TECHNICAL BULLETIN – TB025
CREATING DEAD LEVEL FLOORS WITH ARDEX FLOOR SMOOTHING CEMENTS

Date, Tuesday, 22 November 2016

INTRODUCTION & SCOPE

Revolving doorways, television studio floors, high-lift warehouse floors, indoor bowls floor and flooring installations with floor to ceiling windows that give a high degree of light reflection onto high gloss finishes, may require a specification to supply a "water level" floor finish to the entire floor area.

Concrete structures rarely are finished to "Dead Level" tolerance and would require topping to meet this specification. The issues with finish can be seen in the following typical floor specifications. The NATSPEC classes for flatness tolerance are;

Class A Maximum deviation from a 3-m straightedge is 3 mm.

Class B Maximum deviation from a 3-m straightedge is 6 mm.

Class C Maximum deviation from a 600 -mm straightedge is 6 mm.

With 12mm in 3m considered to be a 'reasonable finish'.

The revision of AS1884-2012 gives the following figures;

3.1.1.4 Surface quality

The surface of a concrete subfloor shall be thoroughly checked for the following:

(a) Planeness - When a straightedge 2000 mm long is placed at rest at two points 2000 mm apart on the surface, no part of the surface shall be more than 4 mm below the straightedge.

(b) Smoothness - When a straightedge 150 mm long is placed at any position at rest at two points on the surface, no part of the surface shall be more than 1 mm below the straightedge.

None of the above finish tolerances would be suitable for a dead-level floor type of application.

Traditionally, height changes were made with sand/cement toppings, but these are labour intensive and the minimum thickness is typically 25mm which would require alteration to floor heights.

This leads to the need for ramps and can result in significant weight loading of the concrete subfloor. With a drying time of 1mm per day (sand/cement screed) long time delays before floor coverings (vinyl tile or epoxy coating) can be installed will result. It is also difficult to get the floor dead smooth even if quite flat.

The revision to AS1884 restricts sand-cement* screeds to having a minimum compressive strength of 20MPa and 1.5MPa tensile strength which require significant densification and compaction of the screed.

In contrast, the ARDEX "Dead Level" floor system can quickly provide these tight specifications. Through the employment of experienced contractors, tolerances of +/- 1mm over 500m² can be achieved. Where the better flowing products Ardex K15M, K55 or K12N are used, it is easy to get a smooth and flat surface finish on the floor. Thicker areas can be bulk filled and then smooth finished with a neat smoothing cement coating.

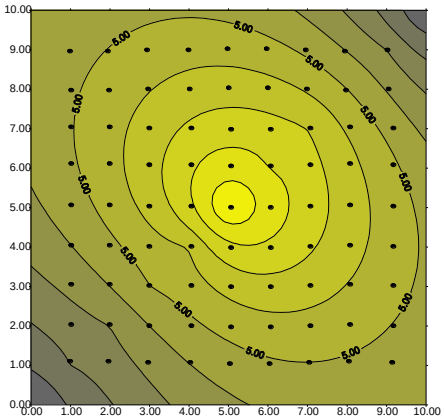
*Engineered screeds can easily achieve these figures with values exceeding 30MPa possible in compression, however this does not necessarily resolve the issues about flatness.

PREPARATION

1. ***IMPORTANT NOTE: A survey plan of the floor area taking measurements at 1-metre grid intervals before preparation begins is essential.***
2. Concrete floors must be structurally sound with all previous coatings removed, clean, dry and free of oil, grease, wax, latex compounds, curing compounds, efflorescence, laitance, dust and all foreign matter, back to a roughened, open porous matrix of the concrete.
3. Professional cleaning by mechanical means, such as shotblasting, scarifying or diamond grinding is required.

   Please contact ARDEX for their recommended cleaning method for this floor or refer to Technical Bulletin TB041.

Initial floor survey showing heights

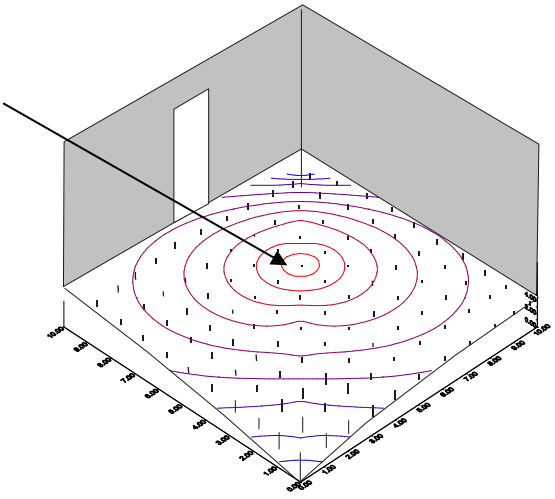


4. The qualified surveyor shall provide the appropriate height pins that can be manually adjusted for the initial base bulk fill topping, then readjusted up to the height required for the final floor height finish.
5. Height pins are to be placed at exactly on a 1 metre grid intervals over the entire floor area. Adjacent walls or fixtures are to be marked to indicate the rows of pins. This will enable the installer to easily identify where heights pins are located should they be covered during the installing process.

   NOTE: THE USE OF SAND PILES TO 'DEFINE' FLOOR HEIGHTS IS NOT RECOMMENDED.

6. ***After removal of high points during the preparation procedure the surveyor will conduct another survey of the floor area to determine and isolate the highest point on the floor.***

7. The highest point on the floor will then become the O R/L reference point. The general layout of a surveyed and height pinned floor is shown in the adjacent schematic diagram (the O R/L is in the centre of the floor area).
8. The final floor height will be +4mm - 8mm to the O R/L. This allows for a 4mm coating above the highest point on the floor.



