TECHNICAL BULLETIN – TB197

ARDEX K15, K80, K11, K12 & A55 OVER HEATED CONCRETE & ARDITEX ON TIMBER OR COMPRESSED FIBRE-CEMENT SUBFLOORS EXISTING IN SLAB & SELECTED STRIP HEATING SYSTEMS

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INTRODUCTION & SCOPE

Subfloor heating is becoming a popular climate control medium offering the client many benefits and creature comforts. Installing flooring over heated subfloors requires all the components to be able to accommodate the thermal variations associated with this flooring concept. The forces and thermal movement associated with heated subfloors can place additional stresses onto components within the heated subfloor and floor coverings.

Floor heating has traditionally been placed using heating elements into sand/cement screeds or the concrete subfloors, requiring long drying times for concrete, lifting floor heights and adding considerable weight where sand/cements screeds are used.

SOLUTIONS

CONCRETE

The ARDEX K15, K12, or K11 (optional mixing with ARDEX E25 will minimise strain issues – see note below about resilient flooring) and ARDEX A55 Self Smoothing Cements requires only 3-6mm coverage over the electric heating cables when these are installed onto the subfloor, or 3mm of smoothing cement when used on subfloors with heating installed within the slab. Floor coverings can be laid the next day.

NOTE: ARDEX K80 is designed to be laid at a minimum of 6mm and is an industrial topping containing a coarser grade of sand than K15, K12 K11, and can be used for heated floors with either cables within the slab, or cables laid onto the subfloor and embedded in the topping.

Where the covering is to be resilient flooring such as vinyl, the addition of Ardex E25 is required for Ardex K12 and ardex K11.

TIMBER OR COMPRESSED FIBRE-CEMENT

The ARDITEX Self-Smoothing Cement requires only 3-6mm coverage over the electric heating cables. Floor coverings can be laid after 2 days.

NOTE: ARDITEX can also be used over concrete surfaces as well.

TILING

Ardex supplies a range of tile adhesives suitable for bonding to the underlayment over both concrete and timber floors.

PRECAUTIONS

To provide additional protection when installing floor-levelling cement over pre-existing heated subfloors we recommend the following procedures.

A. Heating element to be disconnected and bring down subfloor temperature to a max. +18°C

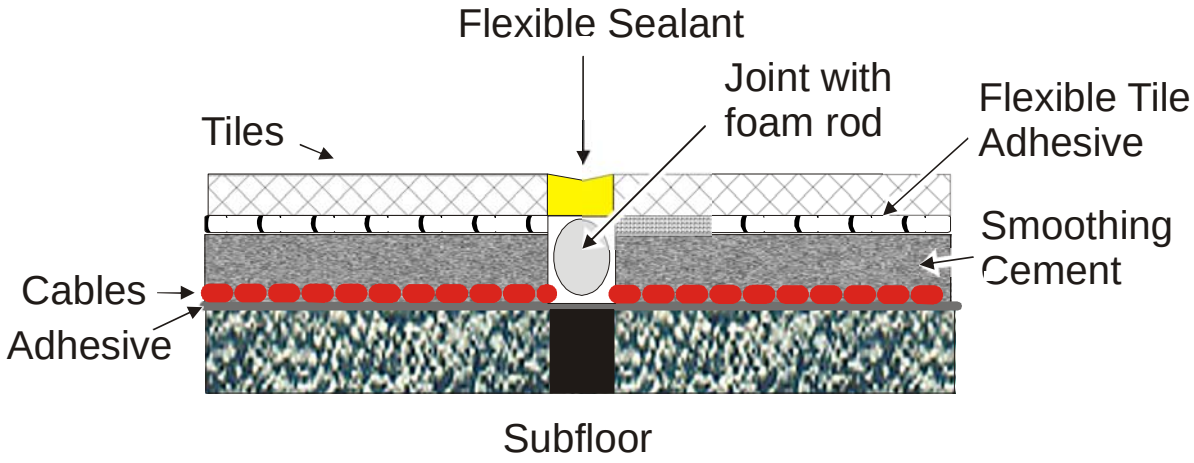
B. Subfloor shall be inspected and corrected for moisture in accordance with AS 1884-1985 or AS/NZS2455-2007, or any other conditions that may affect the performance of the underlayment or finished floor covering.

This procedure does not apply to warm water systems were heated water is pumped through pipes either on, or placed inside the slab. Any leaks can result in damage to the levelling compound or possible blistering of the vinyl.

C. Refer to manufacturer's specifications for laying heating cables to confirm that they comply with this procedure.

D. All expansion joints in the tile bed should be transferred through the ARDEX K15, K80, K12, K11, A55 or ARDITEX topping (see diagram below).

