



The Critical Role of Pool Surround Surfacing:

Comparing Popular Materials for Durability, Safety, Maintenance, and Aesthetics



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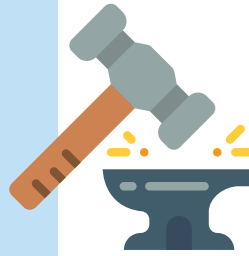
Overview

While swimming and waterplay areas are key amenities for encouraging guests to relax, play, or enjoy the sunshine, these areas are also hot spots for a list of health and safety risks. From the potential for slip and fall injuries to the spread of harmful microorganisms, resorts and hotels need to analyze how their material and design choices affect their ability to create a clean, safe environment for their guests to enjoy.

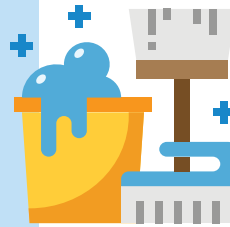
One of the most common – and most commonly overlooked – contributing factors to the health, safety, and enjoyment of your guests in an aquatic environment is the pool surround surface material. While many wouldn't think to look beneath their feet to find five-star-worthy reasons to enjoy a swimming pool or spa, the quality and design of your pool surround and deck directly impact the safety, hygiene, and atmosphere of your aquatic areas.

In this whitepaper, we will define the critical role pool surround materials play in your aquatic area's design and performance, as well as note the impact it has on your guests. This means carefully considering surfacing aspects like texture, hardness, color, coefficient of friction, chemical resistance, and other factors.

We will use four Key Factors as a lens for evaluation: Durability, Cleanability, Safety, and Aesthetics.



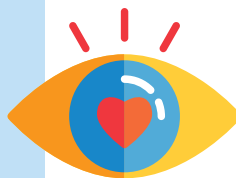
Durability – As we analyze durability, we consider the strength of the material as well as its ability to maintain performance against a variety of factors. Durability is a key factor in the long-term performance expectations of your pool surround and associated costs of repair or replacement.



Cleanability / Maintenance – Efficient and thorough cleaning of pool surround areas is critical: if a surface is not properly cleaned or drained of standing water, waterplay areas become a prime site for bacterial growth. The surface material's design and makeup will contribute heavily to your resort's ability to properly clean, drain, and maintain the pool deck area. This contributes to guests' visual appreciation of the area as well as protection against spreading a virus or microorganism.



Safety – Pool surround safety is paramount given the serious injuries guests and families can incur around water. While slipperiness of the material is a top factor in analysis for safety, we will also analyze other safety concerns such as tripping hazards, unsafe heat transference, and attenuation on impact. Thoroughly analyzing products for safety not only protects your guests and preserves their vacation experience, but also protects your company from liability.



Aesthetics – Your resort's pool, spa, and waterplay areas present key amenities that influence a guest's experience with your brand. Having a beautiful, well-designed pool can be the difference between a 5-star review and a brand disconnect.

Concrete

Why Concrete

Concrete remains one of the most used material choices for building swimming pools and aquatic areas because of its strength. Sharp objects won't damage it, and with proper maintenance, it won't collect algae or mold. Concrete suppliers are plentiful, which creates a competitive marketplace, often saving buyers some upfront costs. While the surface of concrete is somewhat porous – which can lead to staining if there are areas of ponding water – it is also smooth enough to require minimal slope to direct water to a drain. Hand-finished concrete and lightly broomed concrete only requires 1/8 inch per foot.

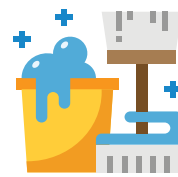
Key Factor Performance



Durability

Concrete's most obvious identifying factor is its strength and rigidity. However, this rigidity also causes a fault in concrete's long-term durability at the surface level.

Concrete is exposed to a wide range of elements as a pool deck: shifting soil subsurface, UV-rays, chemical cleaning agents, chlorinated water, changing temperatures, sliding deck chairs, and pounding feet. While the concrete contractor will place "control joints" in an attempt to control where the concrete cracks, it will inevitably crack. As the crack grows or as the concrete degrades around the crack, it will need to be replaced.



