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## TECHNICAL BULLETIN – TB244

# SUMMARY – SCREEDING AND SELF LEVELLING SYSTEMS

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### INTRODUCTION & SCOPE

Toppings are a necessary part of the construction process. They remove variation in floor heights, create falls to drainage systems, and provide flat /planar surfaces for selected floor finishes. Toppings can include self-levelling compounds and traditional sand and cement mortars (screeds).

Other specialised screeds may comprise premixed binders or epoxy resins mixed with size-graded sand. In all cases, these screeds are to be applied over a structurally sound substrate capable of supporting the weight of the screed. The screeds can be either bonded screed or un-bonded. This bulletin provides a summary of these systems. Refer to TB243 for definitions and terminology.

### SELF-LEVELLING COMPOUNDS – ENGINEERED CEMENTS

These cementitious products are engineered to have flow properties that allow the surface to self-level when applied in thin (<20mm) layers. They are meant to be applied to structurally sound-prepared & primed substrates. (Refer to ARDEX Technical Bulletin TB102).

These products are classified as *underlayment* as defined in AS1884 and are generally intended for the installation of resilient (e.g., vinyl) floor coverings, textiles (i.e., carpet), and resinous (e.g., epoxy) coatings. They are also commonly used under waterproofing membranes and/or tile adhesives. These products, even though not classified as 'screeds', exceed the minimum performance requirements of 20MPa compressive strength & 1.5MPa tensile strength, which are the minimum requirements for 'screeds' in Section 3 of AS1884 (Installation of Resilient Flooring).

Self-leveling compounds have rapid setting and rapid hardening properties. There is also no residual moisture to prolong drying times. This allows the installation of impervious floor coverings (e.g., vinyl) within 1-3 days of the self-levelling compound installation. These products are not designed to provide falls for drainage and can be limited in their capacity to achieve significant thickness. Their sole purpose is to provide internal bonded floor toppings that must be protected from moisture.

### BULK FILLS

The limitations of thin-layer applications can be overcome by mixing the self-leveling compounds with selected washed and dried aggregate to create a bulk fill. This allows a greater thickness to be achieved at reduced cost/m<sup>2</sup>. Aggregate-filled toppings are generally finished with a smoothing skim coat of the levelling compound before installing resilient floor coverings. Specialised proprietary bulk-fill toppings (e.g., ARDEX K900 BF, ARDEX A38 & ARDEX A48) could also create thicker bonded substrates before a final self-levelling compound finish.

ARDEX K900 BF is applied as a bonded internal floor topping with an application range of 3mm to 90mm thickness in one application. It will harden in 4 hours to allow foot traffic access and resilient floor coverings to be installed after 24 hours.





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ARDEX A38 Rapid Set screed consists of a proprietary engineered binder mix added to approved aggregate/sand with particle size within the nominated (0-4mm) range. This 'engineered screed' may be applied from 15 to 100mm as a bonded screed and a minimum of 40mm to 100mm as an un-bonded screed. It may be used internally and externally and can be tiled after 8 hours. ARDEX A38 will be ready for the internal application of ARDEX levelling compounds after 24 hours. It will be ready to apply resilient floor coverings or waterproofing membranes after 72 hours. ARDEX A38 may be used with floor heating systems, electrical wire types, and hot water piping systems. (Consult ARDEX for these applications.)

ARDEX A48 Rapid Set Screed is a proprietary mix of binder and aggregate/sand in one 20kg bag. Its properties and application are identical to the ARDEX A38 Rapid Set Screed. ARDEX A48 is typically used for smaller domestic applications.

### **MORTAR TOPPINGS - SCREEDS**

Traditional sand & cement mortars are typically used under hard tile finishes. They are classified as 'screeds' (the verb 'screeding' refers to using a long bar to even out the surface). Screeds typically blend 3 or 4 volumes of sand to 1 volume of cement mixed with gauging water. This will achieve a workable mortar that can be screeded to falls as required. AS3958 recommends a minimum thickness of 15mm for a bonded topping.

A modified version of a traditional screed is the 'Granolithic screed,' which uses sand-gravel in the 0-4mm range as the aggregate filler to achieve better matrix packing and, consequently, better strength potential. ARDEX A38 and ARDEX A48 have similar properties, with the difference being the use of a high-performance engineered cement binder.

Gauging water for screeds can be improved by adding liquid polymer additives such as the ARDEX Abacrete or ARDEX WPM405. These additives reduce the amount of liquid in the mortar, maintaining the mortar's workability while increasing the screed's strength. Screeds are best applied wet over a wet bonding slurry composed of the liquid additive mixed with cement.

The performance of standard screeds is generally less than that of self-levelling compounds. Screeds display lower compressive and tensile bond strength and have longer drying times. They are best suited for installing hard floor finishes such as ceramic/porcelain and/or natural stone tiles, as drying of the screed can continue by moisture evaporation through the porous grout lines. Screeds are unsuitable for use under resilient floor coverings as they may develop "ruts" due to crushing under heavy, concentrated loads. The floor covering could also be bubbling /blistering /discolouration due to excess moisture in the screed.

