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GSA U.S. General Services Administration Removing Dirt From Stone Masonry By Pressure Washing

Procedure code: 440001S Source: Developed For Hspg (Nps - Sero) Division: Masonry Section: Stonework Last Modified: 07/20/2016

PART 1---GENERAL

1.01 SUMMARY

- A. This procedure includes guidance on removing dirt build-up on masonry by pressure washing with water and mild detergents. This technique is effective for removal of light to moderate atmospheric and organic staining. It may also be used to remove any residual traces of chemicals used in other cleaning treatment
- B. Water washing of stone masonry may be used periodically to remove dust, dirt, accumulations of grime or airborne pollutants which settle on the stone and do not get washed off by the natural action of wind-driven rainwater.
- C. Advantages of Pressure Washing:
 - 1. Surface staining and loose surface debris may be removed more quickly.
 - 2. May be used effectively in conjunction with chemical cleaning agents or abrasive materials; however, see limitation under 1.01 D.8.
 - 3. The amount of time spent scraping and scrubbing may be substantially reduced when appropriate rinsing pressures and water volumes are used.
- D. Limitations of Pressure Washing:
 - 1. When used independently, this technique is generally not effective in removing severe staining.
 - 2. Excessively high water pressures and flow rates may have an abrasive effect and may accelerate masonry decay.
 - 3. Extreme exposure to water can result in oxidation of natural components of the masonry.
 - 4. Water-saturated masonry may take several weeks to dry thoroughly.
 - 5. Cleaning procedures must be scheduled when there is no threat of freezing temperatures.
 - 6. Prolonged exposure to water or water entering through voids in the wall system may result in damage to interior surfaces, furnishings, and equipment.
 - 7. Excessive pressure can erode mortar joints and force water to the interior.

- 8. Water, even at low pressure, in combination with a grit or abrasive material can cause damage to historic materials.
- 9. Water runoff must be controlled to prevent intrusion into basement areas and surrounding properties.
- E. Safety Precautions: Precautions should be taken to guard against unnecessary water infiltration. Monitors should be set within the walls to determine moisture content and possible problems.
- F. See 01100-07-S for general project guidelines to be reviewed along with this procedure. These 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)

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).

G. See also 04400-02-P and 04400-03-P for alternative guidance on removing dirt from stone masonry.

PART 2---PRODUCTS

2.01 MANUFACTURERS

A. Dow Chemical {a nongovernment website}

1776 I St NW #1050 Washington, DC 20006 989-636-1000

- B. Union Carbide Corporation {a nongovernment website} Houston, TX
- C. Ashland Chemical {a nongovernment website} Covington, Ky.

2.02 MATERIALS

- A. Non-ionic detergent such as "Tergitol",
 - "Triton", "Igepal", or approved equal.
 - 1. Use dilution as approved by testing on material to be cleaned.
 - 2. or alkaline products are NOT acceptable.
- B. Clean, potable water (preferably mineral water)

2.02 EQUIPMENT

- A. Garden hose and nozzle (size appropriate for very fine misting).
- B. Spray Equipment: Provide equipment for controller spray application of water and cleaners, if any, at rates specified by RHPO for pressure, measured at spray tip, and for volume.
 - 1. For spray application of cleaners provide low-pressure tank or pump suitable for cleaner selected, equipped with cone-shaped spray-tip.
 - 2. For spray application of water provide fan-shaped spray-tip which disperses water at angle of not less than 15 degrees.

