TECHNICAL BULLETIN – TB029

APPLICATION OF ARDEX MATERIALS OVER HEATED SUBFLOORS INCLUDING HYDRONIC HEATING

15th July 2025

Introduction & Scope

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

Floor heating has traditionally been placed using heating elements into sand/cement screeds or concrete subfloors. This requires long drying times for concrete, lifts floor heights, and adds considerable weight where sand/cement screeds are used.

SOLUTIONS

CONCRETE

ARDEX K15, ARDEX K12, ARDEX K125, ARDEX K275 (mixed with ARDEX E25), and ARDEX K55 Self-Smoothing Cements require only 3-6mm of cover over the electric heating cables when they are installed onto the subfloor or 3mm of material when used on subfloors with heating systems 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 the other K series products. It can be used for heated floors with either cables within the slab or cables laid onto the subfloor and embedded in the topping.

TIMBER OR COMPRESSED FIBRE-CEMENT

ARDEX K65 and K60 ARDITEX Self-Smoothing Cements require only 3-6mm coverage over the electric heating cables. After 2 days, floor coverings can be laid. **NOTE**: ARDEX K65 and K60 ARDITEX can also be used over concrete surfaces.

TILING

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

PRECAUTIONS

ARDEX recommends the following procedures to provide additional protection when installing floor-levelling cement over pre-existing heated subfloors.

A. The heating element is to be disconnected, and the subfloor temperature is to be brought down to a preferred max. +18°C, but no less than $+10^0$C.

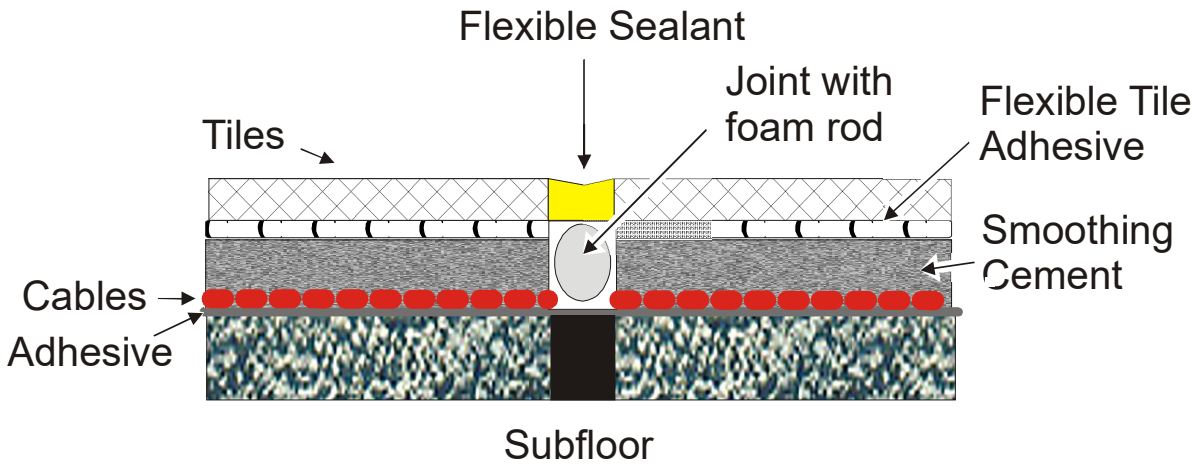
B. The subfloor should be inspected and corrected for moisture in accordance with AS 1884-2021 or AS2455-1995 or any other conditions that may affect the performance of the underlayment or finished floor covering.

C. Hydrononic systems in which heated water is pumped through pipes sitting directly on the slab should not be embedded in a liquid smoothing cement. The smoothing cement can be applied over concrete with heating pipes embedded, but the depth needs to be 25mm at least.
ARDEX K80 can be considered where the pipes are held in a plastic-framed structure that sits on the concrete subfloor and allows the smoothing cement penetration around the pipes.
Pipes can be directly embedded in an A38-A48 engineered screed.
However, any leaks can damage the levelling compound or engineered screed and possibly blister the vinyl.

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

E. All expansion joints in the tile bed should be transferred through the ARDEX liquid applied smoothing cement topping (see diagram below).

F. The subfloor must be correctly prepared as heated subfloors are high-stress applications, and poor surface preparation and contamination can compromise the topping bond. The development of show through cracks is possible over the heating elements.



