

1887 WEST SIXTH STREET BRIDGE AT SHOAL CREEK

Austin, Texas



Prepared for the
SHOAL CREEK CONSERVANCY

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LIMBACHER & GODFREY Architects

Cover Image: HAER photograph, 1996, view from the southwest

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Center vault, looking south.



GRAFFITI PROTECTION

Project Charge

This report was commissioned by the Shoal Creek Conservancy as part of an effort to identify appropriate strategies for graffiti prevention at the West Sixth Street Bridge, a limestone masonry arch bridge built across Shoal Creek in 1887. The bridge is a significant historic resource in Austin, Texas, and is recorded in the Historic American Engineering Record (HAER) and listed on the National Register of Historic Places.

The study is focused on the use of protective anti-graffiti coating, intended to isolate graffiti applications from the limestone surface and aid in graffiti removal. A brief field study was conducted of several graffiti protection coatings, which were applied to the bridge for a period of several months. The samples were monitored for changes in appearance, then tagged and cleaned, to determine the effectiveness of the protective coatings.

Field Conditions

The bridge itself is a three-arch limestone structure, with elliptic arch vaults arranged parallel to Shoal Creek and supported on solid limestone pier walls running the width of the bridge. The limestone in the vaults is worked in two different patterns. The pier walls are large, rusticated pitch faced blocks up to the spring line of the arch vault. The limestone blocks of the arch vaults above are more straight faced, and lightly textured with a pecked hammered finish. The stones at the north and south end faces of the vaults have lightly pitched faces, with chiseled margins at the voussoir stones. The rusticated, irregular finish at the stone surface creates nooks and crannies that pose cleaning and protection challenges for anti-graffiti treatments. Care must be taken to consistently clean and treat the undulating surfaces.

In studying the photographs taken in the HAER documentation project, completed just over twenty years ago in the summer of 1996, the limestone surfaces appear generally



Detail view of west bridge wall at the trail, showing overpaint treatment of graffiti and moisture migration through the upper vault mortar joints.

View of the upper surface of the center vault, showing discoloration and evidence of moisture migration through the mortar. Detail views, below, of damp mortar and efflorescence and surface exfoliation.



clean, with only a few areas tagged with graffiti. However, there is much more graffiti visible on the vaults and face of the historic bridge today. There is also evidence of extensive overpainting of the limestone surfaces, a treatment done to expunge graffiti on the surfaces of the vaults at the underside of the historic bridge.

In the course of making field visits for the graffiti coating project, it was also noted that moisture appears to migrate through some of the upper surfaces of the vaults. Damp patches and small areas of efflorescence occur at these areas, and may pose challenges for the application of protective anti-graffiti coating materials over these areas. There are also areas of peeling or flaking on the limestone surface, perhaps due to simple weathering. These areas of exfoliation may also pose challenges for the application of protective anti-graffiti coating materials.

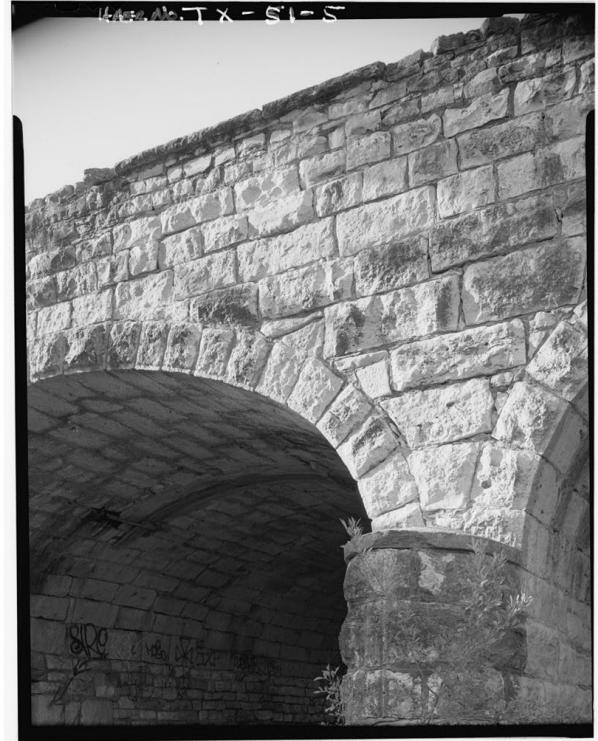
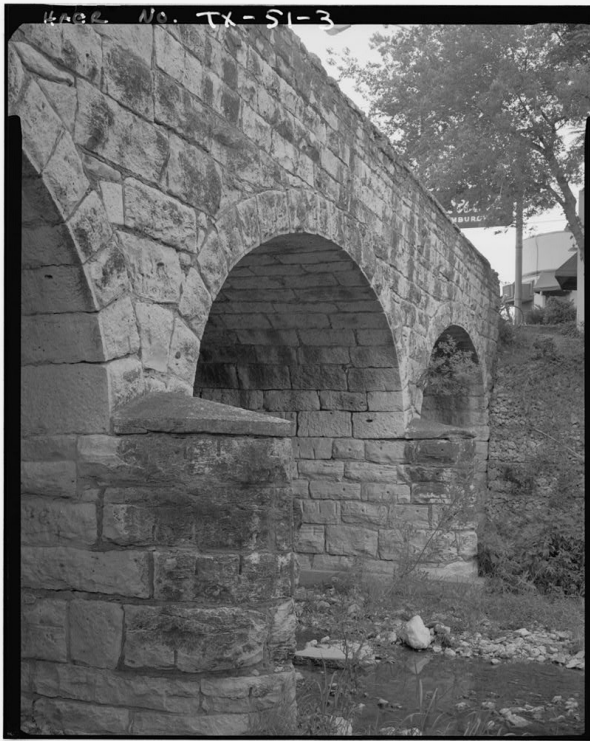
Selection Criteria

The most basic consideration for the selection of appropriate graffiti protection treatments is found in the *Secretary of the Interior's Standards for the Treatment of Historic Properties*, as follows:

Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.

From a review of technical historic preservation articles on the topic of graffiti treatment, other selection considerations are:

- No change in water vapor permeability of masonry substrate, which must continue to breathe
- No change in color or sheen of the masonry
- Durable and stable over time, with little change due to weather or UV exposure
- Ease of application and removal
- Not toxic to humans, animals or plants



Photographs from the HAER documentation done in 1996 show little graffiti. Left, view from the southwest, and right, from the southeast.

- Coating application is reversible
- Coating does not attract dirt or biological growth
- Coating is durable once applied, and not subject to abrasion or dissolving
- Consideration of required surface preparation and compatibility with existing substrates

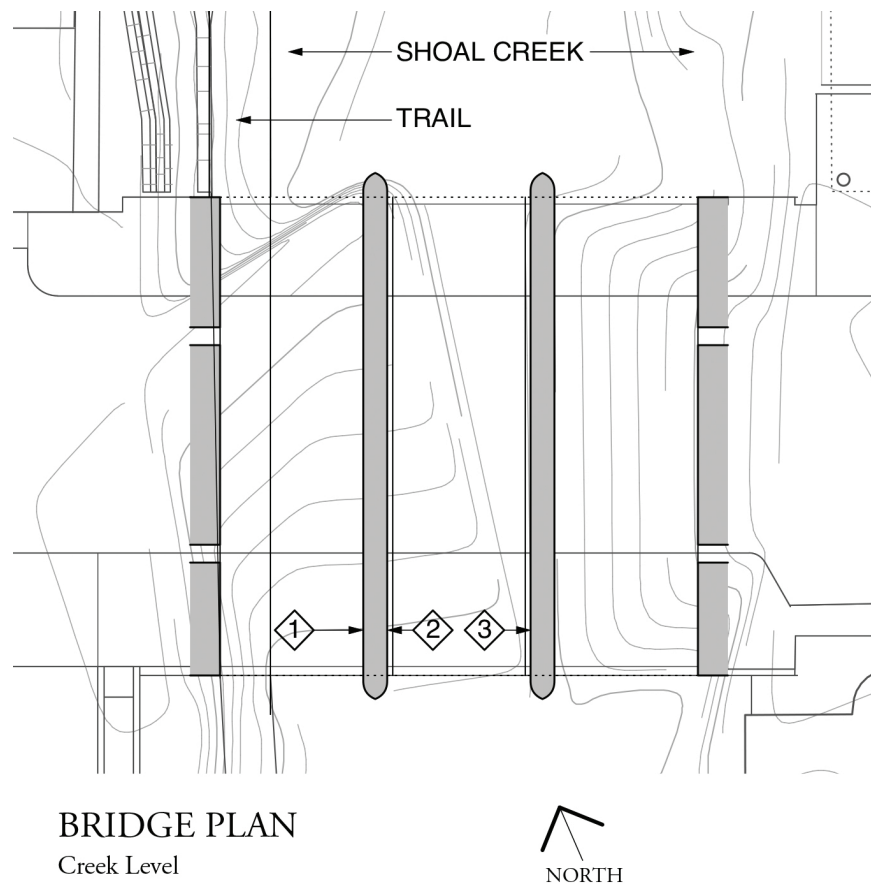
The selection of a coating product with the desired qualities should also consider the resources and costs required to prepare the substrate and apply the coating, as well as the cost of periodic renewed applications and of spot cleaning and re-treatment at graffiti sites.

Available Graffiti Protection Coatings

Graffiti protection coatings are available in two basic types. Sacrificial coatings are essentially temporary coatings, intended to be removed along with a graffiti application during cleaning. Once the graffiti cleaning is complete, and the coating is “sacrificed”, a fresh application of graffiti protection coating must be made. Sacrificial coatings are generally water-based, viscous emulsions, with wax, acrylic, vegetable polysaccharide or other binder.

Long-lasting protective coatings, intended to be cleaned of graffiti multiple times before replacement is required, are also available. This type of protective coating is often designed to be used with a companion chemical stripper, intended for localized removal of graffiti, or with pressurized water. Long-lasting graffiti protection coatings are generally solvent-based liquid solutions, although some water-based formulations are available. Long-lasting coatings are often water-repellent treatments, and should be used with care to avoid issues with reduction of vapor permeability and water outflow of the masonry.

