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Tekwarm Routed XPS 450 Underfloor Heating System Installation Guide for Routed XPS Board Applications Plain or Aluminium Foil-Faced XPS Boards – 450kPA



Designed to Heat. Built to Last

Tekwarm

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INSTALLATION GUIDE FOR ROUTED XPS BOARD APPLICATIONS

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ROUTED XPS BOARD APPLICATIONS

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1. INTRODUCTION

The Tekwarm Routed XPS 450 Underfloor Heating System is a warm water UFH board system designed for use with routed XPS insulation boards.

The boards are pre-routed to receive Tekwarm underfloor heating pipework, allowing the pipe to be installed neatly within the board before the system is covered with a suitable screed, smoothing compound, overlay board, dry floor deck or other approved floor build-up.

The boards are available in **plain or aluminium foil-faced options** and are manufactured using high-compressive-strength XPS, with an impressive **450kPa compressive strength**.

The routed XPS 450 board system provides:

- Thermal insulation
- Defined pipe routing
- Controlled pipe spacing
- High compressive strength
- Improved support under higher loads
- A robust low-profile UFH solution
- Compatibility with a range of covering systems
- Improved heat direction towards the occupied space
- Improved heat spread where aluminium foil-faced boards are used

The boards can be fixed to a suitable substrate using:

- High-tack spray adhesive
- Tekwarm screws and washers
- Correct masonry screws for concrete / screed / masonry substrates
- Correct wood screws for timber substrates
- A combined adhesive and mechanical fixing method where required

The system typically includes:

- Tekwarm routed XPS 450 boards
- Plain or aluminium foil-faced board options

- Tekwarm UFH pipe
- High-tack spray adhesive where bonding
- Tekwarm screws and washers where mechanically fixing
- Correct masonry or wood screws depending on substrate
- Suitable screed, smoothing compound, overlay board or dry floor deck
- Manifold assembly
- Pipe conduit / protection sleeves where required
- Pressure testing equipment

This guide covers the key stages of installation, including substrate checks, board fixing, pipe installation, covering options, manifold connection, filling, pressure testing and final floor finish considerations.

This guide should be read alongside the Tekwarm UFH design, Tekwarm board layout, adhesive manufacturer guidance, fixing guidance, overboard manufacturer guidance, floor finish manufacturer guidance and all relevant British Standards and Building Regulations.

2. IMPORTANT NOTES BEFORE STARTING

Before installation begins, check that:

- The Tekwarm UFH design has been reviewed and understood.
- The manifold location has been agreed.
- The routed XPS board layout matches the UFH design.
- The correct XPS board type has been supplied.
- Plain or aluminium foil-faced boards have been supplied as specified.
- The 450kPa board grade has been supplied.
- The board thickness and routed depth are suitable for the pipe size.
- The correct pipe diameter has been supplied.
- The fixing method has been confirmed.
- The boards are to be bonded using high-tack spray adhesive, mechanically fixed using Tekwarm screws and washers, or fixed using a combined method.
- The correct masonry or wood screws have been requested.
- The substrate is clean, dry, level and suitable.
- The final floor finish and covering method have been confirmed.
- The total floor build-up has been checked.
- Door thresholds and floor level transitions have been reviewed.
- Movement joints, service penetrations and no-pipe zones have been considered.
- The area is dry, weather-tight and suitable for installation.

Do not install the system if the XPS boards cannot be fully supported, properly restrained or covered with a suitable load-spreading system.

3. HEALTH AND SAFETY

Installation should only be carried out by competent persons.

Always wear appropriate PPE, including:

- Safety boots
- Gloves
- Eye protection
- Knee protection
- High-visibility clothing where required
- Dust protection where cutting XPS boards

Where high-tack spray adhesive is used, follow the adhesive manufacturer's safety guidance.

Ensure suitable ventilation when using spray adhesives.

Do not use spray adhesive near naked flames, ignition sources, sparks or smoking areas.

Adhesive products should be stored and used in accordance with the manufacturer's instructions.

Keep the work area clean and free from trip hazards. XPS boards, pipework, adhesive cans, tools and offcuts can create hazards during installation.

Avoid unnecessary traffic over installed XPS boards and pipework before the system is covered.

