TECHNICAL BULLETIN – TB176

TILING WITH UNDERFLOOR HEATING SYSTEMS

8TH JULY 2025

INTRODUCTION & SCOPE

This technical Bulletin provides guidance on suitable product selection and methodology that would typically be employed to enable the application of heating cables above concrete, compressed fibre cement, and timber floors prior to tiling.

This bulletin does not cover the use of Ardex self-smoothing cements, which are covered separately by Ardex Technical Bulletin TB029. See also TB177, which includes other systems for concrete only.

CONDITIONS

1. Application of tile systems should comply with AS3958.1 and the BCA.
2. Heating cables vary in design and manufacturer and may be supplied as individual cable lengths, meshed, or mat units. The attached recommendations are based on testing of a limited number of underfloor cabling systems. The cable manufacturer or supplier should test, engineer, and approve any system design to meet any relevant standards, regulatory requirements, or performance requirements.
3. In South Australia, waterproofing must comply with the South Australian Ministers' specification SA F1.7 in conjunction with Australian Standard AS3740, the Building Code of Australia, and the Housing Code.

DESIGN PRECAUTIONS & SURFACE PREPARATION

The key to a successful installation with ARDEX tiling adhesive products is to achieve a good bond between the substrate and the flooring cover. Proper surface preparation is the most important factor in achieving this bond. The surface, therefore, must be sound, clean and free of oil, grease, wax, dirt, old tile, vinyl or carpet adhesives, asphaltic (bituminous) underlayment, dust, finishes, paint or any contaminant which might act as a bond breaker.

All timber and Compressed Fibre Cement (CFC) sheeted floors must comply with AS1684 and AS3958 for maximum deformation between joists of 1 in 360th of the joists' span. Note that the deflection should be lower when fixing large format (i.e. >400 x 400 mm) tiles. In this case, the deflection should be no more than 1 in 500th of the joists' span.

Timber floors should comply with AS2796 for moisture content and be acclimatised under end-use conditions for at least 60 days before tiling to reduce unpredictable movement. Installation of timber floors must comply with good installation practices and design to provide for effective underfloor ventilation and minimal exposure to localized heating, drying, and moisture.

WHEN COMMISSIONING THE FLOOR, OBSERVE RECOMMENDED DRYING TIMES AND TURN THE HEATING UNIT ON BY INCREASING THE TEMPERATURE TO APPROXIMATELY 2°C PER DAY UNTIL THE DESIRED TEMPERATURE IS REACHED.
DO NOT HEAT ABOVE 45°C.
FAILURE TO OBSERVE THESE RECOMMENDATIONS MAY RESULT IN PROBLEMS WITH SOFTENING ADHESIVES, EXCESSIVE MOVEMENT IN TILED FLOORS, AND POSSIBLE DE-BONDING OF ANY SMOOTHING OR SOUND-DEADENING TOPPINGS APPLIED.

SUMMARY OF SYSTEMS OUTLINED

System Number	Substrate	Joints/Primer	Embedding Screed	Membrane	Adhesive(s) for Tiles
1 Wet Cables in S:C Screed Flexible subfloor	Wet Area Timber or CFC/FC	Multiprime or WPM265 Superflex primer	Sand/Cement self-supporting with Abacrete or WPM405	Superflex WPM001 or 002, WPM155	X56
2 Wet Cables on DS40 Sound Deadening Matting Flexible subfloor	Wet Area Timber or CFC/FC	Substrate: P9 or Multiprime primer DS40 bonded with X56	Cable laid onto membrane and spot bonded	Superflex WPM001 or 002, WPM155	X56
3 Dry Cables on the flexible subfloor	Sanded Timber* or CFC/FC	Prime timber with Optima (2P:1L), Multiprime CFC\FC. Tape or silicone joints	X56	NA	X56 2P Isoflex
4 Dry Cables on the flexible subfloor	CFC	P9 or Multiprime, then silicone all sheet joints	X77 + E90	NA	X77 + E90
5 Dry Cables on DS40 Sound Deadening Matting	Sanded Timber or CFC/FC	Substrate. P9 or Multiprime primer DS40 bonded with X56	Cable laid onto DS40, and spot bonded	NA	X56
6 Dry Cables on subfloor	Mechanically prepared Concrete or Sand/Cement screed	Multiprime	NA	NA	X56 Abaflex X18 ± E90[1] X77±E90[1]
7 Wet Cables in S: C Screed	Concrete	Multiprime or WPM265 Superflex primer	Sand/Cement self-supporting with Abacrete or WPM405	Superflex WPM001 or 002, WPM155	X56 Abaflex X18 ± E90[1] X77±E90[1]
8 Dry Cables in topping	Mechanically Prepared Concrete	Multiprime or P9	LQ92 (optional Abalastic)	NA	X56 Abaflex X18 ± E90[1] X77±E90[1]
9 Wet Cables sitting directly on the membrane	Mechanically prepared Concrete, Sand/Cement screed	Multiprime or P9 or WPM265 Superflex primer	Cable laid onto membrane and spot bonded	Superflex WPM001 or 002, WPM155	X56 Abaflex X18 ± E90[1] X77±E90[1]