A specific long-lasting coating, fluorinated polyurethanes have been used to treat stone in Italy for several decades, but are regarded as expensive to apply. Early formulations of



Bridge plan, showing the locations of the three graffiti protection coating samples.

PFPEs also released chlorofluorocarbons (CFCs) to the atmosphere. Newer formulations address the environmental issues, and PFPE products remain of interest to European conservators. From current research, PFPEs may not be effective on porous limestone substrates, but product refinement and development continues, and this may be a better option in the future.

Technical Reference and Product Research

For this graffiti protection protocol study, we began with a review of best preservation practice and technical research papers related to graffiti protection methods. In brief, a cautious approach to graffiti protection is recommended for historic structures. While repeated cleaning to remove graffiti has the potential to damage or abrade historic masonry surfaces, protective coatings may also cause physical damage to historic structures, particularly if vapor permeability is disturbed. Protective coatings may also cause aesthetic changes in color or gloss, or may attract dirt and biological growth. Preventive measures -- lighting, security, active eyes on the site -- are often the best defense against graffiti. In cases where serial graffiti occurs, the use of a sacrificial coating to aid in removing the graffiti is suggested.

To investigate sacrificial coatings, English Heritage commissioned a study of the effects of these coatings on historic masonry surfaces in the mid-1990s. The findings were reported in a chapter of *Stone*, Volume 2 of the *English Heritage Research Transactions*, published in 2002. The laboratory testing revealed that the wax-based sacrificial coatings were not fully reversible, with residue remaining on the stone surface and building up over repeated application/removal cycles. Wax-based coatings are generally considered among the safest, gentlest protective treatments, but the study showed a potential



Sample size packages of the three graffiti protection products used in the field application and cleaning tests.

negative effect. Vegetable polysaccharide-based sacrificial coatings are still considered appropriate for use on historic surfaces, and are described in the literature reviewed as fully reversible, with little change in vapor permeability and appearance.

Because there is considerable effort involved in cleaning and preparing surfaces to receive a graffiti protection coating, and ongoing effort to monitor and re-apply sacrificial treatments, we also reviewed the technical literature regarding long-lasting graffiti protection treatments. Many sources advise against the use of a long-lasting coating, because these are not considered reversible. One paper noted that coating residue remained on stone surfaces years after it had been “fully removed”, reducing water vapor permeability and leading to accelerated deterioration of the masonry structure, requiring complete replacement. There are precedents for use of long-lasting coatings where the cost of re-coating must be controlled, and ease of graffiti removal without a need to also remove and replace a sacrificial coating is desired. Long-lasting coatings are often used on contemporary and utility structures, as a result.

We then reviewed available graffiti protection products, and gathered technical product data and material safety data for a range of graffiti protection products from a range of manufacturers. We discussed graffiti protection issues with several manufacturer’s technical representatives to learn more about appropriate products they might recommend.

We identified three products to be further evaluated through field application and monitoring, as follows:

- PSS 20 Anti-Graffiti Coating, KEIM Mineral Coatings of America, described by the manufacturer as a 100% reversible anti-graffiti and anti-soiling coating. It is a polysaccharide-based sacrificial coating.
- Defacer Eraser Sacrificial Coating SC-1, Prosoco, Inc., described by the manufacturer as a clear, water-based sacrificial coating for the control of graffiti on most building surfaces. It is a wax-based sacrificial coating.
- Sure Klean Weather Seal Blok-Guard & Graffiti Control Ultra, Prosoco, Inc., described by the manufacturer as a clear, solvent-based silicone elastomer formulated to weatherproof concrete block and other porous masonry materials. It is a long-lasting coating.

We also briefly discussed graffiti control products with Fran Gale, of the Architectural Conservation Laboratory, University of Texas at Austin, School of Architecture. She



Location 1: The wall was lightly cleaned with water applied with a battery powered airless sprayer. The PSS 20 product is a viscous liquid, also spray applied in two coats. After application, the appearance of the stone is unchanged.

spoke with us about laboratory graffiti trials she and preservation graduate students had done in the Conservation Laboratory in recent years, to identify appropriate graffiti protection coatings for use on stone and concrete block elements on campus. They tested two sacrificial coatings, four long-lasting coatings and two water repellent treatments, which included the three products identified above.

Field Application

The manufacturers of the three selected products provided sample quantities for our use in the field testing. The samples were installed in general accord with the manufacturer's recommendations, although it should be noted that the application and cleaning methods were essentially prescribed by the field conditions at the bridge. No electrical power or hose bibb are available at the creek level, or even above at the street level. The creek level of the bridge is not accessible to vehicles, and all tools and equipment must be carried in over the gravel trail. Also, field equipment was rented from a local home improvement store, and the specific capabilities of the equipment were pre-determined by the available offerings.

A visual assessment of the surfaces within reach on the bridge vaults was made, to identify three locations that appeared free of existing graffiti, overpainting or other coatings. The locations were all at the south end of the bridge, to test the samples by exposure to sunlight for part of each day of the trial application. The locations are shown on the diagrammatic plan of the bridge on page 4.

PSS 20 was installed first, with the assistance of Eric Wall, Southwest Technical Sales Executive with KEIM Mineral Coatings of America. The sample area was cleaned



Location 2: The wall was lightly cleaned with water applied with a battery powered airless sprayer and a nylon bristle brush. The Blok Guard & Graffiti Control Ultra product is a watery liquid, with a strong odor, roller applied in two coats. After application, the appearance of the stone is darker than the rest of the wall.

of dirt and dust with clean water applied with a battery powered airless sprayer. For absorbent surfaces, such as natural limestone, the surface must be thoroughly pre-wet prior to application of PSS 20. One coat was applied, in both a vertical and horizontal overlapping pattern, and left to dry for several hours. A second coat was applied a few hours later, after the first coat was dry to the touch. The sample was installed at Location 1. The product data notes that full dry will occur in 12 to 48 hours, depending on weather conditions. If the product is allowed to dry too quickly, this will give a sheen to the surface. (This would presumably occur if applied in full sun, or on a heated masonry surface. Planning the application schedule around solar exposures, or the use of shade cloths would likely mitigate any possible issues.)

A few days later, the two Prosoco products were installed at Locations 2 and 3. The sample areas were cleaned with water and a nylon bristle brush to remove dirt and left to dry for several hours. Blok-Guard & Graffiti Control Ultra was installed with a roller, to eliminate the potential for overspray of solvents in the creek area. A second coat was applied about half an hour later, when the first coat was dry to the touch. The sample was installed at Location 2. The product data notes that full drying takes about half an hour, perhaps longer at lower temperatures. The product cures for water repellency in 24 hours, and for graffiti resistance in three to five days. Treated surfaces must be protected from rain for at least four to six hours after initial application.

Sacrificial Coating SC-1 was installed at Location 3. The sample area was cleaned and left to dry for a few hours. The coating was applied with a battery powered, airless sprayer, left to penetrate for a few minutes and remaining drips and buildups were lightly brushed in. A second coat was applied when the first coat was dry to the touch,



Location 3: The wall was lightly cleaned with water applied with a battery powered airless sprayer and a nylon bristle brush. The Sacrificial Coating SC-1 product is a milky liquid, spray applied in two coats. After application, the appearance of the stone is lighter than the rest of the wall, and the SC-1 is a milky film.

after about 30 minutes. The product data notes that the surface should be checked in raking light for the presence of a continuous light film across the surface to be protected, and apply additional coats as might be needed. Full drying takes one to two hours.

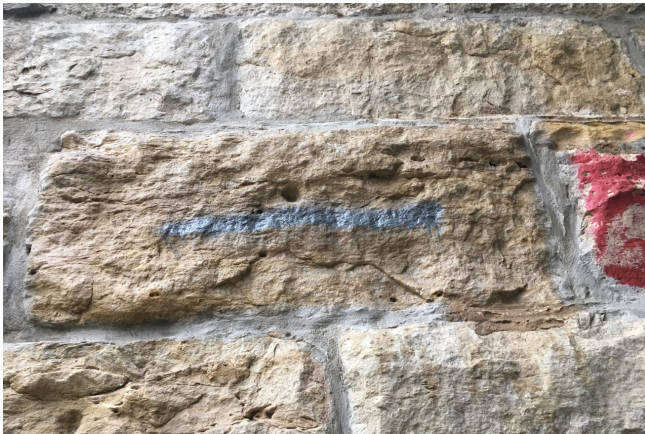
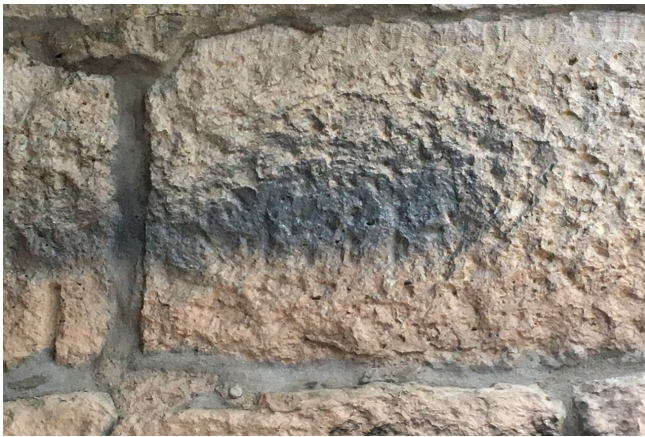
Field Monitoring

The samples were reviewed in the field the following week, to check the appearance of the stones with graffiti protection coatings. At Location 1, the PSS 20 sample was not detectable, with no change in color or sheen visible. At Location 2, the Blok Guard & Graffiti Control Ultra sample looked darker than the adjacent uncoated stones. At Location 3, the Sacrificial Coating SC-1 sample looked whiter than the adjacent uncoated stones.

The samples were left in place for a period of several months, to see the effect of weather changes that occurred in that time. The National Weather Service recorded temperatures ranging from 99 degrees to 19 degrees in that period. Over 12 inches of rain was recorded at the closest weather station, Camp Mabry. The samples were reviewed in the field monthly, and the appearance of the samples remained the same as upon initial installation.