4. TOOLS AND EQUIPMENT REQUIRED

Typical tools and equipment required include:

- Pipe decoiler
- Pipe cutter suitable for UFH pipe
- Tape measure
- Marker pen
- Straight edge
- Utility knife or insulation saw
- Soft broom and vacuum
- High-tack spray adhesive where bonding
- Tekwarm screws and washers where mechanically fixing
- Correct masonry screws for cementitious / masonry substrates
- Correct wood screws for timber substrates
- Drill / driver
- Suitable fixing bits and drill bits
- Spanners / manifold connection tools
- Pressure test pump
- Hose connections
- Water supply for filling
- Temporary pipe protection sleeves / conduit
- Suitable tools for installing screed, smoothing compound or overlay boards

The exact tools required will depend on the substrate, board type, fixing method, pipe size, covering system and final floor finish.

5. SUBSTRATE CHECKS AND PREPARATION

Before installing routed XPS boards or pipework, the substrate must be inspected.

The substrate should be:

- ✓ Structurally sound
- ✓ Clean and free from debris
- ✓ Dry
- ✓ Stable
- ✓ Flat and level
- ✓ Free from sharp projections
- ✓ Free from oil, grease, dust, plaster residue, laitance, paint or contaminants
- ✓ Free from loose or friable material
- ✓ Capable of supporting the finished floor build-up
- ✓ Suitable for adhesive bonding or mechanical fixing
- ✓ Suitable for the intended floor loading and final floor finish

Remove all loose material, mortar droppings, plaster, timber offcuts, fixings, sharp objects and general site debris.

Sweep and vacuum the surface before installation.

Any cracks, movement, deflection, hollow areas, weak screed, loose boards or unstable substrates must be addressed before proceeding.

Do not install routed XPS boards over a substrate that is moving, flexing excessively, contaminated or incapable of supporting the system.

The boards must be fully supported. Voids, rocking or unsupported sections can affect heat transfer, pipe position, floor finish performance and long-term durability.

6. SUBSTRATE SUITABILITY

The Tekwarm Routed XPS 450 system may be installed over a range of substrates, subject to correct preparation and suitable fixing.

Potential substrates may include:

- Concrete
- Sand/cement screed
- Cementitious levelling compound
- Plywood
- Chipboard
- OSB
- Existing stable floor decks
- Other suitable structural substrates

The substrate must be assessed before installation.

Cementitious / Masonry Substrates

Where installing over concrete, screed or masonry-based substrates, the substrate must be clean, dry, stable and strong enough to receive the selected fixing method.

Where boards are mechanically fixed, use Tekwarm screws and washers with the correct **masonry screws**.

Check for buried services before drilling.

Timber-Based Substrates

Timber substrates must be structurally sound, dry, clean, stable and free from excessive movement.

Loose boards must be fixed. Damaged boards must be replaced. Joints should be secured, and the substrate must be suitable for the chosen fixing method.

Where boards are mechanically fixed, use Tekwarm screws and washers with the correct **wood screws**.

Adhesive-Bonded Substrates

Where high-tack spray adhesive is used, the receiving surface must be clean, dry, dust-free and suitable for adhesion.

Do not rely on adhesive bonding over damp, dusty, friable, loose or contaminated surfaces.

7. XPS BOARD TYPE AND COMPRESSIVE STRENGTH

Tekwarm routed XPS 450 boards may be supplied in plain or aluminium foil-faced options.

Board options may include:

- Plain XPS routed boards
- Aluminium foil-faced XPS routed boards

The board compressive strength is:

450kPa

This high compressive strength makes the system suitable for applications where enhanced support is required, subject to the correct floor build-up, covering layer and project specification.

The board strength must still be considered alongside:

- Substrate condition
- Board thickness
- Covering system
- Overlay board type
- Screed or smoothing compound depth
- Final floor finish
- Point loads
- Traffic levels
- Intended use of the space

Do not substitute with a lower compressive strength board without approval.

The selected board must be suitable for the intended use.

8. FLOOR BUILD-UP AND LEVEL CHECKS

Before installation, confirm the full floor build-up.

Check:

- ✓ Existing substrate level
- ✓ XPS board thickness
- ✓ Plain or aluminium foil-faced board type
- ✓ Pipe diameter
- ✓ Screed / smoothing compound depth where used
- ✓ Overlay board type and thickness where used
- ✓ Final floor finish thickness
- ✓ Adhesive layers
- ✓ Door thresholds
- ✓ Skirting details
- ✓ Stair risers
- ✓ Floor level transitions between rooms
- ✓ Appliance clearances
- ✓ Kitchen and fixed furniture details

Do not start installation until the finished floor level has been checked and agreed.

