

TECHNICAL BULLETIN - TB057

Installation of Self-supporting Sand & Cement Screeds for the Installation of Ceramic Tiling

Date: April 8th 2020

INTRODUCTION & SCOPE

There are many situations where the use of a self-supporting (unbonded) screed is required to support new tiling installations. These include traditional mesh reinforced sand & cement screeds or the engineered ARDEX A38 / A48 Rapid Set screed.

This Bulletin describes the process of installation of a self-supporting unbonded screed.

Typical application would be as follows:

- On timber subfloors with excessive movement/vibration and where a rigid subfloor is required to avoid cracking of large format tiles,
- On external balconies/decks constructed of timber or steel framing where a torsionally rigid subfloor is required and falls to floor waste are specified,
- Where specific classes of thick fibre-cement sheet flooring are not installed with falls as recommended by the sheet supplier,
- Over light weight subfloors not strong enough for other bonded toppings,
- Over hi-density foam (thermal insulation and sound insulation) where a sand & cement screed is required prior to tiling,
- Over waterproof membranes that are incompatible with tile adhesives or barrier coatings such as bitumen and polyurethane membranes.

INSTALLATION RECOMMENDATIONS:

1. Lay two layers of PVC sheeting (200 to 300 microns thick each layer) as a slip sheet between the substrate and the applied sand & cement screed.
2. The second layer of PVC sheeting to be installed at 90° to the previous layer and the layers must be independent of each other.
3. The individual layers of PVC sheeting should be joined with duct tape or similar. Do not fix the first layer to the top layer and do not fix either layer to substrate. There shall be no creases in the sheets.
4. A self-supporting screed must be at least 40 mm thick to avoid the risk of cracking. Reinforced sand & cement screeds from 40mm to about 60mm

shall be polymer improved using either ARDEX Abacrete (or ARDEX WPM405) liquid additive and may be prepared using a sand & cement mortar blend. Screeds over 60mm may be prepared using a sand & cement blend bulk filled with equal volumes of 5-8mm aggregate (this becomes a type of granolithic topping), see 8).

5. To prepare a sand & cement screed (for 40-60mm thickness) blend 3 volumes of sand with 1 volume of Portland cement. Prepare a gauging solution by mixing 3 volumes of water with 1 volume of ARDEX Abacrete and blend with the sand & cement mix to form a stiff flowing mortar.
6. To prepare the ARDEX A38 screed, mix one 20kg bag of the A38 binder with 100kg of the ARDEX Gravel mix in a horizontal forced action mixer with between 9.5 to 11.0 litres (max.) of water (dependent on the moisture content of the gravel mix) for at least 2 minutes.
7. ARDEX A48 screed is a pre-mixed material that is handled the same way as A38 in terms of mixing and placement.
8. To prepare a bulk filled sand & cement mortar (also known as a granolithic screed), blend 3 volumes of sand with 1 volume of Portland cement. Blend the sand cement mix with 4 volumes of 5-8mm aggregate. Fresh water may be used as the gauging solution however the recommended solution includes the liquid polymer additives.
9. Improved results will be obtained by using the ARDEX Abacrete (or ARDEX WPM405) gauging solution described in 4) above.

Note: the ARDEX A38 / A48 screed does not require the liquid additives and can be applied to 100mm thickness.

10. The sand & cement screed must be reinforced using a galvanised steel mesh as recommended in AS3958. For screeds up to 60mm a minimum 1.2mm diameter mesh of 25mm spacing is recommended while with thicker screeds a 3-5mm diameter mesh is recommended.

Note: ARDEX A38 / A48 Rapid Set Screed does not require additional reinforcement and can be applied up to 100mm thickness. Ensure the screed is fully compacted.

11. Lay the sand & cement mortar or bulk fill to half the thickness finally required. Place the reinforcing mesh over the laid screed. Finally lay the remaining mortar or bulk fill over and through the reinforcing steel and finish using a wood float. Ensure the mortar is fully compacted as any voids around the mesh reduce the integrity of the screed.
12. Expansion and movement joints should be installed in a grid pattern of not greater than 4 metres externally and over all movement joints in the substrates and in accordance with the recommendations of AS3958.1-2007.