Application of Graffiti

Because the samples were applied in the field, on the historic masonry of the Sixth Street Bridge, a more limited range of graffiti materials and colors was applied than might have been used with laboratory samples. No dark or bright colors were used, and no felt-tip markers or pens were used. Rust-Oleum Gloss Protective Enamel, in a mid-



Spray painted graffiti was applied at each sample location.

At Location 2 and 3, the protective coating held the paint on the surface, and it dripped down the face of the stone.

gray tone, was applied to each sample area, from a distance of about 8". At Location 1, over the PSS 20, the spray paint spread in a normal application pattern, and did not bead up on the surface. This was likely due to the fact that the sample area was high off the ground, and the paint was sprayed at an upward angle. At Location 2, over the Blok Guard & Graffiti Control Ultra, paint was applied orthogonal to the surface of the stones, and beaded up and dripped down the coated surface. At Location 3, over the Sacrificial Coating SC-1, the paint was also applied orthogonal to the surface of the stones, and beaded up and dripped down the coated surface. The graffiti tags were left to cure in place for several days.

Removal of Graffiti

Each sample location was cleaned with a high-pressure water washer, rented from a local home improvement store. A readily available, gasoline powered pressure washer rig, manufactured by Landa, was used for the cleaning tests. The water supply was provided by Hut's Hamburgers, the closest water source to the field sample locations, routed through approximately 150' of 5/8" diameter hose. The pressure washer was positioned on the creek trail sidewalk at the south end of the bridge, and a 50' wand hose was extended to the three sample locations.

A collection system was installed at each sample location, to collect the cleaning water runoff from the sample removal, and prevent contamination of creek waters. A plastic collection curtain was taped to the masonry wall below the sample location, and draped into a collection bucket. The cleaning water was removed from the sample site at the end of the removal testing and properly disposed of off site.



The graffiti was removed with a high-pressure cold water washer, using municipal water.



All tests were conducted with a 25 degree spray tip. (A wider spray tip may have been preferable, but the 40 degree tip on the rental equipment was defective and could not be used.) The tip was maintained a distance of roughly 10" from the sample location, and moved horizontally back and forth across the graffiti area. Each sample area was cleaned for one to two minutes. A second pass was performed at a closer distance, about six inches, for an additional minute.

At Location 1, the graffiti was successfully removed, with a faint shadow remaining. At Location 2, a more pronounced shadow of the graffiti tag remained, and the cleaning water beaded up noticeably on the surface. Location 3 was the least successful of the cleaning tests, with roughly 15% of the graffiti remaining on the stone surface. The sacrificial coating was clearly removed in the cleaning process.

It is important to note that this field test was limited in nature, due to the available equipment for rent, restricted access to power and water supplies, and the need to avoid the use of chemical removal agents in the creek. The field test also amply demonstrates the challenge associated with graffiti protection and maintenance at this environmentally sensitive site. The field test was tailored to a removal program that seemed consistently achievable, given the physical constraints.

At Location 1, the manufacturer's recommended removal method for PSS 20 includes an activation period of several minutes with 140 degree hot water, applied without pressure, which causes the coating to swell under the graffiti. Once the activation takes place, the protective film and the graffiti are intended to be removed by hot water pressure jet, applied at an angle to the surface being cleaned. The jet pressure should be gauged to the particular substrate and a wide fan tip used. In this sensitive field



Once dried, the test panels were again evaluated. At Location 1, a faint shadow of spray paint remains, most prominent at the mortar joint. At Location 2, flecks of spray paint remain on the stone surface, and the coated stones are darker than the natural stones. At Location 3, more spray paint remains on the stone than at the other locations, and the coated stones are lighter than the natural stones.

setting, the use of hot water may be a concern for wildlife, and would require worker protection. In discussions with the manufacturer's technical representative, he noted that another client with a bridge setting had controlled the use of the hot water by applying it with a sponge and not by spray. The product will also activate at a lower temperature, if wildlife exposure to 140 degree water is a concern.

At Location 2, the manufacturer's recommended removal method for Blok-Guard & Graffiti Control Ultra is by the use of chemical graffiti remover or stripper. Graffiti Wipe, one such recommended chemical remover, has a relatively low chemical and VOC profile. For porous surfaces, the remover must be brush or spray applied, and then rinsed with a relatively high water flow, at 400 to 1,000 psi, with a 15 to 45 degree fan tip, to achieve even cleaning. Heated water, in the 150 to 180 degree range, is



At Location 2 and 3, the coated stones remain discolored, even after the completion of the graffiti removal work.



recommended for increased cleaning efficiency. These higher water temperatures pose even greater field dangers to people and animals.

At Location 3, the manufacturer's recommended removal method for Sacrificial Coating SC-1 is with 180 degree hot water at pressures of 500 to 1,500 psi, with a 15 to 25 degree fan tip. The removal recommendations are the most extreme, in terms of water temperature, pressure and spray tip, of the products tested. However, if hot water is not available, the manufacturer also notes that the chemical remover Graffiti Wipe may be used, with a cold pressure water rinse, or even a stiff-bristle brush and water from a hose.

If a safe, accessible method for the use of hot water cleaning is determined, we would expect the graffiti removal trials to be even more successful than those completed in this study with cold water only. The sponge application method, possible with the PSS 20, would allow for the greatest control of the hot water in the creek setting.

Recommendations

From the field testing, the PSS 20 Anti-Graffiti Coating does not change the appearance of the limestone surface, and the other two products tested do. The product has no VOC content, is reversible and environmentally safe, per the manufacturer. The PSS 20 was the most effective in the graffiti removal trial, in comparison to the other two products tested. It is simply and easily applied, and is designed for easy removal with hot water rinsing, in comparison to the other two products tested. Adapting the removal method by the use of sponge application of hot water, to reduce the potential for damage to wildlife, is a practical option for the remote bridge location. Spot removal of a tagged area of the product is easily performed, and re-application may be done immediately after cleaning over the wet substrate. There is not a need to allow the cleaned area to first dry before application of a fresh protective coating, as with the other sacrificial coating tested. For these reasons, the PSS 20 Anti-Graffiti Coating is recommended as the appropriate product for use as a sacrificial graffiti protection coating on the Sixth Street Bridge.

In considering the use of a graffiti protection treatment, a few other issues must be taken in to account. First, the current graffiti and overpainting must be carefully removed from the limestone surfaces, so that the graffiti protection will properly adhere. Identifying an appropriate cleaning method is likely the source of another study and field trial effort, and will require the participation of a properly skilled masonry cleaning and restoration contractor to complete the work. Given the creek setting and historic significance of the bridge, the same concerns for appropriate gentle cleaning methods



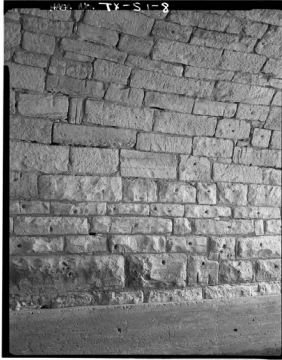
At Location 1, the appearance of the stones coated with PSS 20 is no different than the adjacent stones without overpaint or biological staining on them.

and worker and environmental protections will apply to the development of the cleaning method.

Second, an effective maintenance strategy for the graffiti protection protocol must be developed. This will involve identifying appropriate sources of water and power at the bridge site as might be needed. It will also involve acquiring or accessing appropriate tools and equipment for applying and maintaining the graffiti protection coating. Helpful equipment would include an airless sprayer, with a battery powered option if a source of power is not available at the site, and a hot water pressure washer. If a sponge application method for the hot water is preferred, then some sort of water heating equipment would also be needed. If a ready source of water is not identified, then a water tank may be needed. All of the equipment must be portable, and if a ready source of power is not identified, must be battery, gasoline or propane powered.

Related to the ongoing graffiti protection, it will be helpful to identify the appropriate entity to address the implementation of the selected graffiti removal strategy at the bridge. Currently, there are several departments of the City of Austin working on graffiti abatement on a range of structure types and locations in the city. In the course of this study, we contacted several of them, while searching for a water source for our work, and learned that multiple departments have an interest in the bridge site, and responsibilities and zones of work are segregated at the site.

Finally, any graffiti protection coating will need to be entirely replaced at the end of its useful installed life. An appropriate budget and maintenance plan for the recommended replacement cycle should be established for the bridge. For the PSS 20 product, the manufacturer recommends the product be removed and reapplied at least every five years.



*Detail view of limestone in
center vault, HAER.*

APPENDIX

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Keeping It Clean, 1988

Recommend an area of about 1 square meter/yard for test panels of cleaning methods.

May want to use non-staining pH papers, before and after test application, to determine if any acidic or alkaline residues remain on the surface.

Tools:

Clean cotton painters rags

Trash bags

Inexpensive paint brushes, rollers and paint containers

Dust mask

Safety glasses

Safety gloves

Water in spray bottles

Masonry brush

NPS Pres Brief 38, 1995

Steps for developing a Treatment Plan for cleaning, including graffiti, outlined. Considerations for selecting a barrier coating outlined, including questions about durability versus cost.

Cautionary words against Barrier Coatings:

There are a number of negative aspects of transparent barrier coatings – may alter the color of the masonry surface, and add a gloss that may be highly visible, or only apparent in certain lighting conditions or when it rains. Second, may reduce the water-vapor permeability of the masonry, and contribute to possible water-related deterioration. Third, the coating may discolor and change over time. Exposure to UV may cause yellowing. Dirt build-up may darken the surface, and some coatings develop a sheen when rubbed or brushed against. Many coatings tend to fail, if not maintained on a regular basis. Patchy look.

Some water-based polysaccharide coatings and silicone and silicone-based coatings have been used with success.

The Rehabilitation of Bethesda Terrace, APT Bulletin Vol 18, No 3, 1996.

