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U.S. General Services Administration

Removing Manganese Stains from Brick Masonry

Procedure code:

421111S

Source:

Developed For HSPG (NPS - Southeast Regional Office)

Division:

Masonry

Section:

Brick Unit Masonry

Last Modified:

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

PART 1---GENERAL

1.01 SUMMARY

- A. This procedure includes guidance on removing brown stains from brick masonry resulting from deposits of manganese on the masonry surface.
- B. Manganese is sometimes used in brick composition as a colorant.
- C. Manganese staining is a form of efflorescence that develops when moisture in the wall draws salts and color from the brick composition to the surface of the masonry. As the water evaporates, color from the manganese is left behind.
- D. Manganese stains are usually tan, brown, nearly black or gray in color, have an oily appearance and may streak down over the face of the brick.
- E. See "General Project Guidelines" 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).

PART 2---PRODUCTS

2.01 MANUFACTURERS

A. Diedrich Technologies, Inc.

2.02 MATERIALS

A. CAUTION: DO NOT CLEAN MANGANESE COLORED BRICK WITH HYDROCHLORIC ACID WITHOUT NEUTRALIZING THE ACID DURING THE RINSING OPERATION.

B. CAUTION: DO NOT USE ANY ACIDIC SOLUTIONS ON TAN, BROWN, BLACK OR GRAY BRICK. THERE ARE SPECIAL PROPRIETARY CLEANING COMPOUNDS AVAILABLE FOR CLEANING BRICK CONTAINING MANGANESE. THEY SHOULD BE TESTED FOR EFFECTIVENESS PRIOR TO USE. THE ADVICE OF THE BRICK MANUFACTURER SHOULD BE REQUESTED AND FOLLOWED.

C. 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 (*).

D. Chemicals for Heavy Manganese Staining:

1. Acetic Acid (80% or stronger):

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

2. Hydrogen Peroxide - 30-35% (H2O2):

- a. An unstable compound used especially as an oxidizing and bleaching agent, an antiseptic, and a propellant.
 - b. Other chemical or common names include Peroxide of hydrogen*; Solution of hydrogen dioxide*; Superoxol*; (hydrogen peroxide is commonly sold as a 3% solution; Superoxol is a 30% solution; Superoxol causes flesh burns; 3% hydrogen peroxide does not).
 - c. Potential Hazards: TOXIC (when concentrated); CORROSIVE TO FLESH; FLAMMABLE (in high concentration).
 - d. Available from chemical supply house, drugstore, pharmaceutical supply distributor, or hardware store.
- OR-
- e. Proprietary cleaner such as "Diedrich 940 Iron & Manganese Stain Remover" (Diedrich Technologies), or approved equal.

E. For Light-colored Manganese Staining:

1. Oxalic Acid (COOH)2 or (H2C2O4):

- a. A poisonous strong acid that occurs in various plants as oxalates and is used especially as a bleaching 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 photographic supply distributor (not camera shop). (Often sold under a manufacturer's brand name; the chemical name may appear on the label.)
- 2. Clean, potable water
 - 3. Clean natural fiber rags

2.03 EQUIPMENT

- A. Garden hose and nozzle
- B. Stiff bristle brushes (no iron wire)
- C. Wood scrapers

PART 3---EXECUTION

3.01 PREPARATION

- A. Protection:
 - 1. Provide adequate wash solutions (i.e. water, soap and towels) before starting the job.
 - 2. Whenever acid is used, the surface should be thoroughly rinsed with water as soon as its action has been adequate. Otherwise it will continue etching the masonry even though the stain is gone.

3.02 ERECTION/INSTALLATION/APPLICATION

NOTE: DO NOT TRY MORE THAN ONE TREATMENT ON A GIVEN AREA UNLESS THE CHEMICALS USED FROM PRIOR TREATMENT HAVE BEEN WASHED AWAY.

- A. For Heavy Manganese Staining:
 - 1. Mix 1 part acetic acid, 1 part hydrogen peroxide and 6 parts water.
 - 2. CAUTION: ALTHOUGH THIS SOLUTION IS VERY EFFECTIVE, IT IS A DANGEROUS SOLUTION TO MIX AND USE. ACETIC ACID-HYDROGEN PEROXIDE MAY ALSO BE AVAILABLE IN A PREMIXED FORM KNOWN AS PERACETIC ACID. THIS ACID, A TEXTILE CHEMICAL, IS ALSO DANGEROUS AND MAY BE DIFFICULT TO PURCHASE.
 - 3. Thoroughly wet the masonry surface with clean, clear water
 - 4. Brush or spray on mixture of acetic hydrogen peroxide (see Section 3.02 A. above for mixture). DO NOT SCRUB. The stain should disappear quickly.
 - 5. Thoroughly rinse the wall with clean, clear water.
 - 6. Repeat the procedure if the stains recur after a few days.
- B. For Light-colored or New Manganese Stains:
 - 1. Mix 1 lb of oxalic acid crystals (0.45 kg) with 1 gal (3.79 L) of water.
 - 2. Follow procedures 3.02 B.-E. above.

3.03 ADJUSTING/CLEANING

- A. Upon completion of the masonry cleaning work, clean window glass and spattered adjacent surfaces.