



RAPID REMOVAL

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GRAFFITI REMOVAL AND RESTORATION

Many graffiti removal and restoration efforts can leave surfaces looking as bad, or worse, than before the work began. To ensure successful removal and protect surfaces from further graffiti:

- Identify the surface type and substance to be removed.
- Select the appropriate removal method.
- Apply a protective coating.

Some cities have establish removal and restoration guidelines to maintain the structural integrity of the city's architecture, especially for buildings or other structures that are old or made of material that requires special care. Be familiar with any local guidelines.

1. IDENTIFY THE SURFACE TYPE AND SUBSTANCE TO BE REMOVED.

Brick, stone, concrete, aluminum siding, utility boxes and poles, street signs, bus shelters, pavement, wood, and glass are just some of the materials that can be defaced with graffiti. These surfaces can be smooth or textured. Some are painted while others are unprotected.

While most graffiti is applied with spray paint, graffiti vandals also use markers, adhesives (stickers), shoe polish, lip stick, stencils, and etching products. The length of time graffiti has been on a surface usually impacts how easily it can be removed--the longer, the more difficult.

Depending on the substance to be removed, each surface requires or responds better to a particular method. Use a simple graffiti removal chart for ideas about where to start.

Get the National Park Service guide for removing graffiti from historic masonry.

2. SELECT A REMOVAL METHOD

Except for paint, most anti-graffiti removers are not available at local home improvement, hardware, or paint stores. They are specialty industrial products and are often sold in bulk to cities, counties, or professional graffiti removal companies. Graffiti removers that may be sold in retail outlets are likely to be for small clean up tasks.

Get a list of graffiti removal product suppliers.

Following are the three most common removal methods:

- **Paint-out**
Paint is used to cover over graffiti on smooth, painted surfaces. It is fairly low cost (ranging from donated paint to 6 cents per square foot), and paint is a relatively safe product compared to removing graffiti with some chemical solvents.
- **Chemical Removers**
Chemical removers vary, but typically the stronger the solvent, the faster it will dissolve or remove paint. In some cases, stronger solvents may require more safety consideration or personal protection. A solvent or cleaner that is poorly matched to a particular construction material, however, may create aesthetically unappealing results. Successful product selection is critical.
 - For small jobs, such as removing spray paint and markers from light poles and utility boxes, use a chemical removal product with a cloth and/or scrubber. Easy and safe one-time use products, similar to "handi-wipe," are also available. Larger jobs will require an industrial product and may require professional application.
 - Chemical removers have the potential to be harmful to workers and to the environment. For information on the environmental impacts of 35 graffiti removal products, get a report that lists ingredients, and field tests and rates a dozen of them for performance on various surfaces. Costs are also considered.
- **Pressure Washing**
Pressure washing equipment uses water or water in combination with a solvent to remove graffiti from a surface. A solvent may first be applied and then the surface is washed with pressurized water. Sometimes a blasting media, such as baking soda, is used to remove graffiti. While pressure washing is effective, it can wear down the surface being treated.
 - Get a list of blast (power wash, etc.) cleaning equipment suppliers, including pressure washers.

3. APPLY A PROTECTIVE COATING

There are two types of protective coatings, sacrificial and non-sacrificial or permanent. Sacrificial coatings are protective, but come off when graffiti is removed and must be reapplied. Non-sacrificial or permanent anti-graffiti coatings are unaffected by the graffiti removal process and remain on the surface.

Most anti-graffiti coatings are not available at local home improvement, hardware, or paint stores. They are specialty industrial products and are often sold in bulk to cities, counties, or professional graffiti removal companies. While some paint products have similar properties to anti-graffiti coatings, that is not their intended purpose and they are not likely to be marketed for that use.

Surface Type	Removal of Spray Paint and Similar Materials (markers, shoe polish, lip stick, stencils, etc.)
	<p>Etching – Etching may be repairable on some glass (seek out a professional); replace glass.</p> <p>Adhesives – Scrape away as much of the adhesive as possible; use nail polish remover or acetone-based cleaner to remove remaining residue. Be aware that acetone-based solvents can soften plastics.</p>
Aluminum Siding, Fiberglass	Paint remover (sparingly); rinse with water
Glass	Razor blade to scrape off; can also use paint thinner
Masonry (includes brick, marble, stone,	Power washing with low pressure; sand or soda blasting (may create a shadow); paint remover or