Documentation of consolidation in the project was based on forms devised for Building Research Establishment, in England, for Brethane treatment at Chichester Cathedral:

- Location
- Temperature
- Humidity conditions
- Application time
- Application method
- Quantity used
- Areas of application marked on “dossier drawings”

NPS Pres Brief 1, 2000

Advises against water repellant coatings and anti-graffiti or barrier coatings, because of altered sheen and appearance of the historic masonry surface.

English Heritage – Stone, 2002

Desirable characteristics of sacrificial graffiti barriers

Appearance: cause no visible change in surface appearance

Reversibility: fully reversible, with no traces left on or absorbed into the surface of the masonry

Masonry durability: no reduction of durability of treated masonry surface

Efficiency of graffiti removal: ability to completely remove all graffiti

Product categories, by generic type:

- Emulsions (acrylics or microcrystalline waxes suspended in water) (NOTE: Both tested products fall in this category, one wax emulsion – SGB1, and one acrylic emulsion – SGB3.)
- Solutions (coating dissolved in a volatile organic solvent) (NOTE: One product was partially tested – SGB2.)
- Gels and other suspensions (water mixed with hydrophilic polymers such as polysaccharides, which can be synthetic or naturally produced)
-

Substrates included brick, weathered brick, terracotta, weathered terra cotta, mortar, sandstone, weathered sandstone, limestone, weathered limestone.

Findings:

Appearance:

- All barriers caused small color changes. On darker stones, color produced was “insignificant” or slightly milky looking. Most apparent on weathered surfaces.
- Gloss increased as quantity of barrier applied increased. Gloss was more pronounced on terra cotta substrates.

Reversibility and depth of penetration:

Unless pores were large, barriers formed a thin film on the substrate, and didn’t absorb deeply into the substrate.

- Difficult to achieve 100% removal of the barrier coating. After repeat application/removal cycles, the coating starts to remain on the surface.

Durability:

- Porosity: Barrier coatings did tend to cause some reduction in pore size.
- Permeability: Barrier coatings caused a decrease in permeability. Multiple applications were also tested, and the decrease was greatest with the acrylic emulsion. Cleaning after application did tend to reverse the reduction in permeability.
- Freeze/thaw: Testing indicated this was not an issue, but test conditions may not accurately represent field conditions.
- Soluble salt crystallization: May not be a way to simulate a real weathering situation. The researchers conducted a capillary rise zone crystallization test on mini-columns of stone in lab conditions, to represent rising ground water salts. The sandstone substrate did not show difference between the untreated and treated samples subjected to the test. But, the limestone sample treated with the wax emulsion SGB1, salt crystallization was driven deeper into the stone. The limestone sample treated with solution SGB2 did not show deterioration during the test, likely because the solution treatment reduced

evaporation of moisture from the stone; when the stone was broken, large amounts of sodium sulfate were found deep within the stone. The researchers' conclusions were that the development of salt crystallization was affected by the graffiti barrier coating, and the different coating types and stone substrates showed different behaviors. They recommend that coatings of the types tested should not be applied where soluble salts are an existing or potential problem.

Efficiency of graffiti removal:

A series of tests were performed on various substrates, with two emulsion type treatments. Graffiti made with spray paint and felt tip pen were tested. For limestone, complete removal of spray paint was possible when applied over an acrylic emulsion. Residual staining remained with black felt tip pen. For weathered limestone, the acrylic emulsion treatment did not prevent graffiti staining. With the wax emulsion treatment, on both limestone and weathered limestone substrates, residual staining remained from spray paint, and was not effective at preventing staining from felt tip pen. Retreatment with the acrylic emulsion did not resist graffiti stains on both substrates, from both sources. Retreatment with the wax emulsion was not much better, with residual staining from spray paint on weathered limestone, and other stains remaining. NOTE: The researchers recommend that only water pressures below 300psi be used to clean weathered and historic masonry. Also, the water cleaning will change permeability, with high-pressures, and color, just by removal of colored, weathered surface material. It may also cause soluble salt mobilization and recrystallization, with associated whitening of the surface.

Conclusions:

- Visible color change occurs, particularly on darker surfaces and weathered surfaces.
- Coatings seem largely reversible, with shallow penetration, but some residue remains.
- Coatings cause a decrease in permeability, typically a small one, but this can affect salt crystallization in the masonry.
- Coatings were most effective at facilitating graffiti removal on durable brickwork, and less consistently successful on other masonry surfaces. Retreatment seemed to reduce effectiveness of graffiti removal, so higher water pressures may be required over time.
- If chemical cleaning to remove repeated graffiti attacks is causing deterioration, then a barrier coating may be appropriate.
- The researchers recommend prevention, through lighting, plantings and security/monitoring systems.

New Developments in Fluorinated Materials for Stone Preservation, APT Bulletin, Vol 33, No 4, 2002

PFPEs are expensive and environmentally unsound – CFCs released. Research done on 2002 on new formulations, by DuPont and involving NCPTT, may be promising.

Review of English Heritage Research Transactions/Stone, describing chapter dealing with study of various graffiti protection treatments, from APT Bulletin, Vol 34, No 1, 2003

“Chapter four reports on extensive trials using wax-based sacrificial graffiti barriers on brick and limestone masonry that took place in the early and mid 1990s. It has been presumed that wax-

based systems are far superior to permanent, varnish-type surface coatings because they offered the possibility of being removed after every paint attack. What this study found, however, is that none of the wax-based treatments were fully reversible, because the wax was trapped in stone pores and because the water rinses used to remove the wax systems often caused greater damage than the graffiti itself. With graffiti, prevention remains the best cure.”

SHC article on Washington Square Arch, APT Bulletin, Vol 36, No 2/3, 2005 – Mark Rabinowitz and Robin Gerstad

Application of Prosoco SC-1 sacrificial anti-graffiti coating at the lower 15 feet of the ashlar

Novel, Water-Based Fluorinated Polymers with Excellent Antigraffiti Properties, Journal of Coating Technology Research, 2005

Describes studies done by DSM NeoResins staff scientists to compare performance of fluorinated polymer coatings prepared with different variables, including concentrations of fluorines and crosslinking, as graffiti protection coatings. Coatings were tested on metal and concrete substrates. The test coatings are described as hard, glossy films, and are likely not appropriate for use on historic limestone surfaces.

Graffiti on Historic Surfaces, S Gordon, Senior Conservator at Historic Scotland’s Conservation Centre. The Building Conservation Directory, 2007

Considerations for barrier system:

- The coating should ideally be permeable to water vapor, allowing the stone to behave as it would in its natural state.
- Ideally, there should not be any change in the appearance of the treated surface. May coatings cause a darkening of the surface or sheen. The coating should perform in the same way in wet or dry conditions.
- The coating should remain stable as it ages and should not discolor or be vulnerable to washing away through natural weathering cycles.
- The coating should be easy to remove from the surface. Some coatings require hot, high-pressure water to removed them which can damage a sensitive substrate.
- The coating should not be toxic to people, animals or plant life.
- The process must be reversible so that the coating can be completely removed should this be necessary. Some coatings are permanent while others are designed to be washed away each time any graffiti are applied. It should not produce a cumulative adverse effect if repeated applications are necessary.

Trials should include applying and removing the barrier to check the ease of removal, as well as any adverse effects that might result.

Barriers based on aqueous solutions produced from vegetable polysaccharides are perhaps the most suitable for historic surfaces. They are fully reversible and do not restrict the diffusion of water through a porous substrate. Some slight color change of the surface is possible, but the effect is likely to be minimal.

Water Repellents and Anti-Graffiti: A Standard Safe Approach?, 5th International Conference on Water Repellent Treatment of Building Materials, 2008

Describes a case study completed on a monument in Lichtervelde, Belgium. The limestone monument dates from 1946, to honor victims of WWII. In the late 1990s a water repellent and anti-graffiti coating were applied, and cracks and deterioration developed. The coating was removed but the deterioration continued. Sampling and testing done in the study showed that the French limestone was a type with a high frost sensitivity. Traces of the previously removed coating remained and testing showed it was a polyacrylate and polyurethane formulation, which has a low water vapor permeability. Any water entering the stones of the monument, through the exposed top or rising damp or damaged stones or joints, was trapped within the stones. The monument was irreparably damaged by the trapped humidity. The researchers recommended a complete replacement, and advised that the original graffiti protection product selection should have considered a sacrificial coating that would not reduce water vapor permeability.

New Anti-Graffiti Coating Able to Protect Cultural Heritage Ancient Materials Has Been Developed to Prevent Graffiti Attack, Basque Research, Science Daily, 2009

Describes in broad terms the work of a committee of European countries and institutions to develop a new anti-graffiti system, Graffitiage. The treatment is based on a pH-sensitive silicon-based polymer charge complex, is hydrophobic, adheres to porous surfaces, makes little visible change in appearance, is durable and UV resistant, and is environmentally friendly. Laboratory and field trials were conducted, with reported success. As of the writing of the article, the product was a prototype, in need of refinement and not in commercial production.

Crosslinked fluorinated polyurethanes for the protection of stone surfaces from graffiti, Journal of Cultural Heritage, 2011

Describes laboratory studies of the use of a European, commercially available fluorinated urethane coating (Fluorolink P56), on three different types of stone. Fluorinated coatings, known as PFPEs, were studied a decade earlier and problems with performance and with CFC release were issues. This study tested newer products, presumably without CFCs, in a water-based product designed to repel oil, water and stains from various substrates, but not typically used as graffiti protection. The study also compared the use of cured, or crosslinked, Fluorolink P56 with a polyaziridine curing agent, with the uncured coating. Stones of low (marble), medium (sandstone) and high (limestone) porosity were used in the study. The study found that crosslinked, or cured, Fluorolink P56 was effective as a long-lasting graffiti protection coating for stones of low and medium porosity, but not for high porosity stones, which showed trace stains after cleaning. Further studies were recommended.