The floor build-up must be suitable for the intended use, loading and final floor finish.

9. SETTING OUT THE INSTALLATION

Before fixing the XPS boards or installing pipework, review the Tekwarm UFH layout drawing.

Check:

- ✓ Room names and zones
- ✓ Manifold position
- ✓ Flow and return routes
- ✓ Pipe routes
- ✓ Loop lengths
- ✓ Pipe centres
- ✓ Board layout
- ✓ Board orientation
- ✓ No-pipe zones
- ✓ Door thresholds
- ✓ Service penetrations
- ✓ Movement joints
- ✓ Covering system requirements
- ✓ Final floor finish requirements

The installer should mark out key room zones, manifold routes, no-pipe areas and any service zones before installation begins.

Pipe should generally not be installed beneath fixed units, kitchen islands, baths, shower trays, toilets, fitted wardrobes or areas where permanent fixtures may trap heat or where future fixings may penetrate the floor, unless specifically allowed within the Tekwarm design.

Dry-lay initial boards where helpful to confirm orientation, cuts and pipe routes before final fixing or bonding.

10. MANIFOLD POSITIONING AND MOUNTING

The manifold should be installed in the agreed location shown on the Tekwarm design.

The manifold should be:

- Accessible for commissioning, servicing and maintenance
- Positioned to allow neat pipe routing
- Located where all loops can return without excessive pipe congestion
- Mounted level
- Securely fixed to a suitable wall, cabinet or support frame
- Protected from impact and site damage
- Positioned high enough to allow suitable pipe bends and connections

Avoid positioning the manifold behind fixed units, in inaccessible cupboards or where future access will be restricted.

Allow sufficient space below the manifold for pipework to route neatly into the routed board area without kinks or tight bends.

Clearly identify flow and return bars before connecting pipework.

11. ROUTED XPS BOARD INSTALLATION

Tekwarm routed XPS 450 boards should be installed in accordance with the Tekwarm UFH design and board layout.

The boards should be installed:

- Flat onto the prepared substrate
- Fully supported
- Clean and free from debris underneath
- In the correct orientation
- With routed channels aligned correctly
- With pipe routes matching the Tekwarm design
- Tightly butted together
- Without rocking, curling or movement
- With cuts kept neat and stable
- With suitable restraint to prevent movement

- With aluminium foil face positioned as designed, where foil-faced boards are used

Boards should be positioned so that the routed channels line up between boards and allow continuous pipe routes.

Do not force boards into position. If the boards do not align correctly, stop and check the layout before continuing.

The XPS boards must remain stable during pipe installation, pressure testing and covering works.

12. FIXING ROUTED XPS BOARDS

The routed XPS boards can be fixed using either:

- High-tack spray adhesive
- Tekwarm screws and washers
- A combination of both where required by site conditions

The chosen fixing method must be suitable for the substrate, board type, project requirements and intended floor build-up.

The aim is to ensure that the XPS boards remain flat, stable and fully restrained before pipework and covering systems are installed.

13. BONDING WITH HIGH-TACK SPRAY ADHESIVE

Where bonding with high-tack spray adhesive, the receiving surface must be suitable for adhesion.

The substrate should be:

- ✓ Clean
- ✓ Dry
- ✓ Dust-free
- ✓ Stable
- ✓ Free from oil, grease or contaminants
- ✓ Suitable for the adhesive being used

Apply the high-tack spray adhesive in accordance with the adhesive manufacturer's instructions.

Consider:

- Compatibility with XPS
- Compatibility with aluminium foil-facing where used
- Compatibility with the substrate
- Open time
- Coverage rate
- Application temperature
- Ventilation
- Bond strength requirements

- Whether one-sided or two-sided application is required

Only use adhesive products confirmed as suitable for XPS. Some solvent-based products can attack or damage XPS.

Where aluminium foil-faced boards are used, confirm that the adhesive is suitable for bonding the underside face of the board to the receiving substrate. The foil-facing is typically used to assist heat spread on the upper surface and should be positioned in accordance with the Tekwarm design.

Once bonded, press the boards firmly into place. Use suitable hand pressure or a roller where required to improve contact.

Do not rely on adhesive bonding where the substrate is dusty, damp, friable or contaminated.

14. MECHANICAL FIXING WITH TEKWARM SCREWS AND WASHERS

Where mechanically fixing the boards, use **Tekwarm screws and washers**.