E. The subfloor must be correctly prepared as heated subfloors are high stress applications, and poor surface preparation and contamination can compromise topping bond.



TOPPING INSTALLATION

CONCRETE

1. It is essential that the concrete subfloor provides a mechanical key for the underlayment topping. Diamond shaving/grinding, shotblasting or scarifying the concrete surface to provide a roughened, clean, sound, solid, and porous matrix is required.
2. Primer to be ARDEX P51. Mix ARDEX P51 P1:2 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 underlayment shall not be applied until primer is dry.
3. *FOR INSTALLATION ONTO SLABS WITH INTERNAL HEATING* -

   The cement-based self-smoothing underlayment shall be ARDEX K15, ARDEX A55, ARDEX K12 or ARDEX K11 Self-Smoothing cement.

   The following smoothing cements can be mixed with ARDEX E25 Resilient Emulsion. *Remember resilient requires ARDEX E25 with ARDEX K11 and K12.*

   MIX RATIO
   a) 20 kg bag of ARDEX K15 with
   1.6 litres of ARDEX E25 plus
   4 litres of cool clean water

   b) 20kg bag of ARDEX K12 with
   1.25 litres of ARDEX E25 plus
   3.75 litres of cool water

c) 20kg bag of ARDEX K11 with
1.5 litres of ARDEX E25 plus
3.5 litres of cool clean water

Minimum thickness of ARDEX K15, A55 or K11 to be 3mm
Minimum thickness of ARDEX K80 to be 6mm

4. *FOR INSTALLATIONS USING CABLES OR MATS ON THE SLAB*

Install heating mat or cable system by adhesive fixing the cable/matting at the edge of the cable/matting* roll at specified centres using ARDURIT S16, ARDEX A45, hot melt glue, or liquid nails ensuring that the adhesive used for fixing the cables is used sparingly, avoid soiling of the primed concrete surface.

*Note: Mats must permit approximately 80% contact between floor smoothing cement and subfloor.

The cement-based self-smoothing underlayment shall be ARDEX K15, ARDEX K11 or ARDEX K12 Self-Smoothing Cement.

The following additions of ARDEX E25 Resilient Emulsion are suggested to improve performance. *Remember resilient requires ARDEX E25 with ARDEX K11 and K12.*

MIX RATIO
a) 20 kg bag of ARDEX K15 with
1.6 litres of ARDEX E25 plus
4 litres of cool clean water

b) 20kg bag of ARDEX K11 with
1.5 litres of ARDEX E25 plus
3.5 litres of cool clean water

c) 20kg bag of ARDEX K12 with
1.25 litres of ARDEX E25 plus
3.75 litres of cool water

Minimum thickness of ARDEX K15, A55 or K11 above the heating coil is 4mm - 6mm depending on system.
Minimum thickness of ARDEX K80 above the heating coil is 6mm.

5. For K15 or K80 allow to cure 16-18 hours minimum at 20°C before installing impervious coverings, carpets and floating timber. Tiles can be laid after 4-6 hours.
6. For K12 allow 24 hours before installing floor coverings.
7. For K11 allow 24 hours before installing carpets or floating timber and 2-3 days before installing vinyl. Tiles can be laid after 4-6 hours.
8. For A55 allow to cure for 60-90 minutes at 20°C before installing impervious coverings, carpets, floating timber or tiles. Direct bonded timber requires around 16-18 hours drying.

TIMBER & COMPRESSED FIBRE-CEMENT

1. The wooden subfloors must be clean and free of oil, grease, wax etc., and should be solid and fixed to provide a rigid base. Any boards exhibiting movement should be re-nailed and open joints should be filled with a suitable fast setting mortar. The examination of the subfloor is a professional evaluation by the contractor and is most important.
2. Sand the wooden subfloor, using a coarse abrasive, to remove all foreign matter and to provide a mechanical surface for the installation of the primer.
3. When using Compressed Fibre Cement Sheet (CFC) it shall be laid as per the manufacturer's instructions. Compressed fibre-cement butt joints must be supported by a batten/joist and firmly fixed in to allow no movement. Sheets are to be adhered with HYDREPOXY 501 between panels.

   Compressed fibre-cement to be free from dust, dirt, grease, oil, paint etc. Mechanically prepare (progress, drum, or belt sand) to provide a roughened surface and to remove all adhering foreign matter. Vacuum the surface to remove all dust and dirt.