Definition of the procedure to determine the suitability and durability of an anti-graffiti product for application on cultural heritage porous materials, Journal of Cultural Heritage, 2012

Outlines suggested values and related laboratory testing to gauge the performance of graffiti protection coatings on porous substrates. Ideal characteristics include being reversible and vapor permeable. It should be hydrophobic and oleophilic to resist water and oil penetration,

allow for easy cleaning and graffiti removal, be durable in exterior exposures and environmentally friendly. The study describes a series of recommended laboratory and field tests, in accord with European Standards dealing with the conservation of cultural properties, and proposes a classification system for test findings, to assist in determining the effectiveness and acceptability of the graffiti protection product. The proposed method was verified by studying the effect of two graffiti protection products on sandstone; neither product was deemed satisfactory.

Desirable characteristics of anti-graffiti barriers:

- Reversible
- Permit free water vapor exchange
- Hydrophobic and oleophobic, to avoid penetration of paint or other soluble dirt
- Low surface energy, so the cleaning of graffiti is facilitated
- Resistant to outdoor conditions, such as sun, rain, etc.
- Environmentally friendly, no harm to users or environment

Performance tests should measure:

- Color and gloss variations. Use colorimeters and gloss meters
- Variations in hydric properties. Use
- Durability. Check color variation and maintenance of hydrophobicity after aging, including acid rain aging, UV/condensation aging, salt crystallization and natural weathering.

WJE, Graffiti Cleaning and Prevention, Hawaii, 2015

Considerations for protective coatings:

- Longevity of the coating and how often is recoating recommended? Consider in terms of the anticipated rate of graffiti accumulation and the life cycle cost benefit of the clear protective coating.
- Gloss or sheen difference on the surface?
- Discolor with UV exposure?
- Accelerate dirt accumulation?
- Affect the water vapor permeability of the masonry? Changes in permeability may trap water and salts below the surface of the masonry and result in surface efflorescence or other distress.
- Are existing water repellant coatings present? Incompatibility.
- Sensitive to abrasion? If so, surfaces subject to abrasion may require more frequent maintenance of the coating.
- What substrate surface preparation is recommended? If initial cleaning of the substrate is required, this should be considered in the project budget.
- Suitable for all substrates present on the structure?
-

Should be reversible, so long lasting coatings are not recommended.

Sacrificial coatings are water-based and removed as part of the graffiti cleaning process. Reapplied after each graffiti removal event.

Test applications of SC-1, by Prosoco, were done in this study. Surface prep: surfaces were dry brushed to remove surface dirt and dust/debris was wiped away with a clean cloth. Coating brush applied in accord with manf instructions. Trials allowed to dry and physically examined approximately one week after installation. Caused a white hazy appearance on basalt stone and also on brick trials.

Functional Coatings by Incorporating Nanoparticles, Nanotechnology, 2015

Describes the use of nano particle additives to coatings to enhance functional performance, including scratch resistance, water repellency, durability and gloss maintenance. Examples in self-cleaning coatings for glass, textile and metal surfaces, and anti-fouling coatings for ship hulls, are discussed. No graffiti protection products are noted, and the properties of the nano particle additives seem contrary to the preservation issues related to historic structures.

Products Reviewed, suggested for Sample Application:

1. *Keim PSS-20*: vegetable polysaccharides and water formulation. The product is applied over a clean surface, free of oil, dust, grease or silicone. The substrate must be pre-wet, and the product is applied using airless spray equipment. The product serves as a barrier coating. If graffiti are applied, both the graffiti and the coating are removed with hot water spray, which activates the coating to swell up under the graffiti, and lift both layers off the surface of the stone. Several items to note: applicator skill with airless spray and hot water cleaning is apparently required. Also, the recommended application pressure is 1450 to 2900 psi, which may cause damage to soft substrates. The product is slippery when wet, and should be used on only vertical surfaces.
2. *Prosoco Sacrificial Coating SC-1*: wax/acrylic based emulsion. This seems like a generally safe product, but the product representative indicates it doesn't work as well on limestone substrates as some other Prosoco products do. It works really well on block walls. Also, he indicates that the wax-based product may slip off in high-heat conditions, and may yellow over time.
3. *Prosoco Blok-Guard & Graffiti Control*: solvent based silicone elastomer. Per the Prosoco technical representative, this product bonds well with limestone, and is durable and long lasting, with recoating needed perhaps on a 5-7 year cycle. The product was used at the Nasher Sculpture Garden walls in Dallas. The product is available in an "Ultra" and low VOC formulations, both of which have lower VOC content.

Products Reviewed, with Reservations:

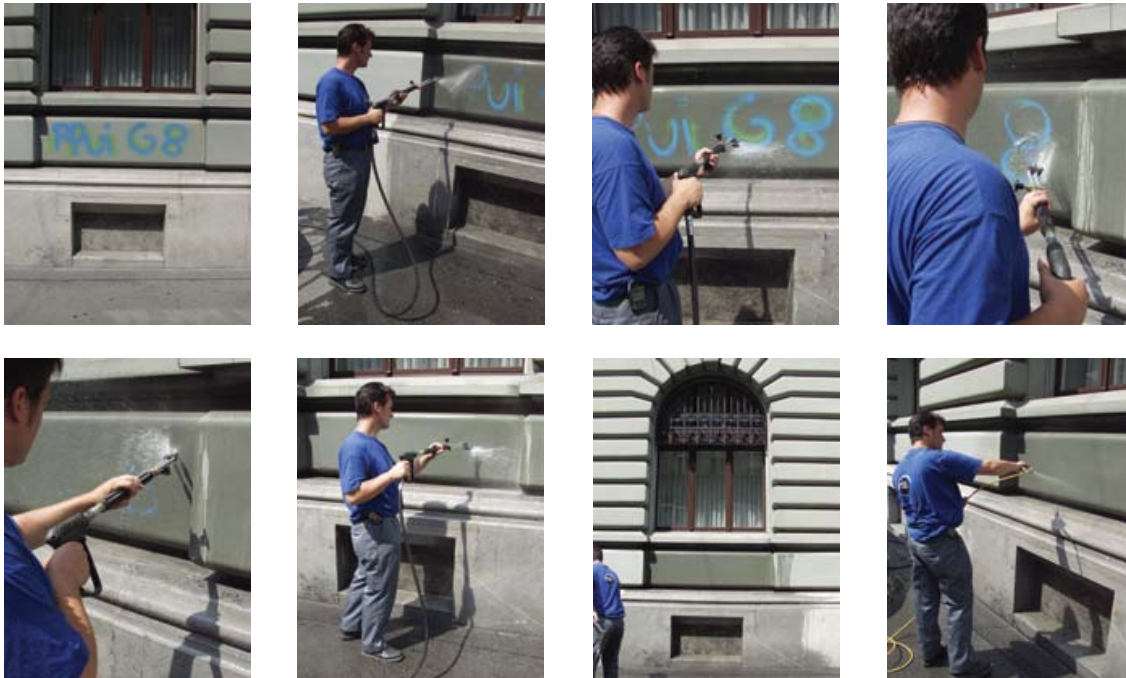
1. *Hohmann & Barnard/Diedrich Omegaseal 333-E 10%*: silicone polymer, described as providing hydrophobic protection through the formation of a semi-permeable membrane. Resistant to UV light and acid rain. Odorless solvent carriers. Apply 1 or 2 flood coats, until water beads on surface. Use Diedrich 505 paint stripper to remove graffiti, or Diedrich 606 paint stripper for stubborn stains. Multiple removals may be possible before re-application is needed. Re-application recommended when signs of water absorption appear.
2. *RustOleum OKON Graffiti Barrier Coat*: acrylic emulsion coating intended to prevent spray paint and markers from penetrating and permanently staining architectural surfaces.
3. *Prosoco Blok-Guard & Graffiti Control 15*: solvent based silicone elastomer. This product is similar to the one in Item 3, above, but has a higher solids content, and is presumably a thicker film application. The product is available in an "Ultra" formulation, which has lower VOC content.
4. *Chemique Artisan Sacrificial Anti-Graffiti Coating*: This product is available through Home Depot. It seems to use low VOC/toxicity products, but it is not clear that it works well on limestone, and may have a color or sheen issue.

Products Reviewed, and Not Recommended:

1. *BASF MasterPel Water-Repellency System*: this product is intended for use in concrete block, and is typically added to the concrete mixture as the block is made.

2. *KreteTek Siloxa-Tek 8500*: this product is intended for use as a water repellant product, primarily to end water and moisture migration through cementitious substrates.
3. *RustOleum OKON S-40*: this product is intended for use as a water repellant product, primarily to end water and moisture migration through cementitious substrates.
4. *Sika Sikagard 701W*: this product is intended for use as a sealer for cementitious and other masonry surfaces.
5. *Prosoco Blok-Guard & Graffiti Control II*: silicone emulsion product, which works best on substrates other than limestone, according to the Prosoco technical representative.
6. *CSL Silicones Si-COAT 530 Remarkable Anti-Graffiti Protective Coating*: Polysiloxane coating, an elastomeric film. Toxic materials are an issue, as well. Product is available in Canada.
7. *Chemique Artisan 2-part Anti-Graffiti Barrier Coating*: This product contains a fluorinated resin. It has more hazardous materials than the product under Item 4 in the Reviewed with Reservations section, above. Again, it is not clear how well it works on limestone, or whether it has a visible color or sheen.
8. *Ecological Coatings Clear Anti-Graffiti Coating*: This is described as a water-based, abrasion resistant product. But, there is not much information regarding its actual formulation, so I have contacted the manufacturer.
9. *Sherwin Williams Anti-Graffiti Coating*: This product is a siloxane coating, apparently intended primarily for use over concrete substrates. It has a semi-gloss finish.
10. *US Coating Solutions AGS-1*: This is an aliphatic polyurethane coating, with an amber color. It is intended for use on metal, concrete and plastic surfaces. There is a topcoat product, AGS-2, that is applied over the AGS-1 primer.
11. *Solvay Fluorolink TLS 5007*: This is a product designed to be used as an additive to other coating products. The manufacturer indicated that this, and other products that they might suggest, would be “experimental” grade products. Solvay makes PFPE products, designed to repel oil and grease.

KEIM surface protection



anti-graffiti, anti-soiling protection for all substrates
completely natural, reversible and vapor permeable

KEIM PSS 20

recommended protection for all surfaces.