Ensure the correct screw type is requested and used:

Masonry screws for concrete, screed or masonry-based substrates

Wood screws for timber-based substrates

Mechanical fixings should:

- Hold the board securely
- Prevent movement
- Prevent board uplift
- Avoid crushing the board
- Be installed flush
- Be positioned away from pipe channels
- Avoid future pipe routes
- Be suitable for the substrate
- Be spaced sufficiently to prevent rocking or lifting

Before drilling or fixing, check for buried services.

Do not overtighten fixings. Overtightening can crush or distort the board and affect the finished floor build-up.

Fixing frequency should be sufficient to prevent movement and should be increased at perimeters, doorways, board edges, high-traffic zones and any areas where board movement is possible.

Where fixing into timber, ensure the timber substrate is sound and capable of holding fixings.

Where fixing into masonry or cementitious substrates, ensure the substrate has adequate strength and that fixings achieve proper hold.

15. BOARD JOINTS, EDGES AND CUT SECTIONS

Board joints should be tight and stable.

Pay particular attention to:

- Perimeters
- Doorways
- Manifold routes
- Small cut sections
- Pipe return areas
- Board transitions
- Service penetrations
- Movement joint locations

Cut boards should be neat, fully supported and restrained.

Small XPS infill pieces should not be left loose. They should be mechanically fixed, bonded or otherwise restrained as required.

Avoid gaps where the overlay system may deflect, crack or become unsupported.

Where board joints are uneven, rocking or misaligned, correct them before installing pipework.

Where aluminium foil-faced boards are cut, take care not to leave loose foil edges that could interfere with pipe installation or covering systems.

16. PIPE HANDLING AND STORAGE

Tekwarm UFH pipe should be handled carefully.

Before installation:

- Store pipe on a clean, dry surface.
- Keep pipe in its packaging until required.
- Protect pipe from sharp objects.
- Do not drag pipe across rough surfaces or sharp foil edges.
- Do not install damaged, kinked, crushed or heavily scratched pipe.
- Do not expose pipe to unnecessary heat or naked flames.
- Use a pipe decoiler to prevent twisting.

Pipe should be installed in continuous loops from the manifold and back to the manifold.

Do not join pipework within the floor build-up unless specifically approved by Tekwarm and the project design team.

Any damaged pipe should be replaced.

17. LAYING PIPEWORK INTO THE ROUTED XPS BOARDS

Start each loop at the manifold.

Connect the pipe to the correct manifold port or leave sufficient pipe length for connection, depending on the preferred installation method.

Lay the pipe in accordance with the Tekwarm UFH design drawing.

Pipe should be laid:

- ✓ In the correct room or zone
- ✓ Into the routed XPS channels
- ✓ Without kinks
- ✓ Without twisting
- ✓ With smooth bends
- ✓ Without sharp contact with board edges or foil edges
- ✓ Without excessive tension
- ✓ With flow and return routes kept neat at the manifold
- ✓ Without lifting the XPS boards
- ✓ Without sitting proud above the board where this may affect the covering system

Press the pipe carefully into the routed channels so that it is held securely.

Where the pipe does not sit correctly, do not force it. Check the route, board alignment, pipe size and bend radius.

Pipe bends must respect the minimum bend radius recommended for the pipe. If a pipe kinks, the affected section should be replaced or technical advice sought.

18. PIPE BENDS, RETURNS AND MANIFOLD ROUTES

Special care is required where pipe changes direction, returns to the manifold or enters / leaves the routed XPS board area.

Pipe bends should:

- Be smooth
- Avoid kinks
- Respect the minimum bend radius
- Avoid sharp board or foil edges
- Avoid excessive stress
- Be protected where required
- Avoid lifting the XPS boards
- Avoid sitting proud of the floor build-up

At manifold routes, pipework can become congested. Ensure the pipework is neatly arranged and protected where required.

Where the pipe exits routed channels, use suitable bends, protection sleeves or transition detailing where needed.

Do not allow pipework to sit proud where it may interfere with the overlay, screed, smoothing compound or final floor finish.

19. MAINTAINING PIPE SPACING AND SYSTEM LAYOUT

The routed XPS board system is designed to maintain pipe spacing through pre-formed channels.

Do not alter pipe routes or centres without approval.

Changing pipe spacing or routes can affect:

- Heat output
- Floor surface temperature
- System balancing
- Comfort levels
- Flow rates
- Loop pressure loss
- Boiler or heat pump efficiency
- Overboard installation
- Final floor finish performance
- System response time

The pipe should be checked as installation progresses to ensure it follows the correct routed path and layout.