   Note: Avoid breathing dust and wear approved personal protective equipment and use appropriate dust suppression equipment. Refer to sheet manufacturers advice in this area. ***Do not sand old compressed asbestos cement sheeting***.
4. Prime the wood or CFC subfloor with ARDEX P82 ULTRA PRIME in accordance with printed technical data.
5. Install heating cable/mat system and adhesive fix the cable/matting at the edge of the cable/matting roll at specified centres using hot melt glue, or liguid nails ensuring that the adhesive used for fixing the cables is used sparingly, avoid soiling of the primed concrete surface.
6. Install ARDITEX as per the printed technical data sheet.
7. Minimum thickness of ARDITEX above the heating coil/mat is 3mm - 6mm depending on system.
8. Finish the ARDITEX with a spiked roller immediately after application to achieve a smooth flat finish.
9. Allow the ARDITEX to dry completely prior to installing flooring.
10. Allow to cure 48 hours minimum at 20°C before installing coverings.

FLOOR COVERING

In general the following product applications apply:

ARDEX K15, K12, A55, or K80 suitable for the following coverings:

Vinyl tiles, strips and sheets, carpet, floating timber, tiles and rubber matting. Note that K80 has a coarser sand than K15 or A55 and may not suitable for all vinyls.

ARDEX K11

Carpet, floating timber, tiles and domestic or light commercial vinyl.

ARDITEX

Carpet, floating timber or tiles.

Install carpet and vinyl coverings with no further preparation required other than touch up work using ARDEX FEATHER FINISH.

Tiling requires the use of a flexible adhesive and grout that will allow movement. The following products shall be used in accordance with their product data sheets

For concrete floors use ARDEX STS8 mixed with ARDEX E90, ARDEX X7 mixed ARDEX E90, ARDEX X77 (with or without ARDEX E90), ARDEX X56 or ARDEX ABAFLEX.

For timber or CFC floors use ARDEX X56.

Grout joints require a flexible grout and choices are ARDEX FG8 GROUT or ARDEX ABACOLOR WIDEJOINT both mixed with ARDEX GROUT BOOSTER.

Install using conventional tiling practices plus allow expansion joints at 4 metre centres and at all vertical abutments, in accordance with Australian Standards AS 3958.1-2007.

For more information about tiling over heated systems refer to Ardex Technical Bulletin TB176 which covers in detail various adhesive system combinations.

COMMISSIONING THE FLOOR

It is important to recognise that sufficient drying and cure in the smoothing cement to lay floor coverings, is not the same degree of cure required before the floor heating is turned on.

Where levelling compounds have been used with vinyl or carpet, the heating can be turned on after two (2) to four (4) days depending on the product installed and the weather conditions.

ARDEX K15, A55, K80 have ARDURAPID drying and cure sufficiently for floor coverings to be laid in 16-18 hrs. However, the minimum cure time before energising of the floor heating is two (2) days, but when the temperature falls below 10^0C this needs to be extended. In late Autumn, Winter, early Spring or in cold climate areas, Ardex recommends that the cure time before energising the subfloor is a minimum of three (3) and preferably four (4) days, unless the room is heated to 18^0C or higher in which case two (2) days is sufficient.

ARDITEX and K11 are hydration products and initially dry, and then cure more slowly, especially in cold and wet weather (10-15^{0}C). The recommended curing time for these products is a minimum four (4) days. These products should not be applied below 10^0C.

Do not apply any smoothing cements when the temperature will fall below 5^0C during the drying-cure period as the cure will be severely retarded, or maybe permanently compromised.

Allow tiled installations to cure for a minimum of 7 days before turning on the heating.

WHEN COMMISSIONING THE FLOOR, TURN HEATING UNIT ON BY INCREASING TEMPERATURE APPROXIMATELY 2^0C PER DAY UNTIL THE DESIRED TEMPERATURE IS REACHED.

THE MAXIMUM RECOMMENDED TEMPERATURE IS 28^0C, AND DO NOT HEAT ABOVE 45^0C. THE FLOOR HEATING SHALL BE CONTROLLED WITH AN APPROPRIATE THERMOSTAT SYSTEM.

FAILURE TO OBSERVE THESE RECOMMENDATIONS MAY RESULT IN DE-BONDING OF THE TOPPING DUE TO THE DEVELOPMENT OF TENSILE STRAINS AT THE TOPPING-FLOOR INTERFACE. ENERGISING THE HEATING BEFORE ADEQUATE CURING IN THE SMOOTHING CEMENT CAN ALSO RESULT IN DEVELOPMENT OF EXCESSIVE TENSILE STRAINS IN THE SMOOTHING CEMENT ITSELF.

PROBLEMS WITH ADHESIVES AND EXCESSIVE MOVEMENT IN TILED FLOORS CAN ALSO RESULT FROM OVER-HEATING THE SUB-FLOOR.

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 Ofiice.

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
New bulletin for New Zealand

REVIEW PERIOD
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