TOPPING RECOMMENDATIONS

CONCRETE

1. The concrete subfloor must provide a mechanical key for the underlayment topping. Diamond shaving/grinding, shot blasting, or scarifying the concrete surface to provide a roughened, clean, sound, solid, and porous matrix is required.

2. The primer used is diluted 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). The underlayment should not be applied until the primer is dry.

   NOTE – Where the smoothing cement is K60 ARDITEX, an alternate primer is ARDEX Multiprime, applied undiluted using the same process as the diluted P51.

3. ***FOR INSTALLATION ONTO SLABS WITH INTERNAL HEATING***

   The cement-based self-smoothing underlayment can be ARDEX K15, ARDEX K55, ARDEX K12, ARDEX K125 or ARDEX K275 Self-Smoothing Cements for 3mm thickness, or 6mm+ for ARDEX

K80. The following smoothing cements should be mixed with ARDEX E25 Resilient Emulsion while ARDEX K80 and ARDEX K55 are used without ARDEX E25.

MIX RATIO
1) 20 kg bag of K15 with
1.6 litres of ARDEX E25 plus
4 litres of cool clean water

2) 20 kg bag of ARDEX K12 with
1 litre of ARDEX E25 plus
4.5 litres of cool clean water

3) 20 kg bag of ARDEX K125 or ARDEX K275 with
1.25 litres of ARDEX E25 plus
3.75 litres of cool clean water

The minimum thickness of ARDEX K15, ARDEX K55, ARDEX K12, ARDEX K125, ARDEX and ARDEX K275 is 3mm.
The minimum thickness of ARDEX K80 is 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 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. Do not apply smoothing cement over a full-coverage insulating mat.

The cement-based underlayment should be ARDEX K15, ARDEX K12, ARDEX K125 or ARDEX K275 Self-Smoothing Cements mixed with ARDEX E25 Emulsion.

Neither ARDEX K80 nor ARDEX K55 require the use of ARDEX E25.

MIX RATIO
1) 20 kg bag of K15 with
1.6 litres of ARDEX E25 plus
4 litres of cool clean water

2) 20 kg bag of ARDEX K12 with
1 litre of ARDEX E25 plus
4.5 litres of cool clean water

3) 20 kg bag of ARDEX K125 or ARDEX K275 with
1.25 litres of ARDEX E25 plus
3.75 litres of cool clean water

The minimum thickness of ARDEX K15, ARDEX K55, ARDEX K12, ARDEX K125 and ARDEX K275 above the heating coil is 4mm - 6mm depending on the system.

The minimum thickness of ARDEX K80 above the heating coil is 6mm.

5. ARDEX K15, ARDEX K12, or ARDEX K80 should be allowed to cure for 16-18 hours at 20°C at minimum before installing impervious coverings, carpets, and floating timber. Tiles can be laid after 4-6 hours.
6. ARDEX K125 and ARDEX K275 require 24 hours for carpet and 48 hours for impervious coverings. Tiles can be laid after 4-6 hours.
7. Allow ARDEX K55 to cure for 60-90 minutes at 20°C before installing impervious coverings, carpets, floating timber, or tiles. Direct-bonded timber requires 16-18 hours of curing.

TIMBER & COMPRESSED FIBRE-CEMENT

1. Wooden subfloors must be solid, clean, and free of oil, grease, wax, etc., 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. Examination of the subfloor is extremely important and should be conducted by a professional contractor.
2. Sand the wooden subfloor using a coarse abrasive to remove all foreign matter and provide a suitable surface for primer installation.
3. Compressed fibre-cement sheet (CFC) should be installed per the manufacturer's instructions. Compressed fibre-cement butt joints must be supported by a batten/joist and be firmly fixed to allow no movement. Sheets are to be adhered with ARDEX RA 88 Plus between panels.