Pay particular attention to:

- Perimeters
- Doorways
- Manifold routes
- Areas with obstacles
- Rooms with irregular shapes
- Board joints
- Cut board sections
- Loop returns

Where pipe routing needs to change due to site conditions, seek approval before proceeding.

20. PIPE SPACING AND NO-PIPE ZONES

Pipe spacing and no-pipe zones must follow the Tekwarm design.

Pipe should not normally be installed within areas where fixings may later penetrate the floor, unless clearly identified and protected.

No-pipe zones may include:

- Kitchen islands
- Fixed cupboards

- Shower trays
- Baths
- Toilets
- Stair bases
- Floor-mounted partitions
- Service penetrations
- Areas requiring future floor fixings

Mark or photograph pipe positions before covering the system. This is especially important around kitchens, islands, thresholds, stair bases, partitions and service zones.

A photographic record should be retained with the project handover information.

21. COVERING OPTIONS OVER ROUTED XPS 450 BOARDS

The Tekwarm Routed XPS 450 system must be covered with a suitable load-spreading, screed, smoothing, overlay or dry-floor system.

Common covering options may include:

- Tekwarm 550 / 550 Plus screed or smoothing compound where suitable
- Chipboard overlay panel
- Plywood overlay panel
- OSB overlay panel
- Cement-based board
- Screed board
- Dry floor board system
- Tile backer board system where suitable
- Other approved structural or load-spreading boards

The selected covering system must be suitable for:

- The XPS 450 board
- The pipe size
- The final floor finish
- The intended loading
- The substrate
- The required floor height
- UFH use

The chosen build-up must be confirmed before installation begins.

Do not leave routed XPS boards exposed as the final wearing surface. The boards should be covered as soon as is practical to do so.

22. SCREED / SMOOTHING COMPOUND COVER

Where a screed or smoothing compound system is used, it must be suitable for use over routed XPS insulation boards and UFH pipework.

The compound should be installed in accordance with the product data sheet and Tekwarm / TekGroup guidance.

Where Tekwarm 550 / 550 Plus is used, follow the correct priming, preparation, mixing, thickness and curing guidance.

The compound must fully cover and encapsulate the pipework.

The surface should be smooth, level and suitable for the intended floor finish.

Minimum cover depths must be confirmed based on the selected board, pipe size, floor finish and project loading.

Do not assume all smoothing compounds are suitable over XPS-based UFH systems.

23. DRY-FIT OVERLAY SYSTEMS

Where a dry-fit system is used, there are multiple options depending on the final floor finish and project requirements.

Dry-fit options may include:

- Timber overlay panel
- Plywood overlay
- Chipboard overlay
- OSB overlay
- Cement-based board
- Proprietary dry floor board system
- Tile backer board system where suitable

The dry-fit board must be:

- Suitable for the intended loading
- Suitable for UFH
- Suitable for the final floor finish
- Installed to manufacturer guidance
- Fixed and / or bonded as required
- Stable and free from movement
- Compatible with the routed XPS system

Fixings must not damage the UFH pipework.

Pipe routes should be photographed and safe fixing zones clearly marked before overlay boards are installed.

Where cement-based boards are used, the board manufacturer's installation details must be followed.

24. OVERBOARDING THE SYSTEM

Once the XPS boards and pipework have been installed and checked, the floor should be overboarded or covered using a suitable board, screed board or floor deck where required.

Suitable overboard materials may include:

- Chipboard
- OSB
- Plywood
- Cement board
- Screed board
- Dry floor board systems
- Other approved structural or load-spreading boards

The selected overboard must be:

- Suitable for the intended loading
- Suitable for use over UFH
- Suitable for the floor finish
- Compatible with the project build-up
- Installed in accordance with the board manufacturer's instructions
- Fixed correctly
- Glued where required
- Fit for the intended purpose

The overboard should sit flat over the routed XPS boards and pipework without rocking, bouncing or creating high points.

The overboard should be fixed and / or glued as required using manufacturer-approved products and methods.

Fixings must not penetrate or damage the UFH pipe.

Before fixing boards, clearly identify pipe routes and safe fixing zones.

Where chipboard is used, tongue-and-groove joints should be glued where required by the board manufacturer.

Where plywood, OSB, cement board or screed board is used, follow the manufacturer's guidance on thickness, orientation, expansion gaps, fixing centres, adhesive, primer and suitability for the final floor finish.

