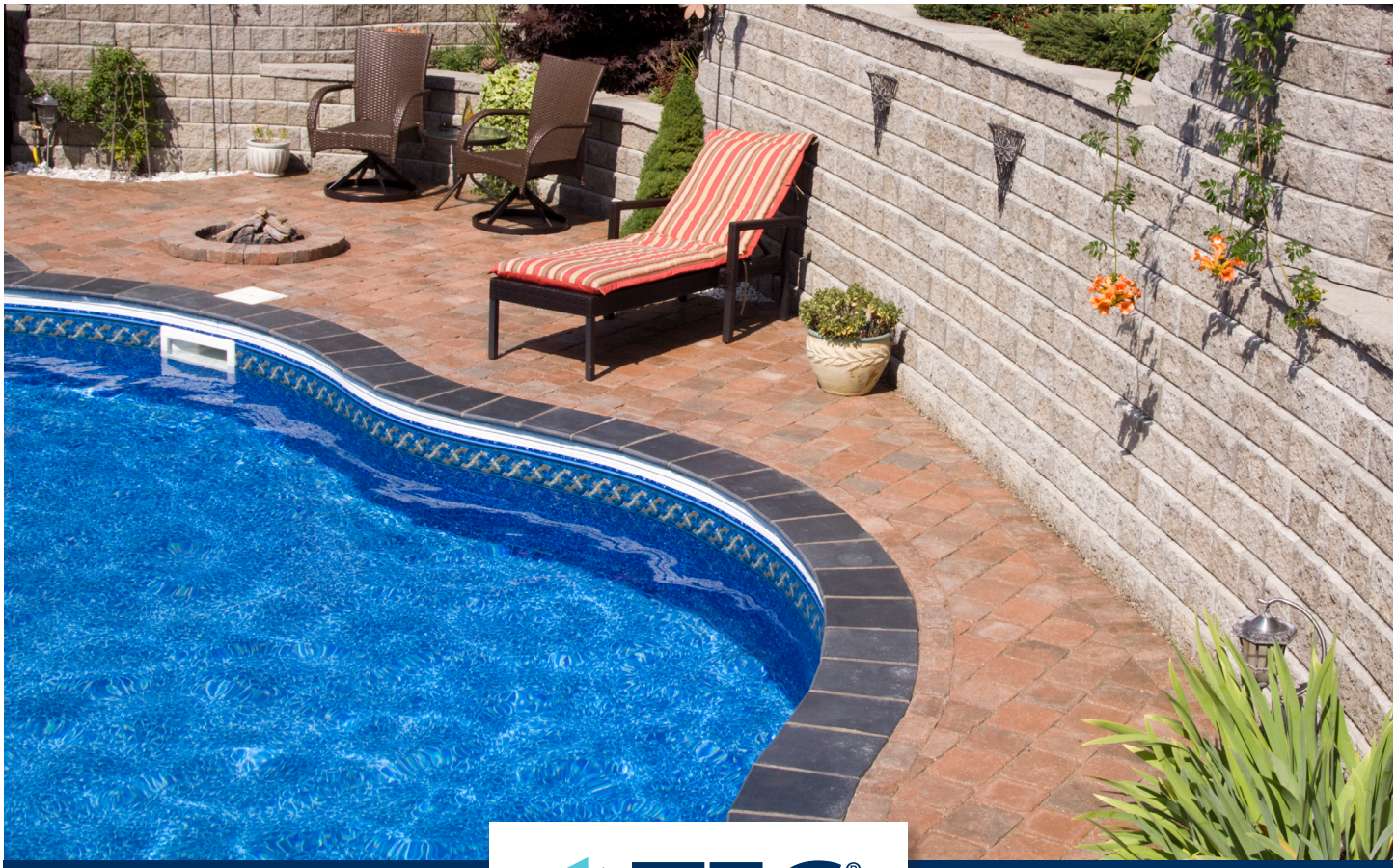


TEC®

INSTALLATION GUIDE

Pool and Water Feature Installation

Installation Materials

Cementitious Waterproofing: TEC® Triple Flex™ Waterproofing Crack Isolation Membrane

Latex-Modified Mortar Bed: TEC Floor Mud with Xtra Flex™ Acrylic Latex Additive

Waterproofing and Crack Isolation Membrane: TEC HydraFlex™ Waterproofing Crack Isolation Membrane

Premium Thinset Mortar: TEC Super Flex™ Ultra-Premium Thin Set Mortar

Premium LFT Mortar: TEC 3N1® Performance Mortar

Premium Cementitious Grout: TEC Power Grout®

Epoxy Grout: TEC AccuColor EFX® Epoxy Special Effects Grout

100% Silicone Caulk: TEC AccuColor 100® 100% Silicone Sealant

Installing Tile in a Pool or Water Feature

Setting tile in a pool or water feature is a challenging task for all contractors. Prior to any installation, proper planning must be done on how to handle different substrate conditions, intended uses, and environmental factors. These are all critical to ensure a long-lasting installation with no issues. This guide will help educate on the unique challenges of pool and water feature installations.