* Timber refers to particleboard or construction-grade plywood only. Strip timber floors should be fibre cement (FC) sheeted prior to applying heating elements and tiles.

[1] X77 or X18 can be used with Ardex E90 if extra flexibility is required. The addition increases the performance and changes the rating to S2.

APPLICATION OF SYSTEMS FOR TIMBER & FIBRE-CEMENT FLOORS

WET AREAS ON WET AREA-RATED STRUCTURAL PARTICLEBOARD FLOORING & COMPRESSED FIBRE-CEMENT (CFC) SHEETING OR UNDERLAY

NOTE: Where timber-based subfloors are used in wet areas, refer to AS3740-2004 for specific instructions concerning waterproofing requirements.

SYSTEM 1 HEATING CABLES IN SELF SUPPORTING CEMENT-BASED SCREED

1. Place builders' plastic sheet (200-250 □m) on the timber floor as a slip sheet.
2. Embed the heating cables in a self-supporting sand /cement /Abacrete (or WPM405) screed at a minimum 40mm thickness with reinforcing mesh. (Refer to TB 057 Installation of Self-Supporting Sand/Cement Screeds for the Installation of Ceramic Tiles.)
3. Prime the porous surfaces with Multiprime or WPM265 primer. If the surface is very porous apply two coats of Ardex Multiprime and let dry (Approx. 30 minutes).
4. Waterproof over the top of the screed after 7 days (minimum) curing, with Ardex WPM 001 (Superflex Premixed Bathroom & Balcony), Ardex WPM002 (Superflex Bathroom & Balcony Two Part) or Ardex WPM155 (Undertile PU) waterproofing membrane and allow to fully dry before commencing tile laying.
5. Use Ardex X56 as the adhesive to bond tiles to the waterproofed screed.
6. Refer to the product datasheets for instructions on using the Ardex products.

SYSTEM 2 HEATING CABLES ON ARDEX DS40 SOUND DEADENING MATT

1) Timber floors should be clean and dry with all fixing screws or nails finishing flush or slightly below the timber surface. In all areas on wet area structural particleboard sheet timber flooring, sand the surface with 40 grit sandpaper.
2) Apply a Compressed Fibre Cement Sheet (CFC) or Fibre Cement (FC) Underlay as per the manufacturer's instructions.
3) Vacuum all loose dust and ensure surface is clean from contaminants.
4) Prime the porous surfaces with Ardex Multiprime or P9 primer. If the surface is very porous, apply two coats of Ardex Multiprime and let dry (approximately 30 minutes) for timber sheet flooring and tape joints with PVC (duct) tape.
5) For fibre-cement sheets, an alternative is to apply a 2mm thick bead of neutral cure silicone over the joints and spread 5mm on either side of the joint to act as a bond breaker. Ensure that the face of the sheet surfaces is not contaminated with silicone during this operation. Allow the silicone to cure overnight.
6) Bond Ardex DS40 Soundproof Underlay using Ardex X56 to all surfaces using a 4 mm notched trowel.

   Install the Ardex DS40 with the fleece side down in a brick pattern and roll into the adhesive using a fluted roller. Fill all gaps between the sheets using a neutral cure silicone sealant. Leave a 6-10mm gap between all perimeter walls and all surface

protrusions to allow for the installation of sealant to isolate the mat from the building structure.