25. FIXING PRECAUTIONS DURING OVERBOARDING

When overboarding, take extreme care to avoid pipe damage.

Before fixing:

- ✓ Check pipe routes.
- ✓ Photograph pipe routes.

- ✓ Mark safe fixing zones.
- ✓ Confirm board fixing method.
- ✓ Confirm fixing lengths.
- ✓ Avoid fixing into pipe channels.
- ✓ Avoid over-penetration.
- ✓ Do not use fixings where pipe location is uncertain.

The overboard fixing pattern should follow the board manufacturer's instructions and structural requirements.

Where adhesive or glue is specified, use the correct product. The adhesive must be compatible with the overlay board, XPS system and intended floor build-up.

After overboarding, do not drag heavy materials across the floor unless suitable protection is used.

26. MANIFOLD CONNECTIONS

Once each loop has been installed, return the pipe to the correct manifold connection.

Cut the pipe cleanly and square using a suitable pipe cutter.

Connect each loop to the correct manifold port using the appropriate Tekwarm manifold connection set.

Ensure:

- ✓ Pipe ends are clean and undamaged
- ✓ Connections are fully inserted
- ✓ Compression fittings are tightened correctly
- ✓ Flow and return are connected to the correct bars
- ✓ Each loop is clearly labelled
- ✓ Loop references match the Tekwarm design drawing
- ✓ Pipework below the manifold is neat and protected
- ✓ Pipe bends into the manifold are smooth and not stressed

Do not overtighten manifold connections. Follow the manifold fitting guidance.

Each loop should be clearly labelled with the room name or circuit number.

27. FILLING THE SYSTEM

Before pressure testing, the system must be filled with water and air must be removed from each circuit.

Typical filling procedure:

- Close the manifold isolation valves from the primary heating system.
- Connect a water supply to the manifold fill point.
- Connect a hose from the drain point to a suitable drain.
- Open one UFH loop at a time.
- Flush water through the loop until air is removed and water runs clear.

- Close the completed loop.
- Repeat for each loop.
- Once all loops are filled and vented, open all loops ready for pressure testing.

The system must be fully vented. Air left in the pipework can affect the pressure test and later system performance.

Pressure testing should be carried out hydraulically using water unless otherwise stated by the project specification or Tekwarm guidance.

28. PRESSURE TESTING BEFORE COVERING

The Tekwarm UFH system must be pressure tested before it is permanently covered or concealed.

Pressure testing confirms the integrity of the pipework and manifold connections before the system becomes difficult to access.

Ideally, the system should be pressure tested before applying screed, smoothing compound or overlay boards, and kept under suitable pressure during covering works so accidental damage can be identified.

A typical pressure testing process is:

- Ensure all pipe loops are connected to the manifold.
- Ensure all loop valves are open.
- Ensure the manifold is isolated from the primary heating system.
- Connect a suitable hydraulic pressure test pump.
- Fill and fully vent all loops.
- Increase the pressure gradually.
- Check all manifold connections and visible pipework.
- Maintain the required test pressure for the required test period.
- Record the test pressure, duration, date and installer details.
- Inspect for any pressure loss or visible leaks.
- Do not cover or conceal the system until the pressure test has passed.

The Tekwarm UFH system should be hydraulically pressure tested before the pipework is permanently concealed. Unless project-specific guidance states otherwise, the system should be tested to 6 bar and checked for pressure stability and visible leaks. The system should remain under suitable pressure during screeding, smoothing, overlay board installation and any subsequent floor installation works.

Where there is a risk of freezing, do not leave the system filled with untreated water unless suitable frost protection measures are in place.

Do not proceed if the pressure test has failed or unexplained pressure loss is observed.

29. PRESSURE TEST RECORD

A pressure test record should be completed before the system is permanently covered.

Recommended information to record:

- ✓ Project name
- ✓ Plot / area / room reference
- ✓ Installer name
- ✓ Date of test
- ✓ Manifold reference
- ✓ Number of loops tested
- ✓ Pipe diameter
- ✓ Test pressure
- ✓ Test duration
- ✓ Start pressure
- ✓ End pressure
- ✓ Ambient temperature
- ✓ Any pressure loss
- ✓ Confirmation of visual inspection
- ✓ Installer signature
- ✓ Client / site representative signature where required

A copy of the pressure test record should be retained as part of the project handover file.