Tank Preparation

Before the installer can begin setting tile, the pool tank shell must be concrete that is properly prepared. Fiberglass pools are not suitable substrates. The pool tank surface must be free of grease, oil, wax, curing compounds, or other bond inhibiting coatings. Shotblast or sandblast if necessary. Protect surrounding work from damage.

The tank preparation and requirements will follow Tile Council of North America (TCNA) specification P602-19. The flatness requirements for tiles with at least one side longer than 15″ must be 1/8″ in 10 ft. and no more than 1/16″ in 2 ft. when measured from the high points. The flatness requirements for tiles that do not have a side longer than 15″ must be 1/4″ in 10 ft. and no more than 1/16″ in 1 ft. when measured from the high points.

Per TCNA requirements, the architect must specify type, width, and location of all movement joints and all joints must be honored throughout the entire installation according to TCNA Handbook EJ 171.

- Directly over any joints in the concrete tank (EJ171A or EJ171E)
- In tilework on 8’ to 12’ centers when exterior or interior areas exposed to direct sunlight (EJ171F)
- Perimeter joint between the tile assembly and coping/decking (EJ171I)
- Perimeter joint at all changes in plane and at all restraining abutments (EJ171G)
- When glass tile is used, it is recommended to increase the usage of movement joints at the higher end of the ranges listed in EJ171

The first step in prepping the pool or water feature is pre-treating all concrete cracks, joints, changes in plane, drains, penetrations, jets, etc. with TEC® Triple Flex Waterproofing Crack Isolation Membrane which is an elastomeric cementitious system used for waterproofing and crack isolation. Apply Triple Flex according to product data sheet instructions. Once finished pre-treating the pool, install Triple Flex ensuring the application has a wet thickness of at least 45 mils. When applied correctly, Triple Flex meets ANSI A118.10 Specifications for Waterproof Membranes and exceeds ANSI A118.12 Specifications for Crack Isolation. Triple Flex has a water vapor transmission rating of <1 perm meaning that it is a semi-impermeable vapor retarder. If flood testing is required, allow 72 hours for Triple Flex to cure. If flood testing is not required, Triple Flex is ready for further application after 4-8 hours. Triple Flex changes from light gray to a dark gray color when cured.

After the Triple Flex has transitioned to the dark gray color and flood testing is complete, TEC® Floor Mud mixed with TEC® XtraFlex™ Premium Acrylic Mortar Additive is needed to make the bonded mortar bed. A bonded mortar bed is a thick-bed installation used to reach the flatness requirements and provide reinforcement to the substrate. The bonded mortar bed does not provide protection against cracking or

movement in the substrate. Ensure the pool is dry after flood testing prior to application of the mud bed. TCNA requires the floor have 1¼" mortar bed and the walls have ¾" thickness. The walls must be plumb and the floors must meet the requirements of the tile as stated earlier. Allow the mortar bed to cure for a minimum of 7 days.

Once the mortar bed has cured for 7 days it is required to add TEC® HydraFlex Waterproofing Crack Isolation Membrane to further protect the installation from cracks and the substrate from water damage. Hydraflex should be used for all tile sizes. When applied correctly, HydraFlex exceeds both ANSI A118.10 Specifications for Waterproof Membranes and ANSI A118.12 Specifications for Crack Isolation Membranes. Two coats of 25 mils wet thickness are required when waterproofing. The second coat must be applied perpendicular to the first coat. HydraFlex will turn dark purple as a visual indicator when dry as opposed to light purple when it is wet. After application of the second coat, wait 2 to 12 hours, dependent on ambient conditions, prior to flood testing.

Tile Setting Notes

An important element of ensuring the tile installation performs as expected and has a long service life is choosing the proper setting materials. It is crucial to select mortars, grouts, and sealants specifically engineered to safeguard against natural elements when installing pools or water features. Some cementitious mortars are designed to work best with small tiles where all sides are less than 15 inches and some are designed to handle the large format tiles. Mix mortars using the recommended water amount being sure not to exceed the maximum water demand. Slake the mortar for the recommended amount of time by leaving it alone. This allows all of the individual components to "wet out" and helps form stronger bonds. **DO NOT** add additional water after the product has slaked for the required time. Organic adhesives (mastics) should never be used on pools. **DO NOT** cover up expansion joints. You must honor the expansion joint up through the entire installation. If covered up, the installation will crack.