MasterFormat™ Division 09 - Finishes
Section 09 96 23 Graffiti-Resistant Coatings





since 1878

KEIM PSS 20 protects the value and appearance of buildings, bridges, public art and monuments.

- made of vegetable polysaccharides and water
- completely harmless to man, animals and environment
- over 65 million square feet protected throughout the world
- 100% reversible - may be removed with hot water spray leaving no trace
- invisible protection even when wet from rain

invisible protection

A surface treated with KEIM PSS 20 is protected against graffiti and environmental pollution. These are removed, together with the PSS 20 film, using hot water. Then KEIM PSS 20 is reapplied by airless spray forming a transparent film undetectable to the eye. Surfaces retain original appearance with no ghosting or marking after cleaning.

durable and responsible

Using only products approved for use in food, KEIM PSS 20 is made from natural vegetable polysaccharides and water. Absolutely safe for man and the environment during processing, storage and throughout its life. KEIM PSS 20 offers a more durable surface protection than other, more aggressive systems. Forms no barrier to water vapor diffusion. No VOCs. UV resistant.

fully reversible

Unlike other products, KEIM PSS 20 may be safely and completely removed from treated surfaces leaving no residue. No chemicals are needed. Hot water spray removes the PSS 20 and any soils or graffiti on top of the film. Historic architecture, sculpture and public art remain unaltered.

versatile

With KEIM PSS 20, almost all surface materials can be protected from graffiti and pollution. Examples include concrete, stucco, brick, CMU, natural stone, metal, plastic, and ceramics.



the original silicate coating since 1878

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Technical Data Sheet

KEIM PSS 20

Reversible graffiti protection system



1. Product description

PSS 20 is a completely reversible protection system for protection against graffiti, advertising bill sticking marks, and also protects against airborne contamination (CO₂, soot, etc.) for facades, walls, indoors and outdoors. PSS 20 is made of vegetable polysaccharides and water with a high viscosity. PSS 20 is a natural sustainable product that is absolutely harmless to man, animal life and the environment. PSS 20 is sprayed on to the wall in one or more coats with an Airless appliance, where on drying it forms a gossamer-thin protective film, normally invisible to the eye and creates a fully breathable type of coating. PSS 20 should be applied by skilled tradesmen who have received the appropriate training.

2. Field of application

PSS 20 can in principle be applied to all washable substrates. In the case of water-repellent substrates (e.g. those treated with hydrophobic agents), the surface tension must first be reduced with a pre-treatment or primer. PSS 20 should only be used on vertical surfaces. PSS 20 is especially suitable for all kinds of natural and artificial stone facades, clinker, concrete, brick, mineral coatings, metal, and aluminum facades.

3. Product properties

PSS 20 comprises vegetable polysaccharides and water with a high viscosity. The components of PSS 20 carry the E-numbers used in the foodstuffs industry. Therefore, PSS 20 is absolutely harmless to man, animal life and the environment.

- Appearance: slightly cloudy liquid gel
- Viscosity: 6000-7200 cpa
- Boiling point: 100° C
- Flammability: non-flammable
- No toxic gases produced on decomposition by heat
- Water vapor permeability: according to DIN 52615: Sd-value 0.012 m (EMPA-Test No. 155194 of 06.10.94) 80 Perms
- Carbonization: good retardant effect, similar to a concrete glaze (LPM Construction materials lab Test No. A-13'041-1 of 18.03.93)
- No VOC's
- Totally reversible by means of hot water
- Reactivity: Highly alkaline conditions are to be avoided
- PSS 20 normally only impedes the sound absorption capability of noise protection walls to an insignificant degree (Test Deutsche Bahn, FT-Centre Munich, of 20.02.98)

Material characteristics

Specific weight: approx. 1.1 g/cm³
pH-value: approx. 6.5

Color shade

Clear, slightly cloudy

4. Application instructions

Substrate preparation

The substrate must be sound, clean and free of oil, dust, grease, and silicone.

For absorbent substrates:

Thoroughly pre-wet substrate this fills the pores allowing the PSS 20 to form its protective coat on



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the surface with as little as possible penetration of the PSS 20 into the substrate.

For non-absorbent substrates:

Substrate must be clean and dry at the time of application.

Application

PSS 20 is applied to the surface in two or three coats using airless spray equipment (spraying without air), at a pressure of between 100 - 200 bar (1450 - 2900 psi). When spraying, both vertical and horizontal overlapping pattern should be used, which together will correspond to a normal coat of PSS 20. For each coat, a quantity of PSS 20 between a minimum of 0.10 to a maximum of 0.20 l/m² (0.01 - 0.02 l/sq.ft.) should be applied. The thickness of the protective film after drying should be approx. 0.030-0.035 mm (1.18 - 1.38 mil). A surface temperature which is too hot during the application of PSS 20 leads to a rapid evaporation of the water in PSS 20. This can lead to problems of binding between PSS 20 and the surface being treated. PSS 20 should be applied by skilled tradesmen who have received the appropriate training.

Note: PSS 20 is very slippery in its liquid and/or damp state. PSS 20 should therefore only be used on vertical surfaces. If PSS 20 is dropped onto the floor, it must be immediately removed or be washed away in order to avoid accidents through slipping.

Working conditions

Air and surface temperature should be > 5°C (> 41° F) and < 35°C (< 95° F)

Do not apply in direct sunlight or onto sun-heated substrates. Protect coated surfaces from direct

sunlight, wind and rain during and after application until dry.

Drying times

A drying time of 1 - 4 hours between coats (each coat should be dry to the touch before the next coat is applied) at least 12 - 48 hours must be allowed to fully dry. Drying times will depend on the weather, temperature and humidity. Special care should be taken that the surface does not dry too quickly as this will result in a sheen on the surface.

Consumption

Consumption rate of between 0.20 and 0.60 l/m² (0.02 - 0.06 liters/sq.ft.) (0.005 - 0.016 gal/sq.ft.) is required when using the product as a graffiti protection and between 0.10 and 0.20 l/m² (0.01 - 0.02 l/sq.ft.) (0.003 - 0.006 gal/sq.ft.) for use as a soiling protection.

The stated consumption value is for guidance and depends on the absorbency and texture of the substrate. Exact consumption values can only be determined by trial areas on the structure to be coated.

Cleaning of tools

Clean with water immediately after use.

Removal and Cleaning of surface protected with PSS 20

The surface with the graffiti must be activated for several minutes using hot water 60° C (140° F) without pressure, that means the surface must first be soaked completely with hot water and then be kept dripping wet with hot water for 2-4 minutes (depending on the external temperature and the



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type of sub-surface). During this time, the PSS 20 film begins to swell, it is very important that the PSS 20 film swells up under the graffiti. In the case of cold external and/or wall temperatures and/or with soft surfaces that only withstand low water pressures, good activation with hot water is particularly important.

After the activation, the PSS 20 protective film is removed together with the graffiti and other soiling by hot water jet from a hot water pressure washer with a wide fan tip. The water jet must always be angled to the surface (30° to 45° degrees, never vertical, always keep the tip of the sprayer at least 20 cm/8 in. from the surface). To ensure that the water has sufficient time to penetrate the PSS 20 film under the graffiti. Best practice is to remove the graffiti from all sides so that there is the same amount of time for the activation of the PSS 20 film on all sides of the graffiti. You will know when you have reached the limit of the activated PSS 20 if the paint of the graffiti suddenly cannot be peeled off anymore, move the water jet to another side of the graffiti in order to give the water on the previously processed side enough time to activate further into the PSS 20 film under the graffiti.

Always adapt the water pressure to the surface!

The surface must never be damaged by using a water pressure that is too high. Clean hard surfaces, such as granite, with higher pressures (50-100 bar) or (725 - 1450 psi) at the nozzle. Clean soft surfaces, such as sandstone, with lower pressures (10-20 bar) or (145 - 290 psi) at the nozzle. (Stated pressures are only suggestions and actual pressure can only be determined by site conditions) Keep in mind lower pressure usually means less clean up time as the loose pieces of graffiti can blow further with higher pressure.

After the removal of the graffiti, the complete processed surface should be once again washed thoroughly with hot water. Porous surfaces should then be immediately re-coated with PSS 20 while they are still wet. In doing this, re-apply the PSS 20 in the necessary number of coats and coat thicknesses as outlined in this document. At the borders of the cleaned surfaces, PSS 20 should be sprayed so as to overlap with the surfaces that are already protected. With non-porous and non-absorbent sub-surfaces, allow the surface to dry before starting to apply the new protective film.

5. Packaging

25 liter (6.6 gal) containers

6. Storage

Shelf life is approx. 12 months in a sealed unopened container under cool, frost-free conditions. Protect from heat and direct sunlight. Refrigerate after opening for best shelf life.

7. Hazardous substances ordinance class

n/a

8. Transport hazard class

n/a



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9. Disposal

EC Waste Code no. 06 02 99

Any residues must be emptied out of containers before recycling.

10. Safety instructions

PSS 20 is very slippery in its liquid and/or damp state. PSS 20 should therefore only be used on vertical surfaces. If PSS 20 is dropped onto the floor, it must be immediately removed or be washed away immediately with plenty of water in order to avoid accidents through slipping. Protect the eyes and skin from splashes. Keep out of reach of children.

Product code: M-SK 02

The stated values and properties are the result of extensive development work and practical experience. Our recommendations for application, whether given verbally or in writing, are intended to provide assistance in the selection of our products and do not establish a contractual relationship. In particular, they do not release those purchasing and applying our products from the duty of establishing for themselves, with due care, the suitability of our products for the intended application. Standard building industry practices must be complied with. We retain the right to make modifications to improve the products or their application. This edition supersedes all earlier editions.



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Blok-Guard® & Graffiti Control Ultra

Sure Klean® Weather Seal Blok-Guard® & Graffiti Control Ultra is a clear, solvent-based silicone elastomer formulated to weatherproof concrete block and other porous masonry materials. Blok-Guard® & Graffiti Control Ultra protects masonry surfaces from repeated graffiti attacks without altering the natural appearance. Weather Seal Blok-Guard® & Graffiti Control Ultra penetrates and fills pores to prevent water penetration through exterior walls exposed to normal weathering. Graffiti removal is fast and easy using Defacer Eraser® Graffiti Wipe. Easy application with low-pressure spray.