Cleanability / Maintenance

The surface of concrete is lightly porous, which can trap microorganisms like bacteria and viruses. Concrete pool surrounds require significant and frequent hands-on maintenance to keep the surface clean. Unfortunately, porous concrete also absorbs chlorine and cleaning chemicals, which causes the surface of the concrete to break apart and lift. As your cleaning crew sprays contaminants from your deck, they might also be spraying off pieces of your concrete. Concrete also stains with chemical-use and hard water.

Ultimately this leads to high maintenance costs to replace the damaged concrete and to regularly re-seal or resurface the concrete. It also means portions of your deck will present an eyesore for your guests, and will be unavailable during maintenance and repair.



Safety

Out of the materials analyzed in this whitepaper, concrete is the lowest performer when it comes to safety:

- *Slip-and-Fall*: Untreated concrete becomes very slippery when wet, which creates liability for slip-and-fall accidents.
- *Trip-and-Fall*: As the surface beneath your concrete is likely to shift and settles, the rigidity of concrete prevents it from flexing with the substrate. As a result, parts of the concrete can crack and lift, creating a tripping hazard.
- *Attenuation*: When a visitor falls, the hard, abrasive quality of concrete increases the chances of a more serious injury, abrasion, or laceration.
- *Burns*: Concrete is famous for getting blisteringly hot in the summer sun. Hot concrete can cause physical burns, especially to children's bare feet, leaving you exposed to a lawsuit.



Aesthetics

Concrete surface options also range widely, including brushed, stamped, and coloring techniques.

Creating colorful designs to match your brand or environment, however, will vary in quality as well as cost. Options include concrete stains, color hardeners, integral pigments, and pool deck paint. Each option will have varying degrees of being long-lasting and wear-resistant, though weathering, UV-damage, poor color application, and pool chemical use will eventually cause discoloration. Proper maintenance of your concrete color will be critical not only for your brand, but also for safety if you are using coloring to communicate information such as pool depth or entry and exit points.



The Bottom Line

While concrete is a popular material for building pools because of its strength, using concrete for the pool deck or surrounding area creates a serious hazard for guests and alarming liability exposure for property owners.

Tile

Why Tile

Porcelain, mosaic, glass, ceramic: tiles designed for swimming pools and spa areas are often chosen for their surface design. Shimmery, textured, or made to look like stone, tiles provide pool designers with a versatility that concrete can't achieve. However, tile performance will depend on the type of tile chosen, material thickness, glaze thickness, and where it is located. Tile is considered a smooth surface, requiring only a minimal slope (1/8 inch) to direct water to a drain. While tile prices range widely based on the material, shapes, and designs, additional costs include using an expert installer and requiring the use of an epoxy grout. While both requirements are more expensive, tile is quickly damaged if improperly installed or installed with subpar grout. The only exception to this requirement polypropylene or plastic tiles that can be installed without an expert.



Key Factor Performance



Durability

Pool tile varies widely in its durability, depending upon the materials used. Tiles made of lesser-quality materials and glaze can chip and crack over time. Dropping heavy items on tile that isn't properly supported causes tile to crack. Tiles that are more porous can absorb water and contaminants.

The Achilles Heel of tile, however, is in the installation and grout. If it is improperly installed, or if the grout is subpar quality or not properly maintained, tile may move and shift. This can cause tiles to crack, crumble, or pop out of place.



Cleanability / Maintenance

Tile scores well on surface cleanability, requiring some cleaning solutions and wiping away contaminants. If your pool's water contains too much calcium or has an incorrect pH balance, white buildup can be left behind once water dries.

However, between the tile, grout presents the greatest challenge for keeping your aquatic area clean. Grout is susceptible to moisture, stains, and fungus and needs to be sealed regularly for protection. As the sealant and tile adhesive breaks down, moisture and contaminants can get caught in the cracks. This serves as a breeding ground for bacteria and viruses, even with cleaning.

Plastic interlocking tile allows water to filter through the surface to the concrete below. While this means the tile is easy to rinse off, the water can get trapped between the tile and the concrete. This again creates a moist environment that encourages mold and microorganisms to grow.