When installing exterior pools or water features, the ambient conditions are very important and must be monitored in order to have a successful installation. When installing in hot weather, the material properties like open time, working time, pot life, etc. will all be accelerated. **TEC Tips:** ensure the powder and water temperature are 80°F or lower, shade the install area, work in the mornings, and work in small areas. Pre-moisten the substrate to extend working time. Pre-moistened substrates are called Saturated Surface Dry (SSD) which helps prevent the moisture in the mortar leaving too quickly. Cold temperatures present the opposite problem of extended open time, working time, pot life, etc. Some cold weather **TEC Tips:** ensure the powder and water temperature are 50°F or higher, use heaters and tents, and double check that the temperature will remain above 50°F for at least 48-72 hours after installation. Longer foot traffic protection might be necessary.

The installation team must understand the unique mortar coverage requirements of exterior installations. These outdoor applications require 95% coverage when installing ceramic or glass tile and increases to 100% with natural stone. When installing glass tile, double check with the manufacturer that it is appropriate for the application and use white mortar to prevent tinting. Substrate variation, bonding material, trowel selection, and troweling technique are critical factors to consider when trying to achieve proper coverage. Voids in the mortar beneath the tile can accumulate moisture. In freeze/thaw climates, this water can freeze and expand, causing degradation and bond failure of the setting material. To achieve the required coverage,

first key in the mortar by using the flat side of the trowel on the substrate. When done correctly it will make a scraping sound. Then, set the tile on freshly notched mortar and slide it back and forth perpendicular to the notches to ensure coverage and prevent voids. Flat back-troweling can also be used to meet coverage requirements. This involves keying in a thin coat of mortar to the back side of the tile with the flat side of the trowel immediately before setting. Mortars are not recommended as a skim coat on the walls. The dot method should **NEVER** be used with cement-based mortars. With this method, the installer puts globs, or dots, of mortar on the back of the tile, rather than carefully troweling it. Although it may seem like it saves time and reduces material expenditures, critical coverage requirements are not achieved and the resulting voids in coverage leave tile susceptible to moisture trapping, which can cause debonding or compromise the bond. **TEC Tips** for installing translucent tiles:

- Knock down trowel ridges
- Use white mortar from the same batch
- Use same amount of water for all mortar mixes
- Do a mock-up installation

TEC® Mortar Solutions

After the substrate meets all specifications and the proper precautions have been taken for extreme weather, it is time to start installing tile. For tiles with all edges 15 inches or less, the preferred product is TEC® Super Flex™ Ultra-Premium Thin Set Mortar. Super Flex exceeds ANSI A118.4E, A118.11, and A118.15E specifications. It has patented bonding technology to allow for unsurpassed strength while also being flexible enough to handle 1/16″ in-plane movement of the tile. The exceptional bond strength and flexible characteristics make it the ideal choice for exterior pools and water features or interior with direct sunlight. ANSI A118.15 mortars have a greater resistance to shock and impact which will help in freeze/thaw conditions. Mix Super Flex according to data sheet instructions and let slake for 10 minutes. When installing tiles remember to key in the mortar to promote adhesion. Check for coverage within the first few tiles to make sure the correct trowel is being used and periodically throughout the installation. If 95% coverage isn't being achieved, switch trowels or back-butter the tiles. Allow 16-24 hours for the mortar to cure before grouting.

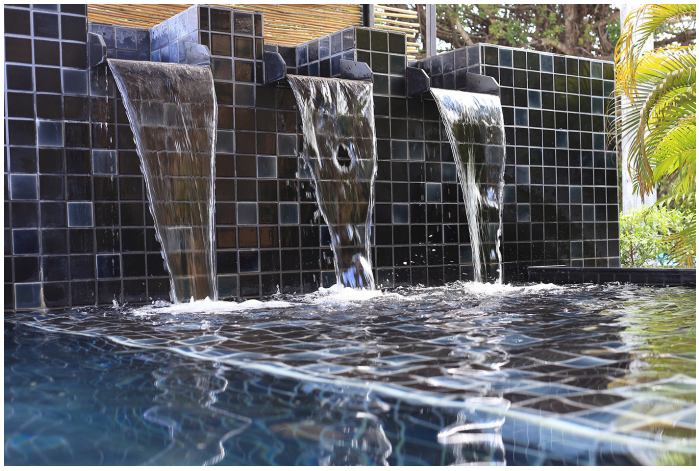
For tiles with at least one edge 15 inches or longer, choose TEC® 3N1™ Performance Mortar which exceeds ANSI A118.4TE, A118.11, and A118.15TE. It is non-sag and non-slump so it can support heavy tile weighing up to 6 lbs./ft^2 on vertical and horizontal applications. As with Super Flex, 3N1 is an ANSI A118.15 mortar so it has higher bond strengths and better resistance to shock and impact than regular latex-modified mortars. The improved performance helps extend the service life of pools. Mix 3N1 according to the water demand and instructions listed on the data sheet. Ensure at least 95% coverage is being achieved by periodically pulling a tile and checking. If 95% coverage isn't being achieved, back-butter the tile or select a different sized trowel. Allow 16-24 hours for the mortar to cure before grouting.

