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Removing Dirt Build-Up from Sandstone

Procedure code:

447003S

Division:

Masonry

Section:

Sandstone

Last Modified:

08/10/2016

PART 1---GENERAL

1.01 SUMMARY

- A. This procedure includes guidance on cleaning selected areas of dirt-build-up on sandstone by washing with an alkaline cleaner (for calcareous sandstone), or by washing with a hydrofluoric acid-based cleaner (for most other sandstones).
- B. NOTE: GENERALLY, THIS WORK SHOULD BE PERFORMED BY AN EXPERIENCED CONTRACTOR.
- C. For precautions relating to pressure washing, see "Guidelines for Using High-Pressure Cleaning Equipment on Masonry".
- D. Read "General Project Guidelines" along with this specification. These guidelines should be reviewed prior to performing this procedure and should be followed, when applicable, along with recommendations from the Regional Historic Preservation Officer (RHPO). The guidelines cover the following sections:

1. Safety Precautions
2. Historic Structures Precautions
3. Submittals
4. Quality Assurance
5. Delivery, Storage and Handling
6. Project/Site Conditions
7. Sequencing and Scheduling
8. General Protection (Surface and Surrounding)

1.02 QUALITY ASSURANCE

A. Qualifications: Minimum ten years of experience in historic masonry cleaning.

B. Reference Standards:

1. The Secretary of the Interior's Standards for Rehabilitation & Illustrated Guidelines for Rehabilitating Historic Buildings. Washington, D.C.: U.S. Department of the Interior, National Park Service, Cultural Resources, Preservation Assistance Division, 1992.
2. Mack, Robert C., Grimmer, Anne E. "Preservation Brief 1: Assessing Cleaning and Water-Repellent Treatments for Historic Masonry Buildings". Washington, D.C.: U.S. Department of the Interior, National Park Service, Technical Preservation Services Branch, 2000.

C. Test panels for each alternative method for each type of cleaning.

PART 2---PRODUCTS

2.01 MANUFACTURERS

ProSoCo, Inc.

Lawrence, KS 66117

[1-800-255-4255](tel:1-800-255-4255)

2.02 MATERIALS

NOTE: Chemical products are sometimes sold under a common name. This usually means that the substance is not as pure as the same chemical sold under its chemical name. The grade of purity of common name substances, however, is usually adequate for stain removal work, and these products should be purchased when available, as they tend to be less expensive. Common names are indicated below by an asterisk (*).

- A. For calcareous sandstone: alkaline cleaners such as "Sure Klean 766 Limestone & Masonry Pre-Wash" (ProSoCo, Inc.), or approved equal, with water rinse. Suitable alkaline cleaners will contain potassium hydroxide or aluminum hydroxide.
- B. For most sandstones, excluding calcareous: hydrofluoric acid-based cleaner containing not more than 5% hydrofluoric acid such as "Sure Klean Restoration Cleaner" (ProSoCo, Inc.), or approved equal.

C. Acetic acid:

1. A colorless pungent liquid acid that is the chief acid of vinegar and that is used especially in synthesis (as of plastics).
2. Other chemical or common names include Acetates*; Acetous salts*; Salts or esters of acetic acid*Vinegar acid*. (Vinegar itself, which contains about 4% acetic acid, may be suitable for some purposes requiring acetic acid.)
3. Potential hazards: CAUSTIC TO FLESH; CORROSIVE TO CONCRETE, STEEL, WOOD AND GLASS.
4. Available from chemical supply house (both commercial and scientific), drugstore or pharmaceutical supply distributor, grocery store or supermarket, or hardware store.

D. Plastic sheeting.

E. Clean, potable water.

2.02 EQUIPMENT

- A. Pressure water rinsing equipment (measuring between 100 and 400 psi for low-pressure; between 400 and 800 psi for medium pressure).
- B. Fan-type spray tips (15 degree fan spray).
- C. Stiff fiber bristle brushes.
- D. Plastic spatula.
- E. Masking tape.

PART 3---EXECUTION

3.01 EXAMINATION

- A. Examine site conditions to determine that current drainage is sufficient for adequately and safely removing cleaning waste and run-off from the site.
- B. Test clean a small, inconspicuous area to check for adverse effects and damage to the material.

3.02 PREPARATION

A. Protection:

1. Protect surrounding materials on the site and adjacent building surfaces and building landscaping from coming in contact with the cleaning materials and run-off. Cover with acid-resistant coatings when using acid-based cleaners. Hydrofluoric acid can severely etch aluminum and glass.
2. Provide workers with necessary protection against cleaning chemicals, overspray and run-off.
3. Prevent cleaning chemicals from coming in contact with any painted, polished or metallic surfaces.
4. Divert flow of run-off to drains in compliance with municipal codes. Comply with municipal codes regarding containment and disposal of cleaning materials.