ADVANTAGES

- Treated surfaces resist penetration of most types of graffiti. Simplifies graffiti removal
- Effective protection for hard-to-seal surfaces
- Controls rainwater penetration through exterior block walls
- Helps control efflorescence, mildew and other moisture-related stains
- Treated surfaces exhibit excellent surface beading and withstand extreme temperatures
- Treated surfaces “breathe” – doesn’t trap moisture
- Excellent UV stability

Limitations

- Not suitable for extremely dense or polished surfaces. Not suitable for asphaltic or painted surfaces
- Not suitable for application to synthetic resin paints, gypsum, plaster or other non-masonry surfaces
- Not recommended for below-grade applications
- Will not prevent water penetration through structural cracks, defects or open joints
- May damage glass or be difficult to remove. Always protect
- Not recommended for horizontal surfaces, including horizontal wood surfaces

REGULATORY COMPLIANCE

VOC Compliance

Sure Klean® Weather Seal Blok-Guard® & Graffiti Control Ultra is compliant with the following national, state and district regulations:

- ☒ US Environmental Protection Agency
- ☒ California Air Resources Board SCM Districts
- ☒ South Coast Air Quality Management District
- ☒ Maricopa County, AZ
- ☒ Northeast Ozone Transport Commission

TYPICAL TECHNICAL DATA

FORM	Clear liquid, petroleum odor
SPECIFIC GRAVITY	1.308
pH	not applicable
WT/GAL	10.85 lbs
ACTIVE CONTENT	9%
TOTAL SOLIDS	9% ASTM D2369
VOC CONTENT	maximum 100 g/L
FLASH POINT	100° F (38°C) ASTM D3278
FREEZE POINT	<-22° F (<-30 C)
SHELF LIFE	1 year in tightly sealed, unopened container

SAFETY INFORMATION

Always read full label and SDS for precautionary instructions before use. Use appropriate safety equipment and job site controls during application and handling.

24-Hour Emergency Information:
INFOTRAC at 800-535-5053

Product Data Sheet

Blok-Guard® & Graffiti Control Ultra

PREPARATION

Protect people, vehicles, property, plants, windows, painted surfaces, anodized aluminum, metal, glass and all non masonry surfaces from product, residue, splash, fumes and wind drift. Sure Klean® Strippable Masking is not appropriate for use with this product.

Ensure fresh air entry and cross ventilation during application and drying. Extinguish all flames, pilot lights and other potential sources of ignition during use and until all vapors are gone. When applying to exteriors of occupied buildings, make sure all windows, exterior intakes and air conditioning vents are covered and air handling equipment is shut down during application and until all vapors have dissipated. Apply at recommended coverage rates as excess material may contribute to vapor problems.

Recommended for these substrates. Always test. Coverage is in sq.ft./m. per gallon.			
Substrate	Type	Use?	Coverage
Architectural Concrete Block	Burnished	yes	30–100 sq.ft. 3–9 sq.m.
	Smooth	yes	
	Split-faced	yes	
	Ribbed	yes	
Concrete*	Brick	yes	75–175 sq.ft. 7–16 sq.m.
	Tile	yes	
	Precast Panels	yes	
	Pavers	no	
	Cast-in-place	yes	
Fired Clay*	Brick	yes	50–125 sq.ft. 5–12 sq.m.
	Tile	yes	
	Terra Cotta (unglazed)	yes	
	Pavers	no	
Marble, Travertine, Limestone	Polished	no	N/A
	Unpolished	yes	100–250 sq.ft. 9–23 sq.m.
Granite	Polished	no	N/A
	Unpolished	no	N/A
Sandstone*	Unpolished	yes	100–150 sq.ft. 9–14 sq.m.
Slate	Unpolished	no	N/A
*Blok-Guard® & Graffiti Control Ultra is suitable for most substrates. May darken or enhance natural color of exposed aggregate, pigmented block or mortar. Always test to ensure desired results. Coverage estimates depend on surface texture and porosity.			

Surface should be clean, dry and absorbent. If cleaning is necessary, use the appropriate Sure Klean® or Enviro Klean® cleaner. Do not use raw acids. Let cleaned surfaces dry completely. Newly constructed surfaces and repointed surfaces should cure for 28 days before application. Sealant and caulking compounds should be in place and cured before application. Fill cracks and voids to prevent penetration of fumes into building.

NOTE: Some wall systems incorporate asphaltic or other crack-suppression membranes. This deeply penetrative protective treatment may penetrate through exposed stone, tile or grout surfaces and react with the membrane to mobilize objectionable staining. Always pretest to ensure desired results.

Surface and Air Temperatures

Surface and air temperatures should be 40–90°F (4–32°C) during application. Higher temperatures evaporate the solvent carrier and reduce penetration. If freezing conditions exist before application, let the masonry thaw.

Equipment

Recommended application is by high volume, low-pressure (<50 psi) spray. Fit spray equipment with stainless steel or brass fittings and gaskets suitable for solvent solutions. Fan spray tips are recommended to avoid atomization of the material.

For small scale application, or when spray application is not appropriate, product may be applied using brush or roller. Contact Customer Care or your local PROSOCO representative for more information. Brushes and rollers should be nylon or other synthetic material resistant to solvent solutions.

Storage and Handling

Store in a cool, dry place away from potential ignition sources. Keep tightly closed when not dispensing. Published shelf life assumes upright storage of factory-sealed containers in a dry place. Maintain temperature of 45–100°F (7–38°C). Do not double stack pallets. Dispose of unused product and container in accordance with local, state and federal regulations.

APPLICATION

Read “Preparation” and the Safety Data Sheet before use.

ALWAYS TEST each type of surface for suitability and results before overall application. Test using the following application instructions. Let test dry thoroughly before inspection.

Product Data Sheet

Blok-Guard® & Graffiti Control Ultra

Dilution & Mixing

Use as packaged. Do not dilute or alter. Stir thoroughly before use. Keep container tightly sealed until ready to use. Once opened, Blok-Guard® & Graffiti Control Ultra must be used immediately.

Application Instructions

Lightweight block and extremely porous masonry will need 2 coats. See "Second Coat Application."

Sprayer Application

1. Saturate, "wet-on-wet" spraying from the bottom up. Avoid excessive overlapping. *For heavily textured and porous surfaces*, apply enough material to create 6–8 inch rundown below the contact point. NOTE: When spray applying to fluted architectural block, spray in an "overlapping X pattern" for complete coverage of recessed surfaces.
2. Let first application penetrate masonry surface for 2 to 3 minutes. *For heavily textured and porous surfaces*, reapply in same saturating manner to ensure complete coverage of recessed surfaces.
3. Immediately brush out runs and drips to prevent build up.

Brush or Roller Application

Recommended for small scale application or when spray is not appropriate. Contact PROSOCO for more information. Thoroughly saturate the surface. Avoid excessive overlapping. Brush-out runs and drips to prevent buildup.

Dense, Smooth Surface Application

Apply in a single coat using enough to completely wet the surface without creating drips, puddles or rundown. Brush out or back roll all runs and drips for a uniform appearance. **DO NOT OVER APPLY.** Over application may cause unacceptable color change. One application is normally enough. **ALWAYS TEST** for application rate.

Second Coat Application

Some surfaces may need 2 coats for maximum graffiti protection. Apply the second coat as soon as the first coat is dry to touch, or within 2 hours of the first coat. Immediately back roll or brush out runs and drips for a uniform appearance and to prevent build up. Allowing more than 2 hours between coats reduces effectiveness of second coat.

Wood Application

Saturate to the point of rejection. Let first application penetrate 2–3 minutes. Reapply in the same saturating manner. (Not appropriate for horizontal wood.)

Drying Time

In normal weather (60–80° F; [16–27° C] 50% humidity), Blok-Guard® & Graffiti Control Ultra dries to touch in about 25 minutes. Drying takes longer at lower temperatures.

Blok-Guard® & Graffiti Control Ultra gains its water-repellency properties in 24 hours. Graffiti resistance properties fully develop in 3 to 5 days, depending upon climate conditions. Protect treated surfaces from rain for at least 4–6 hours after application.

BEST PRACTICES

Surface should be clean, dry and absorbent before application.

Clean soiled surfaces with the appropriate Sure Klean® or Enviro Klean® cleaner before application. Call Customer Care toll-free at 800.255.4255 for recommendations.

Recommended application for PROSOCO protective treatments is high volume, low pressure spray (<50 psi) equipment with a fan-type spray tip and adjustable pressure to avoid atomization of the material.

For small scale application, or when spray application is not appropriate, brushes or rollers may be used. Contact Customer Care of your local PROSOCO representative for more information on brush/roller application.

Apply evenly. Saturate the surface but do not over apply. Brush out runs and drips on dense surfaces.

A second application will be needed on lightweight block and other highly porous masonry. Apply the second coat as soon as the first coat is dry to the touch.

ALWAYS TEST for best coverage rates and to confirm results before overall application. Test using the application instructions included herein. Let the test area dry thoroughly before inspection.

Never go it alone. If you have problems or questions, contact your local PROSOCO distributor or field representative. Or call PROSOCO technical Customer Care, toll-free at 800-255-4255.

Product Data Sheet Blok-Guard® & Graffiti Control Ultra

Graffiti Removal

Remove most types of graffiti with PROSOCO's Defacer Eraser® Graffiti Wipe or Enviro Klean® SafStrip. See product literature or call Customer Care at 800-255-4255.

Cleanup

Clean tools and equipment immediately with mineral spirits or an equivalent cleaning solvent. Remove over spray and spills as soon as possible.

WARRANTY

The information and recommendations made are based on our own research and the research of others, and are believed to be accurate. However, no guarantee of their accuracy is made because we cannot cover every possible application of our products, nor anticipate every variation encountered in masonry surfaces, job conditions and methods used. The purchasers shall make their own tests to determine the suitability of such products for a particular purpose.

