

SECTION 04500
MASONRY RESTORATION AND CLEANING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings, photos and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

- A. Extent of masonry restoration work is indicated on drawings and photos.
- B. Masonry restoration work includes the following:
1. Plaster and brick cleaning all surfaces.
 4. Caulking of cut stone covered in Section 07900
 5. Final cleaning

1.03 QUALITY ASSURANCE

- A. Cleaning Specialist: Work must be performed by a firm having not less than 5 years successful experience in comparable masonry cleaning and restoration projects and employing personnel skilled in the restoration processes and operations indicated.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data for each product indicated including recommendations for their application and use. Include test reports and certifications substantiating that products comply with requirements.
- B. Samples: Submit, for verification purposes, samples of the following:
1. Each new exposed masonry mortar to be used for replacing existing materials. Include in each set of samples the full range of colors and textures to be expected in completed work.
 2. Each type of chemical cleaning material data.
 3. Each type of chemical clear sealer provide manufacturers data.
 4. Stone masonry patching materials product data and application instructions

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to site in manufacturer's original and unopened containers and packaging, bearing labels as to type and names of products and manufacturers.
- B. Protect masonry restoration materials during storage and construction from wetting by rain, snow or ground water, and from staining or intermixture with earth or other types of materials.
- C. Protect grout, mortar and other materials from deterioration by moisture and temperature. Store in a dry location or in waterproof containers. Keep containers tightly closed and away from open flames. Protect liquid components from freezing. Comply with manufacturer's recommendations for minimum and maximum temperature requirements for storage.

1.06 PROJECT CONDITIONS

- A. Do not repoint mortar joints or repair masonry unless air temperatures are between 40 deg.F (4 deg.C) and 80 deg.F (27 deg.C) and will remain so for at least 48 hours after completion of work.
- B. Prevent grout or mortar used in repointing and repair work from staining face of surrounding masonry and other surfaces. Remove immediately grout and mortar in contact with exposed masonry and other surfaces.
- C. Protect sills, ledges and projections from mortar droppings.

1.07 SEQUENCING/SCHEDULING

- A. Perform masonry restoration work in the following sequence:
 - 1. Chemically clean brick and plaster
 - 2. Rakeout existing mortar from joints indicated to be repointed.
 - 3. Repoint existing mortar joints of masonry indicated to be restored.
 - 4. Chemically seal brick, cut stone and rough cut stone masonry.
 - 5. Caulk stone joints specified under Section 07900

1.08 Test Area

- 1. Test a minimum 4 ft. by 4 ft. area on each type of masonry and plaster. Use manufacturer's application instructions. Let the test panel dry 3 to 7 days before inspection. Keep test panels available for comparison throughout the cleaning project.

PART 2 PRODUCTS

2.01 MASONRY MATERIALS

- A. Mortar materials
 - 1. Portland Cement: ASTM C 150, Type I.
 - 2. Hydrated Lime: ASTM C 207, Type S.
 - 3. Colored Mortar Aggregate: Natural or manufactured sand selected to produce mortar color to match adjacent existing mortar color.
 - 4. For pointing mortar provide sand with rounded edges.
 - 5. Match size, texture and gradation of existing mortar as closely as possible.
 - 6. Colored Mortar Pigment: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with record of satisfactory performance in masonry mortars.
 - 7. Water: Clean, free of oils, acids, alkalis and organic matter.

2.02 CLEANING MATERIALS AND EQUIPMENT

- A. Masonry Cleaner: Manufacturer's as indicated below for cleaning for masonry & plaster.
- B. Approved Manufactures
 - 1. ProSoCo Inc. (Used as standard) Sure Klean® Light Duty Restoration Cleaner removes tough atmospheric soiling and subsurface staining, while minimizing potential for damage to delicate masonry and adjacent substrates. Removes difficult calcium (concrete) stains, white scum and other staining from most window glass.
- C. Materials: The specified cleaning application is a three- (3) step process requiring all of the following products. ProSoCo Sure Klean products are used as a standard or approved equal.

- D. For Brick Masonry
 - 1. ProsoCo Sure Klean Sure Klean® Light Duty Restoration Cleaner.
- F. For spot problem stains where required
 - 1. Product: Subject to compliance with requirements, provide "Sure Klean Sure Klean® Restoration Cleaner, ProSoCo, Inc.
- G. Water for Cleaning: Clean, potable, free of oils, acids, alkalis, salts, and organic matter.
 - 1. Warm Water: Heat water to temperature of 140 deg.F-180 deg.F (60 deg.C-82 deg.C).
- H. Brushes: Fiber bristle only.
- I. Spray Equipment: Provide equipment for controlled spray application of water and chemical cleaners, if any, at rates indicated for pressure, measured at spray tip, and for volume.
 - 1. For spray application of chemical cleaners provide lowpressure tank or chemical pump suitable for chemical cleaner indicated, equipped with coneshaped spraytip.
 - 2. For spray application of water provide fanshaped spraytip which disperses water at angle of not less than 15 degrees.