Note: ARDEX A38 / A48 Rapid Set screeds shall be laid in panels of approx., 40m² each.

13. Sand & cement screeds of 40mm thickness must be allowed to cure/dry

for 7 days before applying membranes or adhesives. Thicker screeds should be allowed to cure for longer (for example 100 mm requires 21 days).

ARDEX A38 / A48 Rapid Set screeds are ready for tiling after 8 hours drying. Allow 48 hours drying prior to laying levelling cements and/or resilient (e.g. vinyl) floor coverings.

14. Where necessary to work on “green” sand & cement screeds before the recommended curing time has completed, apply ARDEX WPM300 (or ARDEX WPM368) at a coverage rate of not greater than 3 square metres per litre per coat (0.3mm wet film thickness) as a barrier coating and allow curing to a scratch hard finish. Two coats may be required to ensure a continuous moisture barrier although prolonged drying may occur.
15. If the ARDEX WPM300 (or ARDEX WPM368) moisture barrier coating is not used, the sand & cement screed should be kept moist for at least 48 hours after installation to minimise cracking due to rapid drying.
16. The self-supporting unbonded sand & cement screed shall be cured in accordance with AS1303-4 and allowed a minimum 7 days drying at 20°C and 50% R.H. prior to tile work commencing.

Glossary

Bonded – The overlying topping system is adhered directly to the underlying waterproofing or substrate. There is no fixed upper limit in thickness, but the minimum for a sand-cement screed is 15mm thick and engineered screeds 10mm minimum. Smoothing cements can go to 1mm thick.

Cementitious – This simply means the topping system contains ordinary Portland cement or other specialised hydraulic cements such as High Alumina cement.

Concrete – Is a composite material composed of coarse aggregate bonded together with a fluid cement which hardens over time. Most concretes used are lime-based concretes such as Portland cement concrete or concretes made with other hydraulic cements (<https://en.wikipedia.org/wiki/Concrete>). It would be clear that smoothing cements and their related bulk fills could be loosely called concrete.

Engineered cement – This term refers to proprietary mixes of hydraulic cement with other powders and additives designed to create a higher performance binder system than just simple Portland cement. ARDEX dry powder smoothing cements, mortars and related products are engineered cements.

Engineered screed – This refers to screeds, that are made with engineered cement powders and selected aggregate-sand mixes. The higher performance of the binder allows these screeds to have higher sand-aggregate ratios, faster cure and greater final developed strengths. ARDEX A38 is an engineered screed system based on a specialised cement powder and separate sand-aggregate mix. ARDEX A48 is a pre-bagged and mixed version of this material.

Granolithic screed - A specialised type of sand-cement + aggregate screed, where the sand is replaced by a sand-gravel mix with a size range of typically 0-4mm in most usages. More generally though when used as ‘faux concrete’, the coarse aggregates are well graded, and the particles range from 13 mm to 0.06mm. The granolithic flooring concrete mix is generally in the proportion of 1:1:2 or 1:1:3 by cement-aggregate-sand weight (<http://www.theconstructioncivil.org/granolithic-flooring/>). The overall ratio is 2.5:1 filler-cement by volume so is more binder rich than normal sand-cement.

These 'screeds' compact more effectively and often have higher strengths than standard sand-cement screeds. The ratios may be varied where the aggregate used differs in size.