30. PRE-COVERING INSPECTION CHECKLIST

Before screed, smoothing compound or overlay boards are installed, check:

- ✓ Substrate clean, dry, level and suitable
- ✓ Correct XPS board type installed
- ✓ Plain or aluminium foil-faced boards installed as specified
- ✓ 450kPa board grade confirmed
- ✓ Boards fully supported
- ✓ Boards bonded or fixed securely
- ✓ Correct high-tack spray adhesive used where bonding
- ✓ Correct Tekwarm screws and washers used where mechanically fixing
- ✓ Correct masonry or wood screws used for the substrate
- ✓ No loose, rocking or lifted boards
- ✓ Board joints tight and stable
- ✓ Routed channels aligned correctly
- ✓ No sharp board or foil edges contacting pipe
- ✓ Pipework installed to design
- ✓ Pipe fully seated in routed channels
- ✓ Pipe bends smooth and not kinked
- ✓ No pipework sitting proud
- ✓ Loops connected to manifold
- ✓ Loops labelled correctly
- ✓ System filled and vented
- ✓ Pressure test completed and recorded

- ✓ System left under pressure for covering
- ✓ Pipe routes photographed
- ✓ Safe fixing zones marked where overlay boards are used
- ✓ Correct covering system confirmed for final floor finish

31. PRE-FLOOR FINISH CHECKLIST

Before installing final floor finishes, check:

- ✓ Covering system suitable for UFH
- ✓ Overlay / screed / smoothing system installed to manufacturer guidance
- ✓ Correct cover depth achieved where relevant
- ✓ Overlay boards installed to manufacturer guidance
- ✓ Cement-based boards installed to manufacturer guidance where used
- ✓ No fixings have damaged UFH pipework
- ✓ Floor is flat, stable and suitable
- ✓ UFH pressure has remained stable
- ✓ UFH commissioning has been completed where required
- ✓ Floor finish manufacturer's UFH guidance has been reviewed
- ✓ Maximum floor surface temperature has been confirmed
- ✓ Any required primers, adhesives or decoupling layers have been specified

Different floor finishes have different UFH requirements. Timber, laminate, vinyl, carpet, tiles and resin finishes all have different rules.

32. COMMISSIONING AND INITIAL HEAT-UP

The UFH system should not be operated at full temperature immediately after installation.

Commissioning should be carried out gradually and in accordance with:

- Tekwarm guidance
- Heat source manufacturer's guidance
- Screed / smoothing compound manufacturer's guidance
- Floor finish manufacturer's guidance
- Overlay board manufacturer's guidance
- Project specification
- Relevant UFH standards

The initial heat-up cycle should be controlled and gradual.

Do not use the UFH system to force-dry wet trades or accelerate construction works unless specifically approved.

A gradual commissioning process helps reduce thermal shock, movement, floor finish failure and unnecessary stress within the floor build-up.

33. FLOOR FINISH CONSIDERATIONS

Before installing floor finishes, check:

- ✓ Surface condition
- ✓ Moisture content where relevant
- ✓ Floor stability
- ✓ UFH commissioning records
- ✓ Floor finish manufacturer's requirements
- ✓ Adhesive compatibility
- ✓ Maximum floor surface temperature
- ✓ Need for primers, smoothing compounds or membranes
- ✓ Expansion gap requirements
- ✓ Suitability of the covering system for the chosen finish

Resilient floor finishes, timber, laminate, vinyl, carpet and tiles all have different requirements.

The floor finish installer must confirm that the covering system is suitable before installing the final floor finish.

34. COMMON INSTALLATION MISTAKES TO AVOID

Avoid the following:

- ✗ Installing over an uneven or contaminated substrate
- ✗ Failing to clean the substrate before installation
- ✗ Using adhesive on dusty, damp or friable surfaces
- ✗ Using spray adhesive that is not compatible with XPS
- ✗ Using spray adhesive that is not compatible with aluminium foil-facing where relevant
- ✗ Failing to provide ventilation when using spray adhesive
- ✗ Using the wrong board type
- ✗ Substituting a lower-strength board without approval
- ✗ Overtightening screws and distorting the XPS board
- ✗ Using washers that are too small
- ✗ Using masonry screws where wood screws are required
- ✗ Using wood screws where masonry screws are required
- ✗ Leaving XPS boards loose, rocking or unsupported
- ✗ Failing to align routed channels correctly
- ✗ Leaving gaps between boards
- ✗ Leaving sharp board or foil edges near the pipe
- ✗ Failing to seat the pipe fully into the routed channels
- ✗ Kinking pipe at bends or returns
- ✗ Changing pipe routes without approval
- ✗ Installing pipe below fixed furniture without design approval
- ✗ Failing to photograph pipe routes before covering
- ✗ Fixing overlay boards through pipework
- ✗ Using unsuitable overlay board material
- ✗ Failing to glue boards where required
- ✗ Using incorrect fixings or adhesive
- ✗ Failing to pressure test before covering the system

