installation of ceramic and stone tiles*

Relevant websites

Cement Concrete and Aggregates Australia

www.ccaa.com.au

Relevant worksections

0243 *Landscape – water features*

0411 *Waterproofing – external and tanking*

0612 *Cementitious toppings*

0613 *Terrazzo in situ*

0621 *Waterproofing – wet areas*

0631 *Ceramic tiling*

0632 *Stone and terrazzo tiling*

0651 *Resilient finishes*

0652 *Carpets*

0654 *Multilayered board flooring*

0655 *Timber flooring*

0657 *Resin based seamless flooring*