



Splash Pad Resilient Surfaces



Installation, restoration, retrofitting, and repair tips for a long lifespan

Does your water play, spray ground, or splash pad have a “resilient surface”?

Unlike playground surfaces, the “poured-in-place rubber” surfacing for wet locations is typically installed on a solid concrete base or surface. A properly installed and maintained resilient surface should provide a long-lasting, reliable, slip-resistant, non-abrasive, soft, and safe environment for a minimum of 10 years for patrons enjoying the benefits of water play amenities. Improperly installed and/or poorly maintained rubber surfaces rarely last more than four years, at an average replacement cost of about \$15 per square foot.

So what are the key requirements,

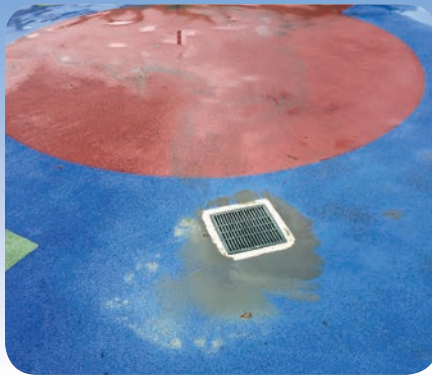
compliance factors, needs, and desires when considering resilient surfaces?

- Proper drainage, which includes preventing ponding, puddling, and standing water, including allowance of drainage below or on the lower side the rubber surface. Most of the water should drain across or on top of the surface, yet allow some penetration of the water through the surface granules, with provisions for weepage at the drain frames or the rubber edge.

- Channel drains and grates are the best option; they are versatile and available in many colors and shapes. Select one that is resistant to overheating, stains, and fading, such as a light-grey, tan, or sand color, preferably

with a slight texture so the surface is slip resistant, non-metallic, non-smooth, and one that limits bare skin contact on the entire surface of the grate material.

- ADA compliance for slopes on surfaces requires a maximum “cross-section” of 2.1 percent or 1:48 ratio, equal to ¼ inch per foot in one direction. However, a steeper slope may be allowable in the perpendicular direction, such as up to 4 percent or almost ½ inch per foot, as rubber surfaces do slow down the water flow to the drains. Many manufacturers suggest having over 3 percent slope, with the highest point upwind, if applicable, so that wind-carried water over-spillage is towards the center of the splash pad surface.



Resilient surfaces should have UV protection that prevents fading or discoloration over time.

- Resistance to algae, mold, mildew, biofilm, moss, fungi or any other pathogens, biological, microbiological, or vegetative growth.
- Good traction and slip resistance with no abrasive reaction to skin contact.
- UV protection that prevents fading or discoloration over time. For outdoor applications, only use an aliphatic sealer or bonding glue (preferably two-part or with a hardening agent), to prevent discoloration or an “ambering” effect of the sealer and/or the rubber surface. Some manufacturers require the use of epoxy binding glue, different than the aliphatic sealer.
- Good bonding and interlocking of the rubber granules in a tight installation that prevents shrinkage, tension, movement or shifting, seam-splitting, exfoliation or de-lamination, curling of the edges, bubbling, ripping, or any other adverse reaction.
- Irregular size or angular shape granules have improved properties of interlocking and filling in the voids. The best of both worlds is a hybrid of the angular (EPDM, SBR or TPV) large and small granules, mixed with spherical or ball-shaped beads, if manufacturers allow such combinations, and the bonding glue is compatible with all variations considered.
- Dark rubber colors will get hotter and deteriorate sooner. When the water splashing, mist, or vapors come in contact with a hot rubber surface, the water will flash-evaporate, leaving behind its minerals, including calcium and scale. Over time, the surface will have a chalky, “cataract” look that cannot be removed by simple washing or rinsing, but requires acid washing, followed by high-pressure/power washing to remove such residue and clean the surface.

- A blend or mixture of colors may provide a strategic look, transitioning to different color patterns, hiding imperfections, stains, and prints, as well as maintaining a cooler surface, especially in hotter areas.
- Consider creating a “key” or V-groove in the concrete around the perimeter, drains, nozzles, and pipe penetrations or flanges. The added groove will afford a better grip of the rubber surface along the edges, holding it down at its weakest points.
- Floor nozzle cup installations should be slightly higher than the rubber surface. Caulking the base of the cups adjacent to the concrete edge will prevent water seepage and seam separation; use a rubberized polyurethane non-sag product.
- Some splash pad manufacturers provide escutcheons that protect the edge of the rubber surface around penetrating structures (bollards, piping, flanges, handrails, etc.).
- Protect the area with a perimeter fence, fixed or temporary, to restrict traffic and avoid vandalism.
- A new concrete surface must be a minimum of four inches thick, with provisions for expansion (including considerations for post-tensioning, similar to that of tennis or basketball courts), a brushed finish that provides a better grip, and be allowed to fully cure for a minimum of 28 days prior to the application of a rubber surface. It must be acid-etched and cleaned with TSP to remove oil residue and neutralize the acid, then rinsed thoroughly and allowed to properly dry before installing the resilient surface.
- Prime the concrete area with a roll-on application of the same sealer as used for bonding, at a rate not to exceed 200 square feet per gallon.