- ✗ Not keeping the system under pressure during covering works
- ✗ Installing floor finishes without checking UFH suitability
- ✗ Running the UFH system too hot too soon

Routed XPS 450 systems are designed to be robust, but robust does not mean invincible. If the board is loose, the pipe is proud and the overlay is guessed, the system is not “innovative” — it is a future complaint with heating controls.

35. TEKWARM ROUTED XPS 450 INSTALLATION SEQUENCE

1. Review the Tekwarm UFH design.
2. Confirm manifold position.
3. Confirm XPS board type — plain or aluminium foil-faced.
4. Confirm XPS 450kPa board grade.
5. Check total floor build-up.
6. Check substrate is clean, dry, level, stable and suitable.
7. Dry-lay initial boards where required to confirm layout.
8. Confirm board channels align with the Tekwarm design.
9. Bond boards using compatible high-tack spray adhesive, or mechanically fix using Tekwarm screws and washers.
10. Use correct masonry screws or wood screws depending on substrate.
11. Ensure boards are flat, stable and fully supported.
12. Secure small cut sections and perimeter pieces.
13. Lay pipework from the manifold.
14. Press pipe securely into routed channels.
15. Check pipe is fully seated and not kinked.
16. Protect pipe at transitions where required.
17. Return pipe loops to the manifold.
18. Cut, connect and label each loop.
19. Fill and flush each loop individually.
20. Vent all air from the system.
21. Hydraulically pressure test the system.
22. Record the test results.
23. Leave the system under suitable pressure.
24. Photograph pipe routes and board layout.
25. Select the correct covering build-up for the final floor finish.
26. Install screed, smoothing compound or overlay board in accordance with manufacturer guidance.
27. Confirm pressure remains stable after covering.
28. Proceed with floor finish installation only once approved.

36. INSTALLER HANDOVER CHECKLIST

The installer should provide the following information at handover:

- ✓ UFH design drawing
- ✓ Manifold schedule
- ✓ Pipe layout photographs
- ✓ Board layout photographs

- ✓ Loop identification records
- ✓ Pressure test certificate
- ✓ Board type installed — plain or aluminium foil-faced
- ✓ Confirmation that XPS 450 board was installed
- ✓ Fixing method used
- ✓ Adhesive used where bonded
- ✓ Confirmation whether Tekwarm screws and washers were used
- ✓ Confirmation whether masonry or wood screws were used
- ✓ Confirmation boards were flat and fully supported
- ✓ Covering method used
- ✓ Overlay board type where dry-fit system used
- ✓ Commissioning guidance
- ✓ Any deviations from design
- ✓ Any areas requiring special attention

37. DISCLAIMER

This guide is provided as general installation guidance for Tekwarm Routed XPS 450 UFH systems using plain or aluminium foil-faced XPS boards. It does not replace project-specific design, structural calculations, adhesive manufacturer instructions, fixing manufacturer instructions, board manufacturer instructions, overboard manufacturer instructions, screed / smoothing compound manufacturer instructions, floor finish guidance or statutory requirements.

All installations must be carried out by competent persons and in accordance with the Tekwarm design, relevant British Standards, Building Regulations, structural requirements, adhesive manufacturer guidance, board manufacturer guidance and floor finish manufacturer requirements.

Where site conditions differ from the design or specification, works should stop and advice should be sought before proceeding.

Only use adhesives, fixings, washers, screws, smoothing compounds and overlay systems that are suitable for the substrate, XPS board system and final floor build-up.

Adhesives must be confirmed as compatible with XPS and aluminium foil-facing where relevant before use.

Tekwarm / TekGroup accepts no responsibility for failures caused by incorrect installation, unsuitable substrates, poor board restraint, incompatible adhesives, incorrect mechanical fixing, unsupported XPS boards, incorrect board selection, incorrect pipe installation, incorrect covering systems, fixings damaging pipework, premature heating, incompatible floor finishes or failure to follow relevant manufacturer guidance.