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

   Note: To avoid breathing dust, wear approved personal protective equipment and use appropriate dust suppression equipment. Refer to the sheet manufacturer's advice in this area. ***Do not sand old, compressed asbestos cement sheeting***.
4. Prime the wood subfloor with ARDEX P82 ULTRA PRIME or ARDEX P9 in accordance with printed technical data. Prime CFC subfloors with either ARDEX P82 ULTRA PRIME, or alternatively, when using ARDEX K65 or K60 ARDITEX, the priming can be done with ARDEX P51 diluted 1:1 or ARDEX MULTIPRIME.
5. Install the 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 liquid nails, ensuring that the adhesive used for fixing the cables is used sparingly, avoid soiling of the primed concrete surface.
6. Install K60 ARDITEX as per the technical data sheet.
7. Depending on the system, the minimum thickness of ARDEX K65 and K60 ARDITEX above the heating coil/mat is 3mm—6mm.
8. Finish the ARDEX K65 or K60 ARDITEX with a spiked roller immediately after application to achieve a smooth, flat finish.
9. Allow the ARDEX K65 or K60 ARDITEX to dry completely before installing flooring.
10. Allow to cure for 48 hours at 20°C minimum before installing coverings, unless constrained by the floor covering/flooring adhesive manufacturers' recommendations or relevant standards, whichever is the greater.

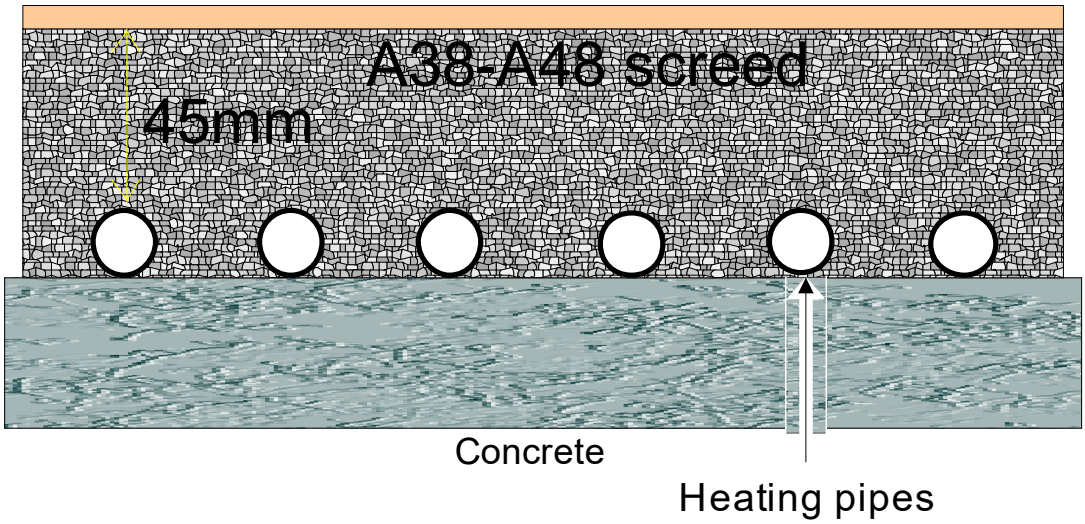
HYDRONIC TYPE HEATED WATER PIPES IN AN A38-A48 SCREED OVER CONCRETE

Water-filled heating pipes should not be placed into the liquid-smoothing cement materials, as this can cause issues with cracking and adhesion.

However, this can be done where the pipes are held in a plastic framework on the subfloor, using K80 with a 10mm cover over the frame.

A38/A48 SCREED SYSTEM

The water pipes can be embedded into an ARDEX A38 or A48 engineered screed, and then the flooring system placed on top.



The minimum screed thickness over the pipes must be 45mm, and then the surface can have direct application of the flooring system, or a smoothing cement finish applied.

The screed's application is in accordance with the product datasheets. It can be directly bonded onto concrete or floating over surfaces such as compressed fibre-cement sheet or timber floors (the latter types need to be able to support the weight of the screed alone, 90kg/m2).

It is not recommended that the plastic sheet be placed over the heating pipes in a floating system since creases in the plastic and variable thickness can create cracks in the overlying screed.

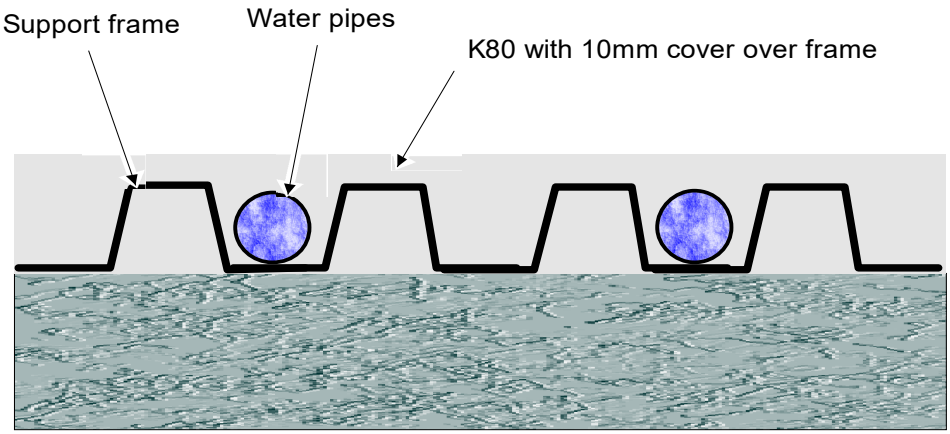
Where multiple heating circuits are used, a sealant-filled movement joint must separate each circuit in a screed panel, and each panel shall be no more than 40m^2.