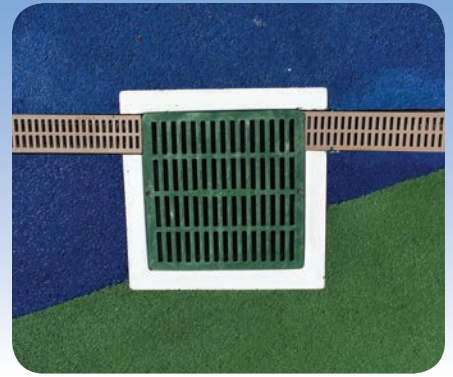
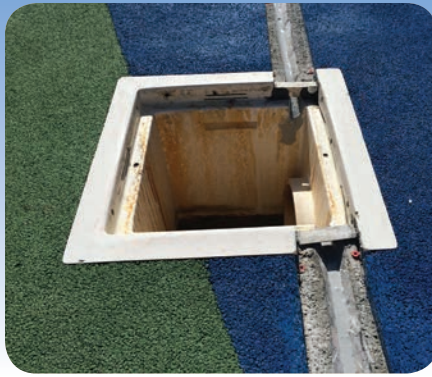
- The rubber surface’s minimum thickness must be 3/8 of an inch, tightly packed and rolled upon installation, with the correct bonding sealer-to-rubber ratio, typically 80 percent rubber to 20 percent sealer by weight (preferably use a two-part aliphatic sealer for outdoor pads).
- Allow the newly installed rubber surface to cure for a minimum of five days.
- Coat the surface with an application of a two-part aliphatic sealer, about 100 square feet per gallon, using 3/8-inch nap rollers.
- The sealer may also be mixed with additives, such as a mildewcide, anti-slip fine granules and diluted with up to 25 percent by volume of xylene, but not counted towards the sealer quantity. If the sealer application is too thin, it will penetrate the surface and not create a desired seal film or membrane on the top of the surface, having an adverse effect on surface resilience.
- The sealer application is usually recommended for re-coating every year, or as needed, for extended life of the surface, especially for high-traffic areas; however, some manufacturers recommend the application every three years, depending on the wear and exposure to the elements, but mostly sun exposure, combined with intermittent water soaking.

Replacing An Existing Surface

It is acceptable to apply a new surface over an existing one, as long as the existing surface is well-bonded and the perimeter areas, three to four inches wide of the rubber, is being removed (including around drains, nozzles, pipe penetrations, and penetrating structures), exposing the edges and concrete below, properly

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When replacing an existing surface, it is also a good time to consider installing and/or retrofitting channel grates with V-grooves through existing solid drain frames.



keyed (V-grooved). Once the old surface and/or perimeter have been removed, V-groove the concrete around structures, drains, and the perimeter (unless already keyed with the original installation), followed by acid washing or etching the concrete, washing it with TSP for removal of organic residue or oils and neutralizing the acid at the same time, including pressure washing, removing any residue. If fungal activity is noted or visible, the bare concrete surface may require additional chemical, disinfectant, insecticide, hot pressure-washing, and sterilization treatment, rinsed away as recommended. This would also be a good time to consider installation of retrofitting channel drains. Allow the surface to completely dry for a few days before priming and installing the rubber surface.

The Right Design

Proper installation starts with the design and overall shape of the splash pad, deciding early on the drainage provisions, slope, nozzle, and play structure's configuration, all working together to assist in washing and rinsing away any surface residue, yet allowing the surface to adequately dry between cycles and/or overnight. Frameless channel drains are the best option, especially when being installed around the perimeter of the surface, as well as through the surface, such as a cross-pattern, star shape, triangle, or any geometrical shape that blends or matches with the resilient surface, proportionally channeling the water to the existing drains. Of more importance may be selecting channel grates that allow water to enter on the sides, similar to swimming pool gutter grates or slats (they are also much easier to remove, without the need to replace an entire

section, as the individual slats interlock). Roundshape surface areas are typically easier to evenly slope, especially when the center is the highest point (similar to a mound), or a flat surface, where one side is adequately raised upwind, combined with a water feature, nozzle, or group of nozzles that will "flood" in every direction, assisting with rinsing the entire surface area, before the water reaches the perimeter or cross-section drains. At the same time, avoid installing nozzles that spill water outside of the resilient surface.