Safety

Like concrete, hard tile surfaces become very slippery when wet. This poses a serious slip-and-fall hazard for guests walking barefoot around your pool or spa area. The hardness of tile makes the impact after a fall more damaging and painful. You cannot add padded underlayment beneath tile. The exception to this safety concern is slip-resistant plastic tiles.

Ceramic and porcelain tiles are very heavy, which can cause the floor beneath them to sink, creating an uneven walking surface. This could cause guests to trip and fall around your pool. A sinking floor can also cause the tile to crack, creating additional hazards for your guests.



Aesthetics

Tile is a popular choice for water features because of their wide design, texture, and color options. However, each tile has to be laid individually by a professional installer, which drives up the cost of using tile for your pool surface. Plastic tile does not require professional installation, but the tiles have a distinct “locker room” feel: the tiles of strong plastic have noticeable gaps to let the water pass through, a look reminiscent of locker room shower areas where one hopes to avoid getting plantar warts or athlete’s foot. With tile, you will also be limited in the configurations your design can take. By the nature of their square or rectangle shape, tiles cannot achieve organic or flowing lines. This limits designs to more geometric patterns.

The Bottom Line

Tile scores high for aesthetics, but the benefits are outweighed by the difficulty in maintenance and safety.

Thermoplastic Vulcanized Rubber (TPV)

Why TVP

Thermoplastic Vulcanized Rubber (TPV) offers resorts more design capabilities and traction than both concrete and tile. TPV is comprised of rubber granules that are held together with a binder, allowing for more organic designs with curved shapes. As an added benefit, the rubber used in production can sometimes come from recycled sources, such as tires. However, when using TPV facility operators need to heavily research the manufacturer, rubber, and binders they are using. Performance can vary widely based on the quality of base materials used, the chemicals used, and in the attention to detail the manufacturer provides.



Key Factor Performance



Durability

TPV's durability reflects that of rubber: it is laid over a solid substrate material such as concrete or stone and can flex with substrate movements and cracks.

A known drawback to TPV is its variable elasticity. In its early years of use, TPV can become more relaxed when heated, potentially losing its shape. Some have reported it can release a rubbery smell in this state. Over time, however, the rubber can lose its elasticity, becoming brittle and more susceptible to breaking apart. This is especially true if the subsurface starts settling and shifting: TPV is more likely to break under pressure, rather than stretch like some other pool surround materials.

The bond used for TPV is also variable. Some binders can break apart with damage from chemicals or too much sunlight. This can cause a "shedding" or breaking away pieces of rubber. Additionally, it has been reported that during the coloring process, the microscopic pours of the rubber are filled with die, preventing the bond from having enough surface area for proper adhesion. The result is a poorer bond strength with TPV than with the same binder on another product.



Cleanability / Maintenance

The surface of concrete is lightly porous, which can trap microorganisms like bacteria and viruses. Concrete pool surrounds require significant and frequent hands-on maintenance to keep the surface clean. Unfortunately, porous concrete also absorbs chlorine and cleaning chemicals, which causes the surface of the concrete to break apart and lift. As your cleaning crew sprays contaminants from your deck, they might also be spraying off pieces of your concrete. Concrete also stains with chemical-use and hard water.

Ultimately this leads to high maintenance costs to replace the damaged concrete and to regularly re-seal or resurface the concrete. It also means portions of your deck will present an eyesore for your guests, and will be unavailable during maintenance and repair.



Safety

TPV provides a skid-resistant solution because of its texture and rubber quality. This makes the solution appealing for areas where children could be running on wet surfaces with bare feet. TPV also offers some impact-attenuation, helping to cushion the blow if a guest should fall.

While the rubber material can absorb some of the heat from the sun – especially the darker colors – it transfers heat at a lesser rate than concrete and tile.



Aesthetics

Designers appreciate the number of colors available with TPV, as well as its ability to be poured into a wide variety of shapes and designs. TPV requires using very strong dyes to fully saturate the granules. If protective binders and resins wear away, the granules can wear and fade as well.

As mentioned, the TPV manufacturer and materials used can vary performance, and this includes in coloring as well. For example, if an aromatic (not aliphatic) binder is used, oils will “amber” in UV light which adds a yellowish tint to your lighter colors, including greens and blues. While this yellowing will fade as the top layer wears away, your new pool surround’s grand reveal might be slightly discolored.