B. Surface Preparation:

1. Before proceeding with cleaning operations, remove all miscellaneous hardware, anchors and bird excrement from the surface to prevent any discoloration.

NOTE: BIRD EXCREMENT THAT COMES INTO CONTACT WITH CLEANING SOLUTION WILL LEAVE A PERMANENT DARK STAIN ON THE SURFACE OF THE STONE.

2. Check for open holes and joints in surface and repaint or caulk as required to prevent water and cleaning solutions from penetrating deeply into the wall.

3.03 ERECTION, INSTALLATION, APPLICATION

NOTE: Avoid over-cleaning stone surfaces. Aim for achieving 85% clean. Most damage occurs when attempting to clean the last 15% of dirt.

NOTE: Test clean a small area to determine effectiveness of cleaning methods, materials, equipment and working pressures

selected before proceeding with cleaning operations on larger areas. Adjust methods, materials, equipment, pressures, etc. as necessary. Allow time for test area to completely dry to assess cleaning results and to determine if there are any material changes that require a modification of the treatment. Do not proceed until an acceptable cleaning operation has been approved and fully documented.

- A. Pre-wet stone surface using a low pressure wash (between 100 and 400 psi).
- B. Loosen dirt by scrubbing the area using a non-metallic brush.
- C. Flood the surface with medium-high water pressure (400- 600 psi) at a rate of three to four gallons per minute.
 1. Rinse from top to bottom.
 2. Keep the stone surface moist during the entire cleaning process in order to avoid the formation of residual salts on the surface.
- D. For calcareous limestone, apply a commercial alkaline cleaner. Follow manufacturer's application instructions.

CAUTION: Do not use acid-based cleaners on calcareous sandstone. Acidic products can etch or abrade the stone. Alkaline cleaners should always be used on acid-sensitive masonry. Avoid using alkaline solutions containing sodium hydroxide (caustic soda or lye) or ammonium bifluoride. These have the potential to cause efflorescence, subflorescence and can lead to abrasion of the surface

1. Apply alkaline cleaner pre-wash using a soft nylon bristle brush. Allow to remain on the surface for 30 minutes, or as long as determined by testing.
2. Rinse the surface thoroughly with clean, clear water using pressure between 400 and 600 psi.
 - a. Direct the spray downward to avoid forcing water into joints and the stone surface.
 - b. Monitor interior spaces at cleaning locations and contain water from rinsing operation so as not to flood building interior.
3. While surface is still wet from rinsing off pre- wash, apply limestone afterwash with a soft, fiber bristle brush.
 - a. Dilute limestone afterwash with as much water as determined effective during testing.
 - b. If surface has begun to dry, re-wet before applying afterwash.
 - c. Cover all corners, moldings, and interstices of the limestone.
4. Allow to stand for 3-5 minutes or as long as determined by testing.
5. Rinse the surface thoroughly with clean, clear water using pressure between 400 and 600 psi.
 - a. Direct spray downward as noted above.
 - b. Monitor interior spaces and contain water from rinsing operation so as not to flood building interior.
6. Spray on an application of Acetic Acid in order to neutralize the alkaline wash.
7. Rinse the stone with clean, clear water again.
8. For very light calcareous sandstone, the use of a complexing agent such as EDTA or organic bleach may be

required in order to achieve uniform results.

CAUTION: ONLY USE COMPLEXING AGENT UNDER PROFESSIONAL SUPERVISION.

E. For most sandstones, EXCLUDING calcareous sandstone, apply a commercial hydrofluoric acid-based cleaner. Follow manufacturer's application instructions.

CAUTION: HYDROFLUORIC ACID MAY LIGHTEN THE COLOR OF SOME SANDSTONES CONTAINING IRON. DO A TEST PATCH IN NOT HIGHLY VISIBLE AREA, MONITOR RESULTS, AND ACT ACCORDINGLY.

1. Apply acid-based cleaner using a soft nylon bristle brush. Allow to remain on the surface as long as determined by testing, but for no longer than 5-7 minutes.
2. Rinse the surface thoroughly with clean, clear water using pressure between 400 and 600 psi. Direct spray downward as noted above. Monitor interior spaces and contain water from rinsing operation so as not to flood building interior.
3. If efflorescence appears, clean a second time with a hydrofluoric acid-based cleaner, followed immediately by rinsing with cold water.

Last Reviewed: 2018-10-25