



TECHNICAL BULLETIN #3 RESILIENT PLAYGROUND SURFACING SYSTEMS Ambering Issues

Poured in place playground surfaces (PIP) are becoming more popular as customers learn of the various creative color options and installers are becoming more proficient in production of custom graphic patterns. As the popularity of PIP grows, it is important to understand the finished products, the methods of installation, and characteristics of the product's curing properties.

PIP is a specific formulation of complex polyurethane cement (PU) mixed with various grades and types of rubber granules. The wet, flowing mix of PU and granules is placed onto a prepared substrate of compacted stone, asphalt or concrete. The polyurethane in the mix cures by drawing moisture from the air to catalyze the reaction, while off-gassing simple carbon dioxide. The strength and durability of the surface are directly related to the bond strength that develops between the PU and the granules. The cure rate is determined by a relationship between temperature and moisture. Commonly, the PU is catalyzed to broad or specific seasonal weather conditions to speed or slow the curing time.

The PIP surface consists of two parts: a cushion course, and a top wearing course which is troweled to a uniform and compact finish. The troweling process utilizes a lubricant that allows the installer to more evenly distribute the granules to a tight, smooth top finish and assure that the surface matrix is adequately uniform in density and porosity. The lubricant is used sparingly and does not affect the integrity of the products.

All surface exposed polyurethane cements that are used for this process are subject to ultraviolet light (UV) degradation. All granules are encapsulated with PU in the mixer. After installation, the granule that is surrounded by PU is exposed to sunlight (UV) and the exposed surface "film" will initially discolor the natural hue of the granules. All colors are affected to some extent. Blues, greens and light colors are some of the most affected. This ambering or yellowing is a natural and temporary phenomenon that will "burn off" or "peel off" with exposure to the weather and natural abrasion from foot traffic. It is important to recognize that the ambering phenomenon is to be expected, variably affects different colors, and does not in any way indicate faulty material or installation. The discolored (ambered) PU is a temporary thin mask over the granule. Blue and green shades of EPDM is the most subject to temporary change and red is the least susceptible.

The only way to avoid UV discoloration is to use an aliphatic type PU binder. While this type of binder will not discolor, it offers no additional strength or long term benefit over aromatic type binders which temporarily discolor. Many aromatic binders are in fact much stronger than aliphatic binders. It is important to note that the benefit of aliphatic binders is temporary and immediate. Consideration should that the cost of aliphatic binders is nearly three times the cost of aromatic binders, and that aliphatic binders all carry hazardous health warnings.

Natural UV exposure to the surface will vary each hour and each day. It is normal to observe different degrees of ambering based on time, weather, natural site shading, and time of day. In the short term (usually within 30-90 days) the extremely thin surface coating of PU will flake off the exposed top of the wearing surface granule, and the colored granule will then appear uniform in its original color. Naturally, high wear areas will experience the return of natural color before low wear perimeter areas.

The common analogy to the curing and temporary "color issues" of PU coated granules are that concrete, mortar and other similar materials that are installed insitu on different days may appear different in color, sometimes for many months after installation; a PIP playground surface is no different. No surface will match immediately after installation if portions are completed on different days or different UV exposures during curing.

The physical and chemical properties of EPDM rubber used for exposed wearing surfaces should also be considered. Some EPDM colors are naturally more UV stable than others, and some specific manufacturer's EPDM colors are notably more stable than other manufacturers'. A common reference to color stability of EPDM is the German DIN standard that rates the color stability on a scale of 1-5, with 5 being the most stable. Generally, a minimum resistance of 3 is recommended for outdoor sport and recreation surfaces. This subject is discussed more fully in Technical Bulletin # 6.

The expected life of a recreational surface is variable, depending on the frequency and duration of use, and the types of activities performed on it. Playground surfaces are resilient, but wear out sooner when not properly cared for. Routine maintenance includes cleaning the surface by simply blowing off surface dirt or washing with a biodegradable detergent or disinfectant. Abrasion of the surface is the most common concern, so it is important to keep the surface clean of sand and similar substances.

Long term wear patterns at the high use areas will develop, and those areas will require first maintenance. It is not uncommon for a customer to initiate a regular maintenance program and extend the warranty of their play surface by top dressing the surface. This will prolong the surface's useful life without major costly repairs. Any area of the surface that appears worn or torn, or shows other obvious weakness or failure, should be repaired as soon as noted, as these areas have lost integrity and will quickly degrade or fail to provide resilient protection against injuries.

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