2.03 POINT MORTAR MIXES

- A. General:
 - 1. Measurement and Mixing: Measure cementitious and aggregate material in a dry condition by volume or equivalent weight. Do not measure by shovel, use known measure. Mix materials in a clean mechanical batch mixer.
 - 2. Mixing Pointing Mortar: Thoroughly mix cementitious and aggregate materials together before adding any water. Then mix again adding only enough water to produce a damp, unworkable mix, which will retain its form when, pressed into a ball. Maintain mortar in this dampened condition for 1to2 hours. Add remaining water in small portions until mortar of desired consistency is reached. Use mortar within 30 minutes of final mixing; do not retemper or use partially hardened material.
 - 3. Colored Mortar: Produce mortar of color required by use of selected ingredients. Do not adjust proportions without Architect's approval.

2.04 Pointing Mortar for rough cut stone: One part white Portland cement, 1 part lime, 6 parts colored mortar aggregate.

- A. Rough cut stone is to have square ribbon mortar joint to match existing profile.

2.05 CHEMICAL SEALERS

- A. Chemical penetrating sealer is for brick, cut stone and rough cut stone. Is to be one of the following.
 - 1. ProsoCo Siloxane PD, or approved equal. Sure Klean® Weather Seal Siloxane PD (predilute) is a ready to-use, water-based silane/siloxane water repellent for concrete and most masonry and stucco surfaces. Siloxane PD is a low-VOC treatment that penetrates more deeply than conventional water repellents and helps masonry resist cracking,

spalling, staining and other damage related to water intrusion. Low odor and alkaline stable, Siloxane PD is ideal for field and in-plant application.

PART 3 EXECUTION

3.01 MASONRY CLEANING

A. PREPARATION

1. General: Comply with recommendations of manufacturers of chemical cleaners for protecting building surfaces against damage from exposure to their products.
2. Protect persons, motor vehicles, surrounding surfaces of building whose masonry surfaces are being restored, building site, mask windows and window frames.
3. Prevent chemical cleaning solutions from coming into contact with pedestrians, motor vehicles, landscaping, buildings and other surfaces, which could be injured by such contact.
4. Do not clean masonry during winds of sufficient force to spread cleaning solutions to unprotected surfaces.
5. Dispose of runoff from cleaning operations by legal means and in manner which prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.
6. Erect temporary protection covers over pedestrian walkways and at points of entrance and exit for persons and vehicles, which must remain in operation during course of masonry restoration work.
7. Protect glass and unpainted metal trim from contact with chemical cleaners by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape. Apply masking agent to comply with manufacturer's recommendations. Do not apply liquid masking agent to painted or porous surfaces.

B. Chemical Cleaner Application Methods:

1.General: Apply chemical cleaners to masonry surfaces to comply with chemical manufacturer's recommendations using brush or spray application methods, at Contractor's option, unless otherwise indicated. Do not allow chemicals to remain on surface for periods longer than that indicated or recommended by manufacturer.

C. CLEANING ALLOCATION FOR BRICK MASONRY

1. Prewet the surface with clean water.
2. Apply cleaner using a brush or roller. Gently scrub to improve results.
3. Let cleaner dwell for 5 to 15 minutes. Gently scrub heavily soiled areas. Don't let cleaner dry on the surface. If drying occurs, lightly wet treated surfaces with fresh water. Reapply the cleaner in a gentle scrubbing manner.
4. Rinse thoroughly with clean water. The best combination of rinsing pressure and water volume is provided by masonry washing equipment generating 400-1000 psi with a water flow rate of 6-8 gallons per minute delivered through a 15-45 degree fan spray tip. Equipment should be adjustable to reduce water flow rate and rinsing pressure as required for controlled cleaning of more sensitive surfaces. See also "Equipment" section of the Product Data Sheet.
5. Repeat steps 1 through 4 above if necessary. Allow to remain on brick for 3 to 5 minutes.
6. Scrub tough stains with stiff bristle brush.
7. Rinse with high-pressure washer (500 to 1200 psi).