Therefore, the minimum performance requirements of AS1884 exclude these sand/cement screeds under resilient (e.g., vinyl) floor coverings as they rarely achieve the required performance.

### **RESIN BASED SCREEDS**

Specialised high-strength screeds can also be made using dry sand mixed with epoxy resins such as ARDEX EG 800F (Parts A+B, no Part C filler).

The epoxy resin is 100% solids, eliminating the need for cement in the mortar mix. The sand's particle size is generally 0 - 2.0mm, allowing the particles to be packed closest together for maximum strength.

The epoxy resin is a two-part liquid system mixed to achieve a uniform colour before adding sand. The mixed epoxy (Part A + Part B) makes up approximately 10% of the screed volume. This screed mix must be thoroughly mixed to ensure all sand particles are coated with the





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liquid epoxy. The substrate is initially primed with a bond coat of the mixed epoxy (no sand), and the epoxy screed mix is placed over the wet primer and screeded to fall as required.

An epoxy screed is used where high strength is required quickly to minimise downtime. Epoxy screeds have been used to install paving cobbles (wet bed method) in driveways leading to loading docks. Epoxy screeds will harden overnight and be made accessible for foot traffic after 24 hours, while vehicular traffic can travel across the screed after a minimum of 7 days.

An epoxy screed is not UV stable despite its strength and may discolour in sunlight. It is of limited use as it is incompatible with levelling compounds and/or tile adhesives because of bonding problems. Due to adhesion issues with flooring adhesives, it is not recommended as a substrate for most floor finishes.

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

Bonded screeds are the most common type of screed as they allow a minimum thickness of 15mm, thus limiting the weight load on the structure. The substrate is generally concrete, but it may also be an applied membrane system.

Note: Self-levelling compounds are not suitable for application over waterproofing membranes. They may be applied to prepared concrete substrates and are often protected by an applied waterproofing membrane. Sand-cement or granolithic (bonded or un-bonded) screeds and the ARDEX A38 and ARDEX A48 (un-bonded only) screeds are the only approved systems applicable over a liquid waterproofing membrane. Bonded screeds, but not ARDEX A38 or ARDEX A48, can only be used over fleece-faced sheet membranes such as ARDEX WPM750 or WPM1000.

Un-bonded screeds are not bonded to the substrate. They are isolated from substrates that may be contaminated, cracked, or constructed with movement joints that would be unacceptable in the new floor coverings. As they are un-bonded, they also must be self-supporting.

This generally means the screeds must include welded wire mesh reinforcement with a minimum thickness of 40mm. Specialist screeds such as the ARDEX A38 and ARDEX A48 can be applied at a minimum thickness of 40 mm and do not require additional reinforcement. However, these screeds are limited to panel/bay sizes of no more than 40m<sup>2</sup>, so large areas will require several panels/bays to be placed.

Unbonded screeds are placed over a slip sheet (e.g., a double-layer plastic sheet 300 microns thick on each layer), with the top layer of plastic placed at right angles across the base layer.

The screed must be compacted regardless of whether it is bonded or unbonded. This ensures close packing and maximum strength development. Self-leveling compounds are applied as liquid mortar and can thus be left to settle without further compaction. Sand/cement screeds and the ARDEX A38 and ARDEX A48 rapid set screeds must be compacted during installation, especially when the topping thickness exceeds 40mm.

### **SELF-DRAINING TOPPING SCREEDS**

External paving installations often exhibit excessive efflorescence due to moisture falling onto the paving and seeping through into the bedding until the weather conditions improve and evaporation can occur. The moisture dissolves the soluble compounds in cement-based screeds and adhesives, which then migrate to the surface as the moisture is drawn up to evaporate. The development of self-draining screeds is a solution where the moisture can continue to drain out of the bedding system into drainage systems in the underlying structural substrate.





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ARDEX A38 and ARDEX A48 rapid setting screeds system can be used as a self-draining bonded screed when mixed with ARDEX 2-5mm washed aggregate. The aggregate size does not provide the close packing normally associated with the A38 and A48 screeds, allowing moisture to percolate down through the screed, provided the screed is a minimum of 60mm thick. The perimeters of this topping screed must be formed to prevent the edges of the screed from breaking under load, and it has a rough surface texture unsuitable for any sort of textile covering such as 'grass carpet'. Typically, this self-draining screed is used with external paving finishes.

## SUMMARY

This Bulletin provides a brief outline of screeding and self-levelling systems provided by ARDEX Australia. It includes self-levelling systems for internal floors, where adding approved aggregate filler can increase thickness more economically.

Other types of screeds are noted, such as traditional sands/cement screeds used mainly under hard tile finishes and the rapid-setting high-strength systems recommended for internal applications under resilient floor coverings and timber floor finishes. Special toppings are noted for specific applications, such as epoxy screeds for installing paving cobbles or using the ARDEX A38 and ARDEX A48 products as self-draining screeds under external paving.

A distinction is also made between unbonded and bonded screeds. Self-levelling compounds are noted to be used only for internal bonded applications.

### **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 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**

Content Review, change of company slogan and address

### **DOCUMENT REVIEW REQUIRED**

36 months or whenever third-party suppliers change their recommendations.

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