U.S. General Services Administration

Poulticing Rust Stains From Limestone And Marble

Procedure code:
440006S
Source:
Outdoor Sculpture Manual - Center For Public Buildings
Division:
Masonry
Section:
Stonework
Last Modified:
07/20/2016

NOTE: The cleaning or removal of stains from stone may involve the use of liquids, detergents or solvents which may run off on adjacent material, discolor the stone or drive the stains deeper into porous stones. Use the products and techniques described here only for the combinations of dirt/stain and stone specified.

PART 1---GENERAL

1.01 SUMMARY

A. This procedure includes guidance on removing rust stains from limestone and marble by poulticing using different chemical solvents or by using a paste containing a commercial rust remover.

NOTE: THIS PROCEDURE MAY ALSO BE USED FOR REMOVING RUST STAINS FROM BRICK MASONRY.

B. Metallic stains from iron or steel have the appearance of rust. This type of staining is often caused by the run-offfrom flashing, gutters, statuary and fasteners. The source of the rusty runoff should be determined and cause abated. Cleaning should be undertaken after rectifying deficiencies causing the rusting. Following cleaning, the surfaces should be inspected after several episodes of precipitation to confirm success of repairs or other treatments.

C. See 01100-07-S for general project guidelines to be reviewed along with this procedure. These guidelinescover 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)
9. 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).

D. For additional information on poulticing, see 04455-02-R.

E. For general information on the characteristics, uses and problems associated with limestone, see 04460-01-S; for marble, see 04455-01-S.

PART 2---PRODUCTS

2.01 MANUFACTURERS

A. ProSoCo, Inc.
www.prosoco.com
Lawrence, KS 66117
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 Normal Treatment:
1. Sodium Citrate (appears like enlarged salt granules):
a. Other chemical or common names include Citrate of soda*.
b. Available from chemical supply house, rug store or pharmaceutical supply distributor.
2. Glycerine:
a. Other chemical or common names include Glycerol; Glyceryl hydroxide; Glycyl alcohol; 1,2,3-propanetriol; Propenyl alcohol.
b. Potential hazards: FLAMMABLE.
c. Available from chemical supply house, drug store or hardware store.

B. For Light Stains:
1. Oxalic acid (COOH)2 or (H2C2O4):
a. A poisonous strong acid that occurs in various plants as oxalates and is used especially as ableaching or cleaning agent and in making dyes.
b. Other chemical or common names include Ethanedioic acid.
c. Potential Hazards: TOXIC; CORROSIVE TO CONCRETE, STEEL, WOOD OR GLASS.
d. Available from chemical supply house, dry cleaning supply distributor, drugstore or pharmaceutical supply distributor, hardware store, or manufacturer's brand name; the chemical name may appear on the label.)

C. For Stubborn Stains:
1. Sodium Hydrosulfite (NaHSO4):
a. Other chemical or common names include Sodium Hyposulfite; Sodium Subsulfite; Sodium Thiosulfate;

Antichlor*; Hypo*; Hyposulfite of soda*.

b. Potential Hazards: TOXIC; CORROSIVE TO CONCRETE, STEEL, WOOD OR GLASS.
c. Available from chemical supply house, dry cleaning supply distributor, drugstore or pharmaceutical supply distributor, photographic supply distributor (not camera shop), stone dealer, or water and sanitation supply distributor.

-OR-

Sodium Hypochlorite:

d. Other chemical or common names include Bleaching solution*; Household bleach*; Laundry bleach*; Solution of chlorinated soda*.
e. Potential Hazards: Caustic to flesh. Available from chemical supply house, grocery store or supermarket, hardware store or janitorial supply distributor.

NOTE: A poultice using either of these chemicals should only be left on the surface for 30 minutes per application and after the removal, the surface should be immediately flushed with a sodium citrate solution. (This treatment may cause some etching of polished surfaces but can be corrected by repolishing - see 04455-02-P "Repolishing Marble").

-OR-

Commercial rust remover, such as "Sure Klean Ferrous Stain Remover (ProSoCo, Inc.), or approved equal.

NOTE: This poultice application should only set for 24 hour periods as opposed to typical 48 hour set period.

D. White absorbent material (molding plaster, untreated white flour, white tissue, paper towels, powdered chalk, talc, fullers earth, acid-free paper pulp or laundry whiting).

E. Plastic sheeting
F. Mineral water

2.02 EQUIPMENT

A. Glass or ceramic container for mixing the solution
B. Wooden utensil for stirring the ingredients
C. Wood or plastic spatula
D. Clean dry towels for blotting the area after treatment
E. Stiff bristle brushes (non-metallic)
F. Garden hose and nozzle
G. Masking tape

PART 3---EXECUTION

3.01 EXAMINATION

A. Examine the masonry surface CAREFULLY to determine the cause of staining before proceeding with any cleaning operation.

3.02 PROTECTION

A. Surface Preparation:
1. Before attempting the stain removal, clean attached or nearby metal items and coat them with a quick drying, clear coating such as varnish, shellac or a plastic spray-on/brush-on coating.
2. If possible, remove the sources of moisture to prevent further oxidation of the metal. Where the source of the stain is an embedded anchor, tie, or other device, the only remedy is to eliminate the moisture at its source as coating would be impossible.

3.03 ERECTION, INSTALLATION, APPLICATION

A. Thoroughly rinse the area to be treated with mineral water to prevent too deep a penetration of the chemical cleaning agent.
B. For Light Stains:
1. Brush or spray on a solution of oxalic acid based on 1 part acid powder to 10 parts water by weight.

-OR-

Mix chemicals with clay or acid-free paper pulp to form a thick paste.
2. Follow poulticing instructions in Section 3.03 E.-L. below.
C. For Normal Treatment:
1. Mix 7 part glycerine, 1 part sodium citrate and 6 parts warm water.
2. Thoroughly moisten the stained surface with this liquid. Be sure to dampen well beyond the stain.
3. Mix the remaining liquid with the white absorbent material to form a paste the consistency or cake icing. (Approximately one pound of paste is needed for every square foot of surface area to be treated).
4. Follow poulticing instructions in Section 3.03 E.-L. below.
D. For Stubborn Stains:
1. Wet the affected area with a solution of 1 part sodium citrate and 6 parts water.
2. Mix sodium hydrosulfite or sodium hypochlorite with filler material such as attapulgite clay to form a thick paste.

NOTE: This treatment may cause some etching of polished surfaces but can be corrected by repolishing - see 04455-02-p "repolishing marble".

-OR-
3. Prepare a commercial rust remover poultice following manufacturer's instructions.
4. Follow poulticing instructions in Section 3.03 E.-L. below.
E. Using a wooden or plastic spatula, apply the poultice to the stained area in layers no more than 1/4 inch thick. The poultice should extend well beyond the stain to prevent forcing the stain into previously clean stone.
F. Check the coating for air pockets or voids.
G. Cover the poultice with plastic sheeting and seal with masking tape in order to prevent too quick of an evaporation.
H. Re-wet the poultice with clean water as needed and leave to dry (approximately 48 hours).
1. For sodium hydrosulfite poultice, leave in place only for 30 minutes per application.
2. For commercial rust remover poultice, leave in place only for 24 hours.
I. Remove the poultice with a wooden or plastic spatula to avoid scratching the surface

J. For sodium hydorsulfite poultice, flush surface immediately with sodium citrate.
K. Rinse the cleaned area with mineral water, blot with clean towels and allow. Once the surface has dried completely,

check for remaining residue and repeat the treatment if necessary.

Last Reviewed: 2018-10-25