C. Assorted Washing Brushes (available from local janitorial supply houses or hardware stores):

- 1. Non-metallic brushes (no iron or brass wire)
- 2. Tampico fiber set in a hardwood block
- 3. A "whitewash brush" (ideal for most purposes)
- 4. "Parts washing" brushes (useful for small areas and crevices)
- D. Wood scrapers
- E. Buckets, molded rubber or plastic, such as the "Fortex" molded rubber pail 12 or 14 quart size
- F. Rubber gloves and rain gear, if desired
- G. Toweling or rags, clean, lint-free

PART 3---EXECUTION

3.01 PREPARATION

- A. Protection:
 - 1. Cleaning methods should be tested prior to selecting the one for use on the building; The simplest and least aggressive methods should be selected.
 - 2. The level of cleanliness desired should be determined; A new appearance look is both inappropriate and requires an overly harsh cleaning method.
 - 3. Prolonged exposure of water causes rapid deterioration in older structures.
 - 4. Take precautions to ensure that the water does not penetrate the surface and cause damage to the interior of the structure.
 - 5. This procedure may cause corrosion of hidden iron work and steel anchors causing either staining or cracking due to the rapid expansion of the metal.
 - 6. If the masonry remains saturated during the first frost, surface pieces may spall off as the water freezes.
 - 7. Iron and chloride in the water can cause disfigurement and staining.
- B. Surface Preparation:
 - 1. Fill the buckets, usually one or two, with about two gallons of water.
 - 2. Beginning at the top and gradually working down, scrub lightly with the fiber brush to remove any superficial deposits. Take care to avoid scratching or otherwise damaging any polished surfaces.
 - 3. Rinse with clean, clear water.
 - 4. Dry with clean, lint-free toweling or rags.
 - 5. Tenacious mineral deposits may be treated locally with gentle abrasion using wooden paddles or sticks. Great care should be exercised to avoid damaging the highly polished where they exist.

3.02 ERECTION/INSTALLATION/APPLICATION

NOTE: This procedure should be used in conjunction with 04510-04-s for guidance on using high pressure cleaning equipment.

NOTE: Low-pressure wash should measure between 100 psi and 400 psi. Medium-pressure wash should measure between 400 psi and 800 psi. High-pressure wash measures between 800 psi and 1200 psi.

- A. General:
 - 1. Spray-apply water to masonry surfaces to comply with requirements specified by RHPO for location, purpose, water temperature, pressure, volume and equipment.
 - 2. Heat water, if required, to effectively aid dirt removal and to clean surfaces.
 - 3. Clean with spray nozzle tip held consistently a minimum of 12-inch distance from masonry surface and direction of stream perpendicular to the surface unless other working distances and angles of spray direction are approved by cleaning tests.

- 4. Keep spray stream moving across the masonry surface at a uniform rate at all times.
 - a. Shut off flow before stopping motion at the end of a sweep, and begin the sweep motion before opening flow.
 - b. Normal sweep motion is horizontal, side to side; however, a vertical pattern may be used where necessary.

CAUTION: "boring in" with spray should be avoided. Concentrating spray stream at a point; using too high of a pressure; and working at a less than approved distance, can seriously damage the masonry and may be cause for rejecting the work and reason to require additional repairs.

- B. Low-Pressure and Medium-Pressure Water Washing:
 - 1. Hand-brush and scrape heavy grime prior to washing (see Section 3.01 B. above).
 - 2. Take a common garden hose and power-wash the face of the building, gradually increasing the water pressure as needed to sufficiently loosen the dirt.
 - 3. Allow to dry, and if additional cleaning is required, try the following:

C. Low-Pressure and Medium-Pressure Water Washing Supplemented with Non-Ionic Detergents:

- 1. Hand-brush and scrape heavy grime prior to washing (see Section 3.01 B. above).
- 2. Wash the masonry using a low-to-medium-pressure wash, adding a non-ionic detergent (see Section 2.02 A. above).
- 3. Hand-brush as needed with non-metallic brushes.
- 4. Rinse cleaned work with pressure wash spray as for cleaning to thoroughly remove loosened dirt, dirty cleaning water, and cleaner residue from surfaces.
 - a. Test rinse water residue on the masonry surface with pH indicating test strips regularly and record results in daily work log for review by RHPO.
 - b. Re-rinse/clean with clear water any area where the pH indicator strips show that there is residual acidity or alkalinity on the surface and allow to dry.

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