The Bottom Line

TPV provides more flexibility in design capabilities, but performance can vary depending on the manufacturer and materials used.

AquaFlex

Why AquaFlex

AquaFlex, a breakthrough in aquatic surfacing technology, is comprised of small and large colored thermoplastic polyurethane pebbles chemically bonded with an aliphatic polyurethane binder. AquaFlex's unique texture and binder makes it uniquely qualified to exceed requirements for easy maintenance, cleaning, and safety. Additionally, AquaFlex's durability makes it resistant to cracks or changing shape with the heat. Facility operators choose AquaFlex for the performance value, though designers choose AquaFlex for its design and color versatility.

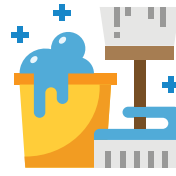
Key Factor Performance



Durability

The challenge of pool surround materials is the amount of abuse it receives. From UV-light, chlorine, cleaning chemicals, power washing, dragging deck chairs, and pounding feet, AquaFlex is made to stand up to it all. AquaFlex also maintains tensile strength when exposed to high heat, which means it will not break apart in applications that receive a lot of sun. It is made to flex under shifting substrate conditions, as well. While a concrete base might crack and crumble with the movement of settling ground, AquaFlex maintains continuity and flexes over substrate cracks. This keeps your pool whole, protected, and looking its best.

AquaFlex's manufacturer, Surface America, is so confident in the product it offers the industry's most comprehensive and longest warranty coverage.



Cleanability / Maintenance

AquaFlex is easy to clean with approved chemicals and power washing. The thermoplastic pebbles are bonded together with a strong aliphatic polyurethane binder that can withstand sustained levels of washing without breaking down.

AquaFlex has low maintenance costs because of its durability. Not only is it resistant to cleaning chemicals, AquaFlex is both UV-stable and chlorine resistant, making it ideal for conditions with some of the strongest (11+) UV index ratings. As the binding agent does not break down, there is no way for cracks or gaps to form and trap water and contaminants.





Safety

AquaFlex is top of the line when it comes to measuring for safety.

This anti-slip surface meets ASTM 1028-2007 Coefficient of Friction Test and OSHA recommendations for wet walking surfaces. This makes AquaFlex a prime material choice wherever there is chance of water splashing, dripping, or spilling in an area. AquaFlex's durability also means it reduces liability for trip-and-fall accidents. If the worst happens and someone falls anyway, AquaFlex has more impact attenuation than the hard surfaces of concrete and tile.

AquaFlex is also uniquely designed to maintain performance in outdoor conditions. While other materials become hot in the sun, AquaFlex protects against transferring the heat to tender bare feet. AquaFlex transfers heat at a minimum rate of 23% lower than alternative surfaces, remaining comfortable to walk on during summer's heat.



Aesthetics

AquaFlex is made up of colored pebbles that can be blended into combinations that perfectly complement your brand's palette. Pebble color saturation is 100% and UV-light stable, so they won't fade with sunshine or regular cleaning, which means your aesthetic design is preserved even with heavy use. Mixing the colors on-site allows for creating borders, intricate patterns, and complicated designs.

The Bottom Line

AquaFlex surpasses the requirements and standards set for aquatic safety and hygiene, while providing nearly infinite design capabilities that will not fade in outdoor applications.



Conclusion

When it comes to considerations for your pool, spa, and aquatic areas, selecting the best surface for your guests' enjoyment, relaxation, and safety is critical. Standards for these areas are very clear as injuries are ever-present dangers. By actively pursuing surfacing solutions that are slip-resistant, easy to maintain, hygienic, and beautiful, you can ensure that your guests not only stay safe during their stay with you, but they also have a wonderful experience.

Resources

For more information on the standards required of resorts and luxury hotels, you can view the industry codes and standards put forth by the National Swimming Pool Foundation (<https://www.nspf.org/industry-codes-and-standards>) and the Centers for Disease Control and Prevention's Model Aquatic Health Code (MAHC) Current Edition (<https://www.cdc.gov/mahc/editions/current.html>).

For more information on Surface America's turnkey flooring solution, AquaFlex, get in touch with the team today:

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