9. At this stage the floor is to be thoroughly vacuumed to remove all dust and dirt, and it is then primed.

Survey pins positioned on floor with paper attached for visual identification

PRIMING

1. Primer for standard absorbent concrete subfloor shall be Ardex P51 mixed 1:2 with water and apply evenly with a soft push broom.

   Do not leave any bare spots, and remove all puddles and excess primer. Allow to dry to a clear, thin film (min. 3 hours max. 24 hours) and the underlayment shall not be applied until primer is dry.

2. The smoothing cement can be applied either straight or bulk filled depending on the thickness to be applied.

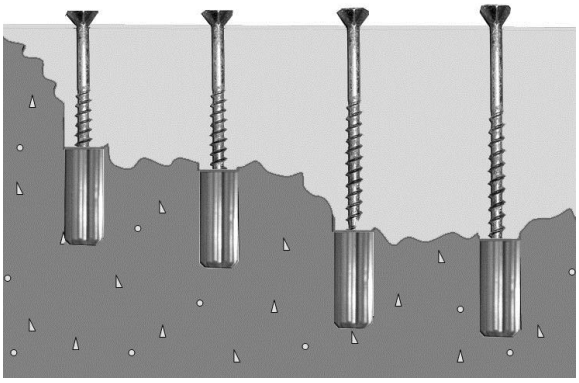
BASE BULK TOPPING

1. For large areas with a thickness over 10mm ARDEX FLCs can be mixed with a well-washed and graded fine aggregate 2-5mm 1:1 or 1:1.25 by volume or which gives a mix of around 18 litres per batch.

   20-25 kg aggregate (2-5mm or 3-8mm) plus

   20 kg ARDEX FLC plus gauging water

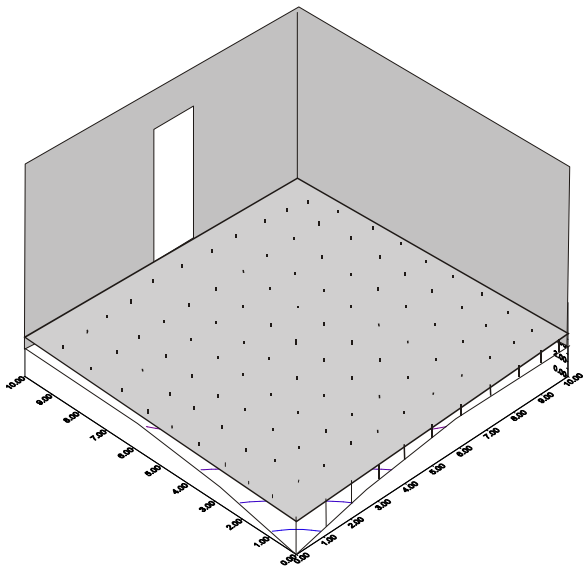
2. Install the ARDEX Levelling Cement base bulk topping using appropriate tools and finish off using a 4-foot spreader in both directions so that 1mm (height pin head) of the height pin is visible.



The bulk fill goes to the base of the height pins.

3. ***It is imperative that the base bulk topping is installed as flat as possible; the final 6 - 8mm coat is designed only as a smoothing coat not as a levelling coat.***

4. The diagram adjacent shows the bulk filled floor with the pin heads still protruding above the flattened floor level.

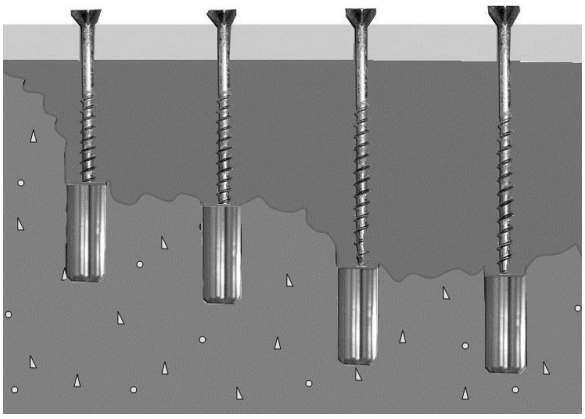


5. Allow the base bulk topping to dry for minimum 12 hours then reprime with ARDEX P51 diluted 2 parts water to 1 part ARDEX P51 and allow to dry (minimum 3 hours; maximum 24 hours).

FINAL SMOOTHING COAT

1. Height pins are then readjusted up to + 8mm from 0 R/L and each pin clearly marked with a piece of white paper.
2. The cement-based self-smoothing underlayment is applied onto the surface and shall be Ardex K15, K12 or K55.
3. The smoothing cement is to be floated in using appropriate tools and finished so that 1mm (head of the height pin) is clearly visible on all height pins.

The height pins have been raised by 3-8mm above the first layer of FLC, and the second smoothing coat has been applied on top.



FINAL SURVEY PLAN

1. Allow the ARDEX topping to cure for 12 hours then complete a final survey plan on the finished surface. Any high points can be ground off immediately.

   The final survey plan is then presented to the client as confirmation of compliance with the client's specification.

2. Floor coverings such as vinyl tile or sheet vinyl can be laid after 60-120 mins for K55, 16 – 18 hours for K15 and approximately 24 hours for K12 @ 20°C.

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

24 month review. Very minor text changes.

DOCUMENT REVIEW REQUIRED

24 months from issue

Document has been reviewed by Technical Services 2016

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