TEC® Grout and Sealant Solutions

When installing grout in an exterior pool or water feature, all the **TEC Tips** for mortars should be extended to grouts. This includes hot weather grouting best practices of ensuring the powder and water temperature

are 80°F or lower, shade the install area, work in the mornings, and work in small areas. Pre-moisten the joint to extend working time. When cold temperatures are present, the grouting best practices of ensuring the powder and water temperature are 50°F or higher, use of heaters and tents, and double checking that the temperature will remain above 50°F for at least 48-72 hours after installation should be followed. Longer foot traffic protection might be necessary.

The premier advanced performance grout for any and all submerged tile applications is TEC® Power Grout. Power Grout can be used in grout joints ranging from 1/16"-1/2" and is crack/shrink resistant. Its breakthrough formulation is stain-proof and efflorescence free ensuring that the joint is color-consistent for the life of the installation. Power Grout exceeds ANSI A118.7 Specifications for High Performance Cement Grouts for Tile Installation. It is always recommended to mix full bags of Power Grout but if less than a full bag or multiple bags from different batch numbers are used, dry mix the contents together. This practice will eliminate slight color differences between batches and ensures that all the fine particles that may have settled during shipping are evenly dispersed. Partial bags must be stored in a sealed air tight environment to ensure quality and performance for the next job. Start with the low end of the water range and add more water to get the desired consistency. However, **DO NOT OVER WATER**. Mix with a low-speed drill (350 rpm maximum) for a minimum of 2 minutes and slake for 3-5 minutes. After the slake is complete, remix for 1 minute and do not add additional water. Fully pack all joints and remove excess grout. Allow grout to firm up before cleanup. This will usually take about 15-30 minutes depending on ambient conditions. Check for firmness by lightly touching the grout with your finger. If there is no transfer to your finger, you may proceed with clean up. Once grouting is finished, you must wait 21 days before filling the pool with water.



TEC offers a complete chemical resistant, 100% solids epoxy grout, TEC® AccuColor EFX® Epoxy Special Effects Grout that is less sensitive to pool chemistry variations. It exceeds ANSI A118.3 Specifications for Epoxy Mortar and Grout and has over 1300 psi bond strength to quarry tile. EFX has superior UV stability which reduces yellowing. You must mix all of part A with all of part B to get the complete chemical resistance. Partial mixing is not an option. Pack all of the grout joints with a hard rubber float. Clean tiles immediately. **DO NOT ALLOW EFX TO HARDEN ON THE TILES.** It will be difficult or impossible to remove once hardened. Epoxy grouts can provide excellent long-term durability and reduce maintenance costs due to their superior chemical resistance.

All movement joints that were specified by the architect must be filled in with TEC® AccuColor 100® 100% Silicone Sealant. It offers permanent flexibility and provides excellent weatherability. Since it is 100% silicone, it will not break down with UV light or any pool chemicals. AccuColor 100 allows for 25% joint compression AND 25% joint expansion. Use masking tape on both sides of the joint to allow for easy cleanup. Fill completely and tool to desired thickness immediately before a skin forms in the joint. Immediately after tooling, remove masking tape and wipe any sealant off the face of the tile. Silicone joints should be regularly checked as part of the maintenance schedule and replaced when needed.

Maintaining Proper Pool Water Balance

Maintaining proper pool water balance is critical to ensure an attractive and long-lasting tile installation. Cement-based grouts, mortars, plumbing, and the concrete pool shell can be degraded if pool water is not regularly checked and adjusted to within recommended ranges. Achieving proper pool water balance

includes maintaining pH and calcium hardness. Pool water must be maintained at a pH of 7.2-7.8. If the pH drops below 7.0 the cement grout and mortar will etch and degrade. When the pH is above 8.0 mineral deposits will form on the tiles. If the calcium hardness level drops too low, the pool water will leach calcium out of the cement grouts and mortar resulting in degradation over time. The Langelier Saturation Index (LSI) is an unbiased relationship between pool chemicals and environment. If the LSI is between -0.30 and +0.30 the pool water is balanced. Pool water below -0.31 will pull calcium from the grout; pool water above +0.31 will deposit calcium onto the tile in the form of hard water stains. Regular water quality checks and adjustments are required to ensure the water is balanced and safe.

Conclusion

Selecting and effectively using high-quality products for pools and water features requires careful consideration of various factors. No two projects are the same, but a comprehensive understanding of the conditions that should drive product selection will always contribute to more successful installations. Ensuring the material qualities are not only rated for submerged application, but also work together as a system, pays off in the creation of a beautiful and durable installation.

Contact your local sales rep to request a demo.
Have a question? Visit TECQuestions.com.

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