7. Apply two coats of Ardex WPM 001, WPM002 or WPM155 waterproofing membrane to achieve the recommended dry film thickness of 1.2mm. Apply the waterproofing membrane as per the standard procedures for tanking a shower recess. Priming is not necessary.

8. Allow the Ardex waterproofing membrane to fully dry as per the recommendations in the datasheet prior to applying the screed. At the very least, 72 hours should be allowed to enable the premixed (one-part) membranes to fully dry before proceeding with the adhesive.

9. Fix the heating cables to the membrane with spots of Ardex CA20P or similar low solvent non-silicone or polyurethane construction adhesive.

10. Apply tiles with Ardex X56 using a minimum 10-12mm notched trowel.

11. Grout the joints the next day with Ardex FG8 Grout boosted with Grout Booster at a concentration of 80% Grout Booster and 20% water.

12. Allow the grout to cure for at least 14 days before using shower areas.

DRY AREAS ON STRUCTURAL PARTICLEBOARD OR PLYWOOD FLOORING & COMPRESSED FIBRE-CEMENT SHEETING OR UNDERLAY

The following systems are applicable to internal areas of residences such as lounges, dining, hallways, bedrooms, and studies that are unlikely to be exposed to water.

SYSTEM 3 HEATING CABLES IN RUBBERISED ADHESIVE BED

1. Timber floors should be clean and dry with all fixing screws or nails finishing flush or slightly below the timber surface, in all areas on structural particleboard or plywood timber sheet flooring, sand the surface with 40-grit sandpaper.

2. Apply a Compressed Fibre Cement Sheet (CFC) or Fibre Cement Underlay (FC) per the manufacturer's instructions.

3. Vacuum all loose dust and ensure surface is clean from contaminants.

4. Prime CFC/FC surfaces with Ardex Multiprime or P9 primer.

5. For particleboard or plywood sheets, create a bonding bridge with Ardex Optima. Mix 2 parts of Ardex Optima (powder) to 1 part of Optima (liquid). Add the powder to the liquid while stirring with a mechanical mixer. Stir until both parts are homogeneously mixed. Apply the Optima slurry with a sponge roller, leaving a thick coat over the timber substrate. Allow the slurry coat to dry fully before tiling over.

6. For timber sheet flooring, tape all sheet joints with PVC (duct) tape. For fibre-cement sheets, an alternative is to apply a 2mm thick bead of neutral cure silicone over the joints and spread 5mm on either side of the joint to act as a bond breaker. Ensure that the face of the sheet surfaces is not contaminated with silicone during this operation. Allow the silicone to cure overnight.

7. Fix the coils to the subfloor to prevent movement and apply a solid screed of Ardex X56, ensuring that the adhesive makes full contact with the underlying timber. Screed the

adhesive to provide a flat, even surface that is at least 2mm above the top of the heating coils. Allow the screeded adhesive to cure overnight.

8. Adhere ceramic or porcelain tiles using Ardex X56, ensuring a minimum bed of adhesive of 2.5mm and at least 90 % coverage to the back of the tile.

9. Grout the joints the next day with Ardex FG8 Grout cement-based grout mixed with Grout Booster at a concentration of 80% Grout Booster and 20% water.

10. Allow the adhesive and grout to cure for at least 14 days before turning on the heating coils.

SYSTEM 4 HEATING CABLES IN ARDEX X77 ADHESIVE

1. Apply a Compressed Fibre Cement Sheet (CFC) per the manufacturer's instructions.

2. Vacuum all loose dust and ensure surface is clean from contaminants.

3. Prime surfaces with Ardex Multiprime or P9 primer and allow to dry for 30 minutes.

4. Apply a 2mm thick bead of neutral cure silicone over the joints and spread 5mm on either side of the joint to act as a bond breaker. Ensure that the face of the sheet surfaces is not contaminated with silicone during this operation. Allow the silicone to cure overnight.

5. Fix the coils to the subfloor to prevent movement and apply a solid screed of Ardex X77 mixed with Ardex E90, ensuring that the adhesive makes full contact with the underlying timber. Screed the adhesive to provide a flat, even surface that is at least 2mm above the top of the heating coils. Allow the screeded adhesive to cure overnight.

6. Adhere ceramic or porcelain tiles with Ardex X77 mixed with Ardex E90, ensuring a minimum bed of adhesive of 2.5mm and at least 90 % coverage of the back of the tile.