Irregular panel shapes are not recommended due to stress concentrations at corners, and sealant joints must be installed around the perimeters.

HEATING PIPES IN A FRAMEWORK OVER CONCRETE

It is feasible to embed the water pipes in ARDEX K80 where they are placed into a plastic holding framework onto the concrete floor. The framework must have holes in it to allow the smoothing cement to pass through, and the system MUST also be intended for use with liquid smoothing cements. Some of these systems are intended to work with screeds and are not suitable.

Where pipes are embedded in the smoothing cement, after the allowed cure time, the floor must be cycled to make sure there are no leaks or other defects that will cause subsequent problems for the floor covering



FLOOR COVERING

Generally, K80 contains coarser sand, which may make it unsuitable for some vinyl flooring. To ensure compatibility, one of the following products may need to be applied over the K80: ARDEX K15, K12, K55, K125 or K275.

- Vinyl tiles, strips and sheets, carpet, floating timber, tiles and rubber matting.

For carpet, floating timber, or tiles, ARDEX K65 and K60 ARDITEX are also suitable options.

If K80 is suitable for the floor covering, no additional preparation is needed other than minor touch-up work, which can be completed using ARDEX Feather Finish or ARDEX MRF.

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

For concrete floors use:

- ARDEX X7 mixed ARDEX E90
- ARDEX X77 (with or without ARDEX E90)
- ARDEX X56
- ARDEX Abaflex
- ARDEX X32 mixed with ARDEX E90
- ARDEX X18 (with or without ARDEX E90
- ARDEX X68 mixed with ARDEX E90
- ARDEX WA 100 epoxy

For timber or CFC floors, use:

- ARDEX X56

Grout joints require flexible grout, and the choices are

- ARDEX FG8 Grout mixed with ARDEX GROUT BOOSTER
- ARDEX FSDD mixed with ARDEX GROUT BOOSTER
- ARDEX WJ50 mixed with ARDEX GROUT BOOSTER

Install using conventional tiling practices plus install expansion joints at 4m centres and 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

Standard comments on curing of heated subfloors.

AS1884-2021 states:

4.1.3 Heated subfloors

Where underfloor heating units are installed the heating units shall be—

a) *turned on prior to laying of the floor covering for a minimum of seven days to ensure that the moisture condition of the heated subfloor will permit successful laying of the coverings; and*

b) *turned off 48 h prior to the commencement of installation to allow the subfloor to return to the temperature range in accordance with instructions of the manufacturer of the floor covering. The heating units shall remain turned off during the laying operations. The heating units shall not be turned on again until 48 h after the laying is completed, in order to allow the adhesive to set.*

Once the heating unit is turned back on it shall be increased at no more than 2 °C per day until the desired temperature has been achieved. The heating unit shall not exceed a temperature greater than 28 °C.

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, ARDEX K12, ARDEX K55, and ARDEX 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.

ARDEX K60 ARDITEX is a hydration product, and ARDEX K65, ARDEX K125 and ARDEX K275 are standard cured materials which initially dry, and then cure more slowly, especially in cold and wet weather (10-15^0C). 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 falls below 5°C during the drying-cure period, as the cure will be severely retarded, or maybe permanently compromised.

Allow tiled installations to cure for at least 7 days before turning on the heating.

WHEN COMMISSIONING THE FLOOR, TURN HEATING UNIT ON BY INCREASING TEMPERATURE APPROXIMATELY 2^OC 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 THE DEVELOPMENT OF EXCESSIVE TENSILE STRAINS IN THE SMOOTHING CEMENT ITSELF.

PROBLEMS WITH ADHESIVES AND EXCESSIVE MOVEMENT IN TILED FLOORS CAN ALSO RESULT FROM OVERHEATING THE SUBFLOOR.

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