Note: during the entire applications process the lower masonry areas must be continuously rinsed to avoid rundown staining of adjacent brick and stone masonry. Note: Application to surfaces exposed to direct sunlight or high winds may cause rapid drying. When possible, clean when surfaces are shaded from direct sunlight. Rinse wet hot surfaces with fresh water immediately before applying cleaner to remove loose soiling and reduce surface temperature. Do not let cleaner dry on the surface. If drying occurs, lightly wet treated surfaces with fresh water and reapply the cleaner in a gentle scrubbing manner.

3.02 REPOINTING EXISTING MASONRY

A Joint Raking:

1. Rake out mortar from joints to depths equal to 2 1/2 times their widths but not less than 3/4" nor less than that required to expose sound, unweathered mortar.
2. Remove mortar from masonry surfaces within rakedout joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum or flush joints to remove dirt and loose debris.
3. Do not spall edges of masonry units or widen joints. Replace any masonry units, which become damaged.
4. Cut out old mortar by hand with chisel and mallet, unless otherwise indicated.
5. Power operated rotary hand saws and grinders will be permitted but only on specific written approval of Architect based on submission by Contractor of a satisfactory quality control program and demonstrated ability of operators to use tools without damage to masonry. Quality control program shall include provisions for supervising performance and preventing damage due to worker fatigue.

B. Joint Pointing:

1. Rinse masonry joint surfaces with water to remove any dust and mortar particles. Time application of rinsing so that, at time of pointing, excess water has evaporated or run off, and joint surfaces are damp but free of standing water.
2. Apply first layer of pointing mortar to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8" until a uniform depth is formed. Compact each layer thoroughly and allow to become thumbprint hard before applying next layer.
3. After joints have been filled to a uniform depth, place remaining pointing mortar in 3 layers with each of first and second layers filling approximately 2/5 of joint depth and third layer the remaining 1/5. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing bricks have rounded edges recess tool final layer slightly back from face of brick. Take care not to spread mortar over edges onto exposed masonry surfaces, or to featheredge mortar.
4. When mortar is thumbprint hard, tool joints to match original appearance of joints, unless otherwise indicated. Remove excess mortar from edge of joint by brushing.
5. Cure mortar by maintaining in a damp condition for not less than 72 hours.
6. Where repointing work precedes cleaning of existing masonry allow mortar to harden not less than 30 days before beginning cleaning work.
7. Owner shall have the right to perform periodic tests to verify depth of repointing. Contractor shall repair with like materials area where mortar has been removed to ascertain depth of repointing.

3.03 FINAL CLEANING

- A. After mortar has fully hardened thoroughly clean exposed masonry surfaces of excess mortar and foreign matter using stiff nylon or bristle brushes and clean water, spray applied at low pressure.
- B. Use of metal scrapers or brushes will not be permitted.
- C. Use of acid or alkali cleaning agents will not be permitted.

3.04 MASONRY & PLASTER SEALING

- A. Protection: mask windows and window frames as sealer is being applied.
- B. Do not apply sealer in windy when air temperature is above 95 degrees F
- C. Test each surface to be covered. Wet each surface with water as a test to determine suitability and results. Wet surfaces without creating drip or run downs.
- D. Spray apply from bottom up creating 4 to 8 inch rundown below the spray contact point. Brush out heavy runs and drips that do not penetrate.
- E. Treated surfaces are dry to touch in one hour and protect from rain for six hours following application.
- F. Before applying, read "Preparation" and "Safety Information" sections in the Manufacturer's Product Data Sheet for Weather Seal Siloxane PD. Refer to the Product Data Sheet for additional information about application of Weather Seal Siloxane PD. Do not dilute or alter.
- G. Vertical Application Instructions
For best results, apply protective treatment "wet-on-wet" to a visibly dry and absorbent surface.
- H. Spray: Saturate from the bottom up, creating a 4" to 8" (15 to 20 cm) rundown below the spray contact point. Let the first application penetrate for 5-10 minutes. Resaturate. Less will be needed for the second application.
- I. Brush or roller: Saturate uniformly. Let protective treatment penetrate for 5 to 10 minutes. Brush out heavy runs and drips that don't penetrate.
- J. Dense Surface Application Instructions
Apply in a single, saturating application with no run down. Back roll all runs and drips to ensure uniform appearance. DO NOT OVER APPLY. One application is normally enough. Always test.
- K. Horizontal Application Instructions
 1. Saturate in a single application. Use enough to keep the surface wet for 2 to 3 minutes before penetration.
 2. Broom out puddles until they soak in. Treated surfaces dry to touch in 1 hour. Protect surfaces from rainfall for 6 hours following treatment. Many surfaces need several days to develop full water repellency.

Note: Protect from rain for 6 hours and from pedestrian and vehicular traffic until visibly dry.

END OF SECTION 04500