Surface Type	Removal of Spray Paint and Similar Materials (markers, shoe polish, lip stick, stencils, etc.)
tile, granite, and concrete)	chemical graffiti remover/solvent applied with brush and rinse with water; paint over
Historic Masonry or Other Valuable Structures	Seek out a professional; get the National Park Service Brief on removing graffiti from historic masonry
Metal	Paint thinner or chemical graffiti remover/solvent and rub with steel wool or sandpaper and rinse; power washing; paint over
Pavement	Chemical remover and power washing; soda blasting
Street Signs	Chemical remover (make sure it does not remove reflective coating)

Surface Type	Removal of Spray Paint and Similar Materials (markers, shoe polish, lip stick, stencils, etc.)
Stucco	Paint remover/chemical remover and rinse with pressure wash; paint over
Utility Boxes	Chemical remover with cloth or scrubber
Vinyl Siding	Chemical solvents sparingly as they may remove the vinyl coating; repaint with primer first
Wood	On painted, unweathered wood can try mineral spirits; power washing with low pressure; sanding; repainting

PAINT-OUT

Use the following guidelines for an effective paint-out:

1. **Avoid the patchwork effect**

Removing graffiti by painting new random square blocks provides graffiti writers with a new, bright canvas. Improper paint selection may also lead to bleed-through of graffiti due to poor durability. When painting over graffiti, color match the paint to the original surface color. If this cannot be done, repaint the entire surface. If limited by time and/or paint, paint the entire surface from ground level up to a certain height (making sure that the line of paint is clean and straight).

2. **Prepare the surface**

Painting over a surface that is not properly prepared may lead to peeling and cracking of paint. Ensure appropriate surface preparation before painting over any graffiti:

- • Clean the surface of any dust, dirt, grease or oils.
- • Apply paint only to a dry surface.
- • Make sure the surface is dull. To achieve this, sanding may be necessary.
- • Ensure the surface is sound before painting over it. Check for cracks, rust, water damage, or other signs that indicate the surface is in poor condition.

3. **Select the right paint**

Poor paint selection and repeated paint-outs have the potential to cause surface damage, allowing for structural deterioration.

When painting over surfaces like wood, concrete, block wall, and brick choose "breathable" paint, such as an acrylic latex (i.e. paint manufactured so that moisture can pass through the product and escape from inside the surface).

Multiple coats of paint on the same area can also prevent surface pores from breathing, causing structural and maintenance problems. Painting over a surface that already has several coats of paint may require using a pressure washer or scraping and sanding to properly prepare it for a new coat of paint. Consider applying a protective coating after 2-3 paint-outs to prevent the need for repainting.

To select the most appropriate paint for a particular surface, and to learn how to best prepare a surface, visit or talk with a professional at your local paint store.

4. **Ensure proper clean-up**

Remember to use a drop cloth when painting to avoid dripping large amounts of paint on the sidewalk and other areas around the site. Also, promptly clean or properly dispose of equipment such as cleaning brushes, rollers, and buckets.

It is often illegal and always environmentally irresponsible to allow dirty cleaning water into the sewer systems or into the soil. Disposal method will likely vary depending on the amount and type of material requiring disposal (water, water and other materials, paint, etc.). Check with local environmental or solid waste services about disposal options, and be sure to read the product label recommendations for disposal.

CHEMICAL REMOVERS

There are five basic types of chemical graffiti removers, which come in a variety of forms including gels, creams, and liquids:

- solvents containing chlorinated hydrocarbons
- solvents containing monoglycol ethers and glycol acetates
- solvents containing diglycol ethers
- solvents containing polar solvents
- solvents containing miscellaneous solvents

When using any chemical remover, keep in mind who will be using the product, the safety precautions to follow, and any training required for the product user. As provided under the Occupational Safety and Health Administration's Hazard Communication Standard, secure a material safety data sheet (MSDS) from the distributor of any hazardous chemical. The MSDS will show chemical make-up and any health and safety risks associated with use.

Four additional factors should be considered prior to purchase of a product:

1. **Specialized equipment**

When working with various chemical solvents, skin and eye protection is necessary. Safety goggles, rubber gloves, and protective clothing should always be worn. Adequate ventilation is required when using many chemicals. If adequate ventilation cannot be provided, wear a National Institute of Occupational Safety and Health (NIOSH) approved respirator. Chemical removers have the potential to pose dangerous safety risks for workers.

2. **Environmental considerations**

VOC (volatile organic compound) refers to the level of fumes emitted into the air. When working with chemical removers, VOCs should be kept as low as possible, and, of course, proper clean-up and disposal is critical. The potential for damaging environmental impacts is high when using and disposing of chemicals.