Consider over-sizing the resilient surface area, allowing for water over-spillage. Wet concrete areas around resilient surfaces are subject to becoming slippery when coated with oils and suntan lotions that unavoidably reach adjacent walkways, if not sloped back to the same perimeter drain. Such areas require acid or detergent washing to remove stains and restore non-slip properties.

Channeling Water

For existing splash pad surfaces that have a limited number of drains (many with only one drain, commonly closer to the center), there is an option to install channel grates that are flush with the top of the rubber, by cutting or slicing out the rubber layer where the grates would be installed, through the existing drain frames. The concrete underneath the grates may further be cut in a V-groove, about one inch deep, using a grinder or circular saw with masonry Diamond blades, to allow the water to channel and travel to the existing drain, through its solid frame that may have otherwise previously prevented the water from weeping or entering the drain. The additional benefit of V-grooving is to create

controlled expansion joints by pouring a self-leveling rubber or polyurethane type of caulk at the bottom of the groove once the grooves have been cleaned and have dried; this will create a smoother, waterproof, and flexible channel surface. Having channel grates throughout the surface also provides breakaway points and sections for changing shapes or color choices, allowing for shrinkage of the rubber surface without creating tension in the entire surface. Over time, if the gap between the rubber surface and the channel grates increases from surface shrinkage, simply replace the channel grates with ones with a larger width. If the rubber surface thickness is not consistent with the grates, it can be shaved to smoothly transition, using an electric planer and/or touch-up with an electric belt sander (50 to 80 grit sanding belts).

Preparing Existing And Older Rubber Surfaces For The Sealer

Assuming no vegetative or fungal growth, the rubber surface needs to be first acid-washed to remove any mineral or scale film. Use a pump sprayer and a solution of 50-percent diluted muriatic or 15-percent concentration of hydrochloric acid, with a gelling additive if needed. Hot pressure-wash the surface using a 15-degree angle nozzle (yellow) with 3 GPM at 2,800 to 4,000 psi. Maintain a quick sideways motion and a constant distance of a minimum of four inches between the nozzle and the rubber surface to prevent physical damage to the surface. The debris on top or imbedded in the rubber surface will bounce off, along with dirt and grime, requiring constant re-rinsing of the adjacent areas, starting with the outer perimeter until the entire surface is completely cleaned and rinsed, with



Regularly washing and rinsing a rubber surface monthly with a sanitizer, such as 12-percent swimming pool bleach, will penetrate, remove, and prevent vegetative and microbiological growth.

no dirt anymore. Using a detergent with the pressure-washing will help remove organic and oil residue. Part of the rinse should include a mixture of bleach solution to sterilize the surface.

For surfaces that have been affected by vegetative or fungal growth, the application of an ammonia solution after the acid wash will eliminate any imbedded growth by “overfeeding” it. Some experts suggest soaking the surface with white vinegar for a few days. The use of a negatively charged or anionic detergent solution (diluted, one gallon to 100 gallons of water, as recommended by its manufacturer) will foam and penetrate the sub-layer of the mildew, mold, or fungi, releasing its protective coating and allowing the bleach and disinfectant treatment to sanitize it, along with sterilizing from the heat or steam of the hot pressure-wash. There are additional options to further rinse, using a disinfectant fungicide, as well as topically spraying a layer of un-diluted insecticide, mold, and mildew concentrated treatment. Any chemical residue will need to be rinsed after inoculation time has lapsed, allowing the surface to completely dry before sealing it, as suggested above: 100 square feet per gallon of a two-part aliphatic sealer, maximum 25 percent diluted and with xylene, plus mildewcide and non-skid additives, using 3/8-inch nap rollers.

After The Sealer

After the sealer coating has cured for a minimum of five days, a final application of a spray-on, non-skid floor wax will provide additional non-slip properties for wet foot traffic, repel water, assist with surface drainage, improve water tension, and prevent scale forming, creating a protective film on top of the surface, as well as

providing improved UV protection.

Regularly wash and rinse the rubber surface monthly with a sanitizer, such as four to five gallons of 12-percent swimming pool bleach (mix it with 100 gallons of water, best applied with a hot pressure-washer that has a water reservoir). This sanitizer will penetrate, remove, and prevent vegetative or microbiological growth, maintaining the resilient surface trouble-free. Eliminate the food source from vegetative growth by preventing ponding, puddling, moisture, and minerals from forming, and not allowing biofilm and chlorophyll to develop and escalate to variations of

fungi, algae, moss, mildew and mold, so mitigating pathogens.

Monthly disinfection and sterilization, as well as annual detailed acid and pressure-washing, will ensure the surfaces look their best.

Benjamin Franklin must have been a Splash Pad enthusiast when he said: “An ounce of prevention is worth a pound of cure!” **PRB**

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