7. Grout the joints the next day with Ardex FG8 Grout, a cement-based grout mixed with Grout Booster at a concentration of 80% Grout Booster and 20% water.

8. Allow the adhesive and grout to cure for at least 14 days before turning on the heating coils.

SYSTEM 5 HEATING CABLES ON ARDEX DS40 SOUND DEADENING MATT

1. Timber floors should be clean and dry with all fixing screws or nails finishing flush or slightly below the timber surface. In all areas on wet area structural particleboard sheet timber flooring, sand the surface with 40 grit sandpaper.

2. Apply a Compressed Fibre Cement Sheet (CFC) or Fibre Cement FC) Underlay per the manufacturer's instructions.

3. Vacuum all loose dust and ensure surface is clean from contaminants.

4. Prime the porous surfaces with Ardex Multiprime. If the surface is very porous, apply two coats of Ardex Multiprime and let dry (approximately 30 minutes). For timber sheet flooring, tape joints with PVC (duct) tape.

5. For fibre-cement sheets, an alternative is to apply a 2mm thick bead of neutral cure silicone over the joints and spread 5mm on either side of the joint to act as a bond

breaker. Ensure that the face of the sheet surfaces is not contaminated with silicone during this operation. Allow the silicone to cure overnight.

6. Bond Ardex DS40 Soundproof Underlay using Ardex X56 to all surfaces using a 4 mm notched trowel; or with Ardex AF266 using 3.2mm V-notch trowels. Install the Ardex DS40 with the fleece side down (butt jointed) in a brick pattern and roll into the adhesive using a fluted roller. Fill any gaps between the DS40 mats using a neutral cure silicone sealant. Leave a 6-10mm gap between all perimeter walls and all surface protrusions to allow for the installation of sealant to isolate the mat from the building structure.

7. Fix the heating cables to the DS40 matting with spots of Ardex CA20P, Liquid Nails, or similar non-silicone or polyurethane construction adhesive.

8. Apply a solid screed of Ardex X56, ensuring that the adhesive makes full contact with the underlying matting. Screed the adhesive to provide a flat, even surface that is at least 2mm above the top of the heating coils. Allow the screeded adhesive to cure overnight.

9. Adhere ceramic or porcelain tiles using Ardex X56, ensuring a minimum adhesive bed of 2.5mm and at least 90 % coverage of the tile's back.

10. Grout the joints the next day with Ardex FG8 Grout boosted with Grout Booster at a concentration of 80% Grout Booster and 20% water.

11. Allow the adhesive and grout to cure for at least 14 days before turning on the heating coils.

APPLICATION OF SYSTEMS FOR CONCRETE AND BONDED CEMENT SCREED SUBFLOORS (WET OR DRY)

SYSTEM 6 HEATING CABLES IN ADHESIVE SCREED (DRY)

1. Surfaces should be sound and free of all contaminating or loose materials. Ensure that the concrete is at least 28 days old or that the screed is at least 7 days old.

2. Prime surfaces with Ardex Multiprime and let dry (generally 15 to 30 minutes).

3. Fix the heating coils to the concrete or screed to prevent movement and apply a solid screed of Ardex X56, Ardex X77, or Abaflex adhesive, ensuring that full contact is made with the substrate.

4. Screed the adhesive to provide a flat, even surface at least 2mm above the top of the heating coils and let cure overnight.

5. Adhere ceramic or porcelain tiles using Ardex X56, Ardex X77, Ardex X18, or Abaflex adhesive, ensuring a minimum bed of adhesive of 2.5mm and at least a 95% coverage to the back of the tile.

6. Grout the joints the next day with Ardex FG8 Grout boosted with Grout Booster at a concentration of 80% Grout Booster and 20% water.

7. Allow the adhesive and grout to cure for at least 14 days before turning on the heating coils.

SYSTEM 7 HEATING CABLES IN SCREED TO CREATE FALLS (WET) WITH WATERPROOF MEMBRANE AND TILED SURFACE

1. Surfaces should be sound and free of all contaminating or loose materials. Ensure that the concrete is at least 28 days old.

2. Embed the heating cables in a self-supporting sand /cement /Abacrete screed with a minimum 40mm thickness, including reinforcing mesh. (Refer TB 057 Installation of Self-Supporting Sand/Cement Screeds for the Installation of ceramic tiling). Allow the screed to cure for a minimum of 7 days.