3. **Employee or operators health risk as recorded on MSDS sheet**

When working with untrained volunteers, it is recommended that you use nothing more than a "Health (2) rating Flammable (2) rating" as indicated on the MSDS sheet. This is the

National Fire Protection Association hazard rating system for indicating health, flammability, reactivity, and special hazards for common chemicals.

Insist that the end user follow the safety precautions as written on the MSDS sheet.

Products that tend to be safer will work more slowly. They may also require agitation or multiple applications depending on the surface and type of graffiti being cleaned along with the porosity of the substrate.

4. **Accessibility to the wall or surface**

Walls located in precarious places, that are difficult to get to, or are enclosed increase the potential dangers of working with chemical removers. In such circumstances, these products should not be considered.

PRESSURE WASHING

Be careful to read and understand all safety precautions prior to using any pressure washing equipment. Significant damage and/or injury can occur if used improperly.

Pressure washing a surface to remove graffiti can be accomplished with three types of washers:

- • Pressure Washers
- • Power Washers
- • Jet Washers

Each is affected by a combination of factors:

1. **Pressure rating**

This refers to the intensity of the water stream. For conservation cleaning of delicate masonry, water pressure should be kept below 500 pounds per square inch (psi). General cleaning usually requires medium to high pressure (500-1500 psi).

2. **Water flow rate**

This refers to the supply of water to the spray head, and determines the impact force of the spray just as much as the pressure rating. The greatest efficiency is likely to be achieved with water flow rates of between 3 to 4 gallons per minute.

3. **Spray nozzle design**

Nozzle design determines the shape of the spray and has a strong bearing on the success of the cleaning process. A fan-type nozzle providing a spray fan angle of 15-50 degrees is considered best for graffiti removal and general surface cleaning. Larger angles reduce spray impact but increase area coverage, while a 0 degree pencil jet produces an intense impact harmful to soft or crumbly masonry and wood surfaces.

4. **Water temperature**

Heated water is useful for graffiti removal from metal surfaces where expansion of the metal helps break the bond. Heated water, however, if used in combination with solvents, may cause rapid evaporation of the solvents, reducing their graffiti removal effectiveness.

5. **Chemical or abrasive additives introduced into the stream**

Apply the chemical product first. Agitate surface and allow for proper dwell time. Follow these two steps with water blasting. When combining chemical removers with water, ensure that the chemical is neutralized (effectively diluted) with water.

6. **Cleaning angle**

It is recommended that the graffiti to be removed be approached at a steep angle (as close to the wall with the spray wand as possible) to undercut the graffiti as much as possible. This will allow it to "peel" from the surface. Coming straight at the graffiti to be removed may drive it further into the surface.

7. **Precautions**

Never use a power washer on glass. The pressure will break it. Never aim a power washer at another person or animal.

ALTERNATIVE BLASTING MEDIA

Be careful to read and understand all safety precautions prior to using any blasting equipment. Significant damage and/or injury can occur if used improperly.

During the past decade, alternatives to conventional sandblasting have evolved that are effective and environmentally friendly:

1. **Ground walnut shells**

Ground walnut shells offered one of the first viable options to silica sand. The walnut shell is softer than sand and less abrasive to walls and structures. Upon impact, most walnut shell particles shatter into fine dust, minimizing surface damage. The downside is the increased cost per pound and reduced speed of removal.

2. **Baking soda crystals**

Armex technology (baking soda) emerged shortly after use of ground walnut shells. The Armex media is softer than both sand and walnut shells, and, in many cases, it is softer than the building materials being cleaned. Upon impact the baking soda crystal shatters to a dust. Depending on the availability of water with the blasting equipment used, the soda crystal dust is dissolved and rinsed into the drainage system as a non-toxic residue.

Soda crystals, although more expensive per pound, use less volume by weight per minute of operation and take less than 5% of the cleanup time than conventional sandblasting. Soda

crystals have been combined with both air and water delivery equipment with preferences for each depending on the application used. This type of blast method, however, is not designed for repeated use as some surface damage is done after each blast. Consider an anti-graffiti protective coating as soon as possible to eliminate blasting damage.

3. **Dry ice**

Dry ice pellets have recently been introduced as a blast medium. Here the pellets are discharged via an air delivery system, disintegrating on impact. Both the defacement of paint residue and the dry ice are shattered, with the dry ice returning to the atmosphere, and the paint pulverized to a size that is undetectable around the work vicinity.

