

# TECHNICAL BULLETIN – TB243

## SCREEDS AND WATERPROOF MEMBRANE AND BARRIERS

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### INTRODUCTION & SCOPE

The variety of waterproofing membranes currently available includes those that are compatible with most cementitious toppings (and/or tiled finishes) and those that are not.

To add further confusion, some toppings are not to be applied over flexible membranes as bonded systems, as opposed to un-bonded systems.

Finally *self-levelling cements* are not to be applied over membranes except in two special circumstances described in ARDEX Technical Bulletin TB199.

This bulletin is a brief introduction to membranes to be used with either bonded or un-bonded toppings and should be read in conjunction with ARDEX Technical Bulletin TB244 Screed System.

### DEFINITIONS

The terminology around toppings and membranes is a bit nomenclatural mess. The first thing to do is be clear on the terminology.

**Bonded** – The overlying topping system is adhered directly to the underlying waterproofing or substrate.

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

**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. ARDEX A38 is an engineered screed system.

**Granolithic screed** - A specialised type of sand-cement screed, where the sand is replaced by a sand-gravel mix with a size range of 0-4mm. The ratio is 3-4:1 as with normal sand-cement. These screeds compact more effectively and often have higher strengths than standard sand-cement screeds.

**Membrane** – This is used to describe waterproofing products compliant with AS4858 / AS3740 / AS4654 that are designed to prevent the penetration of water from above the membrane. This means +ve side water such as rain or spray from showers etc. Most materials of this type are Class II or Class III to AS4858 and can be sheets.

**Moisture barrier** – This is used to describe waterproofing products compliant with AS4858 and AS2870 that are designed to prevent penetration of water from below the barrier. This means -ve side water such as rising damp or residual moisture in screeds and concrete. Most materials are Class I to AS4858 or are plastic sheet materials.

**Screed** - This term is often used generically for many types of applied surface toppings, but strictly speaking 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 (~0.3-0.5mm) mixed in the ratio of ~3-4:1 sand to cement.

**Self levelling cement** – The term is synonymous with *self smoothing cement* and *floor levelling cement*. Specifically the term *underlayment* is defined in AS1884-2012 to describe these products which are engineered cement toppings. These material should never be confused with sand-cement or granolithic screeds.

**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.

### **WATERPROOFING MEMBRANES & MOISTURE BARRIERS**

Waterproofing membranes and barriers may be liquid applied systems or sheet membranes. For more specific detail on specific materials see ARDEX Technical Bulletin TB113.

**Liquid applied membrane systems** include (but are not limited to) the following:

- Acrylic based and acrylic/polyurethane blended premixed flexible products
- Acrylic/cementitious two part flexible products
- Rubber latex based premixed (i.e. SBR) and two part flexible products
- Bituminous rubber latex premixed & spray applied two part flexible products
- Polyurethane premixed flexible products
- Polyurea spray applied semi-rigid membranes
- Epoxy resin based semi-rigid membranes

Where bonded toppings are to be installed, liquid applied membranes such as the acrylic and rubber latex based (excluding the bituminous latex membranes) systems are generally compatible with cementitious sand-cement or granolithic screeds and/or tile adhesives.

Some liquid applied moisture barriers (e.g. epoxy based systems) can be successfully treated by “sand seeding” when newly applied so that the sand provides a mechanical key for the applied topping.

However, the “sand seeding” of polyurethane membranes has been much less successful and is not an ARDEX recommended solution for bonded toppings. Other types of liquid applied resin-based membranes, including most polyurethane systems, are not suitable for bonded toppings although they may be used with un-bonded sand-cement or granolithic screeds.

**Sheet membranes** may include (but are not limited to) the following:

- PVC and EPDM sheet
- Butynol Rubber Sheet and modified undertile variants
- Polyolefin (TPO) sheet (other than PVC or Butynol)
- Bituminous sheet (Self-adhesive or Torch applied)

Only the Butynol rubber sheet membranes that have been modified for undertile applications are suitable for bonded topping screeds.

All other sheet membranes can be used with un-bonded toppings.

### **BONDED VERSUS UN-BONDED SCREEDS**

Bonded *screed* installations are the most common as this allows the minimum thickness (15mm) to be applied thus limiting the weight load on the structure.

The substrate is generally concrete although it may be an applied membrane system over the concrete that is compatible with cement based toppings.

**Bonded screeds** are generally applied with a bonding slurry coat consisting of a liquid polymer additive (e.g. acrylic or SBR - rubber latex such as ARDEX Abalastic or WPM405) mixed with cement. The bonding slurry is broomed thoroughly over the dry membrane and the mixed wet screed mortar applied over the still wet bonding slurry. The liquid polymer additive is also diluted with water and mixed into the screed mortar.

**Un-bonded screeds** are not bonded to the membrane thus act to isolate the topping screed from substrates that may be contaminated, cracked or constructed with movement joints that would be unacceptable in the new floor coverings. Because they are un-bonded, they also have to be self-supporting. This generally means sand-cement or granolithic screeds will include welded wire mesh reinforcement and have a minimum thickness of 40mm.

However, specialist engineered toppings such as the ARDEX A38 Rapid Set engineered screed can be applied at a minimum 45mm thickness and does not require additional reinforcement although it is limited to approx. 40sqm panel/bay size with large areas to be installed in several panels/bays.



Un-bonded systems are placed over a slip sheet (e.g. double layer plastic sheet, ~200 micron - 0.2mm thick for each layer) with the top layer of plastic placed at right angles across the base layer.

Thus the sand-cement or granolithic (bonded or un-bonded) screeds and the ARDEX A38 (**un-bonded only**) toppings are the only approved systems applicable over a liquid applied *waterproofing* membrane. Bonded screeds, but not A38, can only be used over fleece faced sheet membranes such as ARDEX WPM750 or WPM1000.

Regardless of whether or not the screed is bonded or un-bonded, the screed must be compacted to ensure close packing and maximum strength development. However, sand-cement screed mortars and the ARDEX A38 Rapid set screed must be compacted during installation, especially when the topping thickness exceeds 40mm. This ability to adequately compact the mortar can limit the maximum effective thickness.

Note: *Self-levelling cements* are not suitable for application over waterproofing membranes although they may be applied to prepared concrete substrates as bonded toppings and subsequently protected by an applied membrane. They can be applied over appropriate Class I moisture barriers such as epoxies.

Self-levelling smoothing cements are generally applied as a liquid mortar thus can be left to settle without further compaction. They are normally applied as levelling/smoothing toppings directly onto prepared concrete substrates where flat surfaces are required. Aggregate may be added to some self-levelling compounds that will allow the formation of minor fall to drainage. However these products must be protected from moisture penetration by an applied membrane.

**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**

Rewrite with clarifications

**DOCUMENT REVIEW REQUIRED**

24 months from issue

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