3. Prime surfaces with Ardex Multiprime or Ardex WPM265 and let dry (generally 15 to 30 minutes).

4. Apply two coats of Ardex WPM 001, WPM002, or WPM155 waterproofing membrane to the cured screed to achieve the recommended dry film thickness of 1.2mm. Apply the waterproofing membrane as per the standard procedures for tanking a shower recess. Priming of the soundproof underlay is not necessary.

5. Allow the Ardex waterproofing membrane to fully dry as per the recommendations in the datasheet prior to application of the screed. At the very least a minimum of 72 hours should be allowed to enable the premixed membranes to fully dry before proceeding with the screed.

6. Adhere ceramic or porcelain tiles using Ardex X56, Abaflex, Ardex X77 or Ardex X18 ensuring a minimum bed of adhesive of 2.5mm and at least a 95% coverage to the back of the tile.

7. Grout the joints the next day with Ardex FG8 Grout boosted with Grout Booster at a concentration of 80% Grout Booster and 20% water.

8. Allow the adhesive and grout to cure for at least 14 days before turning on the heating coils.

SYSTEM 8 HEATING CABLES IN SELF-LEVELING COMPOUND

1. Surfaces should be sound, dry and free of all contaminating or loose materials. Ensure that the concrete is at least 28 days old.

2. Prime surfaces with Ardex Multiprime and let dry (generally 15 to 30 minutes).

3. Use Ardex LQ92 self-levelling compound to cover the cables. It is optional to mix the LQ92 with Ardex-ABA Abalastic in the following mix ratio per 20kg bag of Ardex LQ92

4. Mix 2.5 litres of Abalastic Liquid

5. And 2.5 litres of clean cool water

6. The smoothing cement is applied apply as per the instructions in the datasheet, ensuring that the finished level is 3mm above the cable.

7. Allow the Ardex LQ 92 allow at least 4 hours to cure, before tiling.

8. Grout the joints the next day with Ardex FG 8 cement-based grout boosted with Grout Booster at a concentration of 80% Grout Booster and 20% water.

9. Adhere ceramic or porcelain tiles using Ardex X56, Abaflex, Ardex X18 or Ardex X77, ensuring a minimum bed of adhesive of 2.5mm and at least a 95% coverage to the back of the tile.

10. Grout the joints the next day with Ardex FG8 Grout boosted with Grout Booster at a concentration of 80% GB and 20% water.

11. Allow the adhesive and grout to cure for a minimum of 14 days before turning on the heating coils.

SYSTEM 9 HEATING CABLES IN ADHESIVE BED WITH WATERPROOF MEMBRANE ON SCREED TO CREATE FALLS (WET)

1. Surfaces should be sound and free of all contaminating or loose materials. Ensure that the concrete is at least 28 days old and screeds 7 days old.

2. Prime surfaces with Ardex Multiprime or Ardex WPM265 and let dry (generally 15 to 30 minutes).

3. Apply two coats of Ardex WPM 001, WPM002, or WPM155 waterproofing membrane to the cured screed to achieve the recommended dry film thickness of 1.2mm. Apply the waterproofing membrane as per the standard procedures for tanking a shower recess. Priming of the soundproof underlay is not necessary.

4. Allow the Ardex waterproofing membrane to fully dry as per the recommendations in the datasheet, prior to application of the screed. At the very least a minimum of 72 hours should be allowed to enable the premixed membranes to fully dry before proceeding with the screed.

5. Fix the heating cables to the membrane with spots of Ardex CA20P or similar low solvent non silicone or polyurethane construction adhesive.

6. Adhere ceramic or porcelain tiles using Ardex X56, Abaflex, Ardex X18 or Ardex X77, ensuring a minimum bed of adhesive of 2.5mm and at least a 95% coverage to the back of the tile.

7. Grout the joints the next day with Ardex FG8 Grout boosted with Grout Booster at a concentration of 80% Grout Booster and 20% water.

8. Allow the adhesive and grout to cure for a minimum of 14 days before turning on the heating coils

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.

Australia: 1300 788 780
New Zealand: 643 384 3029

Web: www.ardexaustralia.com
email: technical.services@ardexaustralia.com
Address: 2 Buda Way, Kemps Creek NSW 2178