Dry ice is available in different size pellets. The size of the pellet containers and the need for specialized blasting equipment limit this method to cleaning large areas of graffiti. The cost for using the dry ice pellet method is much higher than traditional blasting. When faced with removing graffiti from a historic building, however, costs may not be the primary consideration.

4. **Ground rubber and carbon flint**

These materials are also used as a blasting media.

5. **Other media**

Other media (sand, corn cob, etc.) may be locally available. Know the substrate and the equipment available when requesting media.

COATINGS

Two types of protective surface coatings are currently available: sacrificial coatings and non-sacrificial surface treatments. Each is available in clear or pigmented form. A clear coating maintains the natural appearance of the substrate. These are available in a range of gloss levels to suit the original finish. Pigmented coatings perform the dual function of obliterating existing graffiti and providing a surface from which graffiti may readily be removed.

Both sacrificial and non-sacrificial coatings can be applied by brush, roller and/or spray. Brushing is the simplest means of application. Coatings can be applied faster with rollers. Both of these methods maintain a low solvent release rate (allowing for interior surface application). Most manufacturers, however, encourage the spray technique. It is significantly faster, but the rate of solvent vapor release is much higher, preventing its use in poorly ventilated areas.

SACRIFICIAL

A sacrificial coating is a removable, protective film that acts as a barrier to defacement materials. It is often referred to as a catcher-coat, as it catches would-be defacement inks, dyes, and resins and prevents surface penetration.

There are currently two types of sacrificial coatings: a solvent-based silicone/wax coating and a water-based polysaccharide coating. Be sure to select the appropriate coating and use high-quality products to avoid yellowing.

Surface preparation for either type is critical. All surfaces need some form of cleaning to remove dust, dirt, grease, or other contaminants before coating. Smooth hard surfaces need thorough abrasion to promote good adhesion. Poor adhesion can reduce the durability of the coating or cause delamination in the event of a fire (allowing flames to spread rapidly across the coated surface).

The average cost of sacrificial coatings is 2-6 cents per square foot depending on the porosity of the surface to be coated. Typically, sacrificial coatings are not toxic, and, once in place, they often eliminate the need for a solvent or chemical graffiti remover in subsequent graffiti clean-ups.

Graffiti removal from a sacrificial coating involves removing the graffiti and the coating underneath it. Hence, sacrificial coatings must be re-applied after each graffiti clean-up. When removing graffiti from a sacrificial coating keep the following in mind:

1. **Water reactive**

there are a wide variety of tips and nozzles. Proper selection will help determine the effectiveness of the removal process.

2. **Heat sensitive**

excessive heat will damage acrylic and vinyl acrylic paints. Heat should be used only up to the point where it becomes damaging to the paint. A range of 140°-180° should be effective.

3. **Pressure sensitive**

use a water pressure level that removes the graffiti but does not wash out the finer aggregate in the block or masonry construction material, or damage the substrate coating. A psi under 1000 should be effective.

4. **Chemically sensitive**

be careful when removing graffiti from painted surfaces protected with sacrificial coatings. Lengthy dwell time and excessive agitation may strip the paint under the coating.

5. **Sensitive to agitation**

if agitation is employed, it should be abrasive enough to remove only the protective coating, with minimal abrasion to the substrate below.

NON-SACRIFICIAL

Non-sacrificial coatings are basically chemical resistant paints. They allow solvent blends to dissolve defacement paints, inks, and dyes, while leaving the non-sacrificial paint or coating unaffected by the

cleaning or removal process. Most of these hard, impervious anti-graffiti coatings are polyurethane resin systems and range from \$.25 to \$1.25 per square foot.

Recently, two-component aliphatic-polyurethane water-based coatings have become popular. These products often have 5-10 year warranties, regardless of the number of cleanings. The porosity of the surface determines cost, with an average price range from \$.25 - \$.50 per square foot.

Manufacturers have enhanced these coatings by adding slip additives, which cause defacement paints to "crawl" or loosely adhere to the protective silicone, polyethylene or Teflon. The graffiti is unable to adhere to these additives so that, if it sticks at all, the graffiti can be easily removed.

When removing graffiti from a surface coated with a non-sacrificial product, obtain a chemical remover (this can often be purchased by the manufacturer of the protective coating), and spray on defaced surface, agitating slightly and allowing proper dwell time. Follow this with water application. Small surfaces can be cleaned with water-filled spray bottles. Larger surfaces, however, may require the use of a water blaster (keep pressure under 1500 psi).

Disclaimer: The city of Nampa in no way suggests or promotes any products listed within or takes liability for any recommendations or damage that may result from the methods contained in this document.