PROSOCO, Inc. warrants this product to be free from defects. **Where permitted by law, PROSOCO makes no other warranties with respect to this product, express or implied, including without limitation the implied warranties of merchantability or fitness for particular purpose.** The purchaser shall be responsible to make his own

tests to determine the suitability of this product for his particular purpose. PROSOCO's liability shall be limited in all events to supplying sufficient product to re-treat the specific areas to which defective product has been applied. Acceptance and use of this product absolves PROSOCO from any other liability, from whatever source, including liability for incidental, consequential or resultant damages whether due to breach of warranty, negligence or strict liability. This warranty may not be modified or extended by representatives of PROSOCO, its distributors or dealers.

CUSTOMER CARE

Factory personnel are available for product, environment and job-safety assistance with no obligation. Call 800-255-4255 and ask for Customer Care – technical support.

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Sacrificial Coating SC-1

Defacer Eraser® Sacrificial Coating SC-1 is a clear, water-based sacrificial coating for control of graffiti on most building surfaces. SC-1 acts as a graffiti barrier, preventing spray paints, crayons and ink from penetrating and staining the underlying surface. Graffiti is removed by high-pressure hot water, Defacer Eraser® Graffiti Wipe or Sure Klean® Fast Acting Stripper. The coating must then be reapplied to restore the graffiti barrier.

Defacer Eraser® SC-1 allows cost-effective control of chronic graffiti without chemical strippers or abrasives that can damage building surfaces or the surrounding environment. It allows protection of limited areas and spot reapplication without a noticeable change in overall color or appearance. The coating is formulated as a water-thin liquid for spray application to porous and textured surfaces.

TYPICAL TECHNICAL DATA

FORM	Opaque liquid, mild soap odor
SPECIFIC GRAVITY	0.976
pH	9.5-10
WT/GAL	8.12 lbs
ACTIVE CONTENT	10%
TOTAL SOLIDS	10% ASTM D2369
VOC CONTENT	<30 g/L Low Solids Coating
FLASH POINT	>200°F (>93°C) ASTM D3278
FREEZE POINT	32° F (0° C)
SHELF LIFE	2 years in tightly sealed, unopened container

SAFETY INFORMATION

Always read full label and SDS for precautionary instructions before use. Use appropriate safety equipment and job site controls during application and handling.

24-Hour Emergency Information:
INFOTRAC at 800-535-5053

ADVANTAGES

- Allows quick removal of tough graffiti stains from porous and dense surfaces
- Multi-purpose – suitable for masonry, wood, metal and most painted and synthetic surfaces
- Does not darken or alter natural color. Very little color change – no shine or gloss
- Allows same-day re-protection
- Good UV stability provides minimum 5 years exterior performance
- Protected areas “breathe” – protects without heavy buildup

Limitations

- Abrasion will damage coating
- Graffiti resistance may be reduced by maintenance cleaning. Reapply sacrificial coating to restore graffiti resistance
- Not suitable for horizontal surfaces
- Not suitable for application over existing water repellents
- May blush on certain substrates or when over applied. Always test
- May blush when applied to damp surfaces or when moisture comes through the substrate

REGULATORY COMPLIANCE

VOC Compliance

Defacer Eraser® Sacrificial Coating SC-1 is compliant with the following national, state and district VOC regulations:

- ☒ US Environmental Protection Agency
- ☒ California Air Resources Board SCM Districts
- ☒ South Coast Air Quality Management District
- ☒ Maricopa County, AZ
- ☒ Northeast Ozone Transport Commission

Product Data Sheet

Defacer Eraser® Sacrificial Coating SC-1

PREPARATION

Protect people, vehicles, property and all surfaces not meant for application from product, splash, fumes, residue and wind drift. Plants may be protected with running sprinklers. Protect and/or divert pedestrian and auto traffic. Remove spill and over spray immediately from horizontal surfaces as they will become extremely slippery.

Surface must be clean, dry and absorbent. Do not apply after rain until surface is thoroughly dry. If cleaning is needed, use the appropriate Sure Klean® or Enviro Klean® cleaner. For previously painted or metal surfaces, most can be coated 20 minutes to one hour after cleaning. Other surfaces should be allowed to thoroughly dry before treatment.

Remove graffiti from unpainted surfaces using Defacer Eraser® Graffiti Wipe or Sure Klean® Fast Acting Stripper. Rinse thoroughly. Application can begin once surface appears dry.

On painted surfaces, cover graffiti with a fresh coat of paint. Let the new paint dry thoroughly before applying SC-1. Use clean water heated to 180° F (82° C) to remove SC-1 from painted surfaces.

Surface and Air Temperatures

Surface and air temperatures should be 40–90° F (4–32° C). Do not apply during rain showers. Protect freshly coated surfaces from rain for two hours following application.

Equipment

Apply using a garden tank sprayer or conventional airless spray equipment. Adjust tips and pressure for a wide spray pattern. Use only low pressure for application. Do not atomize.

SC-1 is made for spray application but may be applied with a brush or roller.

Storage and Handling

Keep from freezing. Store in a cool, dry place. Always seal container when not dispensing. Do not alter or mix with other chemicals. Published shelf life assumes upright storage of factory-sealed containers in a dry place. Maintain temperatures of 45–100° F (7–38° C). Do not double stack pallets. Dispose of unused product and container in accordance with local, state and federal regulations.

APPLICATION

Read “Preparation” and the Safety Data Sheet before use. **ALWAYS TEST** each type of surface for suitability and results before overall application. Also test for application speed, pattern and technique needed for a uniform, even coat. Test using the following application instructions.

Dilution & Mixing

Apply as packaged. Do not dilute or alter. Stir or mix well before use.

Typical Coverage Rates

Coverage rates vary based on surface texture and porosity.

- 75–400 square feet per US gallon
- 7–37 square meters per US gallon

Application Instructions

1. Spray surface lightly from top to bottom. Use an overlapping horizontal spray pattern. (Follow up with a vertical stroke for deep vertical recesses). Avoid flooding the surface or creating heavy rundowns.
2. Let treatment penetrate for 1–2 minutes. Remove buildups using a damp brush or roller. NOTE: Metal and some painted surfaces can be protected with one coat. Coverage rate for unpainted metal is 300–600 sq.ft./gal.
3. Two coats are recommended for porous surfaces and where protection against felt tip markers (inks) is required. Let previous coat dry to touch (20–30 minutes). Lightly apply subsequent coats. Will dry thoroughly in 1–2 hours.

Minimizing Shadows

Three or four coats may be required for effective protection of more sensitive surfaces. The heavier protective film makes shadow removal easier. Shadows/residue left on some surfaces can be removed using Defacer Eraser® Graffiti Wipe or Sure Klean® Fast Acting Stripper followed by pressure water rinsing.

Product Data Sheet

Defacer Eraser® Sacrificial Coating SC-1

Surface Inspection

After the surface is dry, inspect carefully to assure that enough material has been applied to create a continuous light film across the surface. This film can usually be seen within 12 inches of the surface and in raking (angled) light. If a continuous surface film cannot be detected, an additional coat may be required. Up to four spray coats may be required for adequate protection of some surfaces.

Cleanup

Clean brushes, rollers and spray equipment using warm, soapy water. Use a mild solvent such as mineral spirits or paint thinner for heavy buildups.

Graffiti Removal

Remove graffiti or other surface stains using high-pressure hot water. Equip sprayer with a 15–25° fan spray tip. Sprayer should deliver 3–6 gallons (minimum) per minute of 180° F (82° C) heated water at a pressure of 500–1500 psi. To avoid damaging the surface, always use the lowest psi possible that still gives effective results. Apply pressure spray from top to bottom, allowing warm water to flow over the graffiti-stained area. Rinse thoroughly.

Shadows/residues that remain in some surfaces may be removed using Defacer Eraser® Graffiti Wipe. When surface is dry, reapply SC-1 to restore protection.

NOTE: If high-pressure hot water spray equipment is not available, remove graffiti and the SC-1 coating using Defacer Eraser® Graffiti Wipe. Apply Graffiti Wipe and allow to remain for 3–5 minutes. Remove with cold pressure-water rinse or stiff-bristled brush and garden hose. Rinse thoroughly.

Maintenance

After five years, remove coatings not attacked by graffiti using high-pressure hot water. Reapply coating to restore graffiti resistance.

The treated surface may be periodically rinsed/ washed down with cold water and mild detergents. Avoid using harsh detergents or industrial cleaners on protected surfaces.

If thorough cleaning is required, remove coating completely and re-protect affected area after surface is cleaned. When hot water is not available, the sacrificial coating may be removed using conventional paint or graffiti removers followed by cold-water rinse.

Other Uses

The easy reversibility of SC-1 makes the coating a suitable masking agent for many commercial and industrial applications requiring temporary protection against over spray of paint and other spray-applied materials.

SC-1 is an ideal maintenance coating for areas of commercial buildings that are difficult to keep clean. Protect trash enclosures, loading docks, landscape walls and other areas exposed to regular mud splash or other staining. Periodic washing with hot water restores a like-new appearance. The surface can then be re-protected for another maintenance cycle. NOTE: Not suitable for horizontal surfaces. Extremely slippery when wet.

BEST PRACTICES

Rapid removal is the key to preventing graffiti. Studies show graffiti vandals move on from places where their work is not allowed to stay on view.

Never use products that are not specifically made and warranted for graffiti removal. The wrong product can lock the graffiti in permanently.

Remove graffiti media from Sacrificial Coating SC-1 protected masonry with a hot water pressure wash, or cold water assisted by Defacer Eraser® Graffiti Wipe.

After removing a “tagged” SC-1 coating, let the wall dry thoroughly before reapplying.

Apply SC-1 lightly. Inspect treated wall carefully after application to ensure uniform coverage.

Never go it alone. If you have problems or questions, contact your PROSOCO distributor or field sales representative. Or call PROSOCO technical Customer Care toll-free at 800-255-4255.

Product Data Sheet Defacer Eraser® Sacrificial Coating SC-1

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