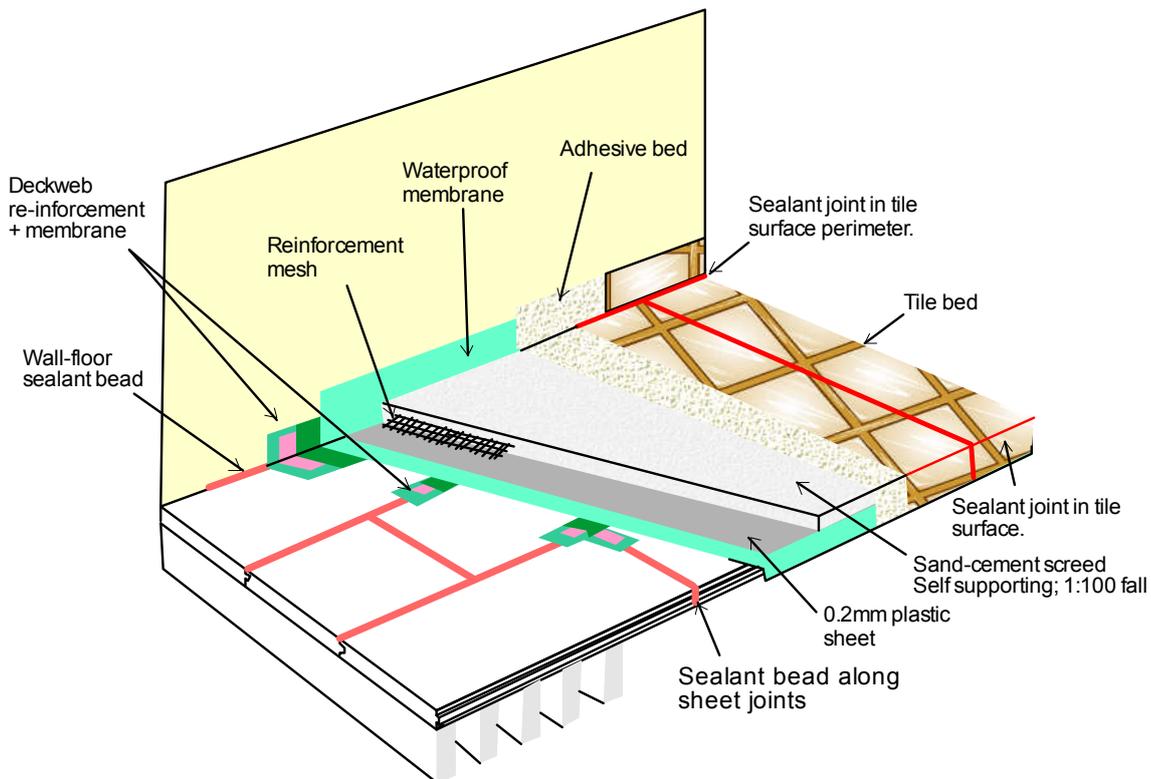
Screed - The common usage of this term is often applied generically for many types of applied surface toppings, but more strictly speaking for our industry, we believe it refers specifically to sand-cement screeds of the type described for tile bedding in AS3958.1-2007.

That means a mixture of Portland cement and clean sand (~0.15-0.5mm) mixed in the ratio of ~3-4:1 sand to cement by weight. Screeds may use coarser grades of sand and thus transition into granolithic screeds.

Self-levelling cement – The term is synonymous with self-smoothing cement, levelling cement and floor levelling cement. More specifically the term underlayment is defined in AS1884-2012 to describe these products which are invariably liquid engineered cement toppings. These materials should never be confused with sand-cement or granolithic screeds as they have completely different properties.

Topping - A generic term which can refer to screeds, mortar beds, smoothing cements and even new thin concrete slabs. It has no specific product material or system identification associated with it and should only be used for low level descriptions of installed beds on floors.

Un-bonded - The overlying topping system is not adhered directly to the underlying waterproofing or substrate and floats on a bond breaking sheet. The nominal minimum thickness is 40mm for sand-cement screeds, though engineered screeds can go down to 35mm with higher binder ratios. Non-engineered screeds contain re-enforcement mesh. Liquid smoothing cements and their related bulk fills cannot be laid un-bonded.



IMPORTANT

This Technical Bulletin provides guideline information only and is not intended to be interpreted as a general specification for the application/installation of the products described. Since each project potentially differs in exposure/condition specific recommendations may vary from the information contained herein. For recommendations for specific applications/installations contact your nearest Ardex Australia or Ardex New Zealand Office.

DISCLAIMER

The information presented in this Technical Bulletin 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 a product for a particular application. Users are asked to check that the literature in their possession is the latest issue.

REASON FOR REVISION – ISSUER

PERIODIC UPDATE

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