

## **PART 1 - GENERAL**

### **1.1 DESCRIPTION**

- A. This projects the exterior rehabilitation of the historic Building 86. Repointing, cleaning, crack repair and patching is per the construction documents and photos.
- B. Masonry restoration work includes the following:
  - 1. Brick or concrete repair where shown or noted.
  - 2. Repointing of mortar joints.
  - 3. Brick or concrete cleaning - all surfaces.
  - 4. Brick or concrete sealing - all surfaces.
- C. All work shall be done in accordance with The Secretary of the Interior's Standards for Rehabilitation (<http://www.nps.gov/tps/standards/rehabilitation.htm>) and NPS Preservation Brief No. 2: Repointing Joints in Historic Masonry (<http://www.nps.gov/history/hps/tps/briefs/brief02.htm>) .

### **1.2 RELATED WORK**

- A. Section 02 41 00, DEMOLITION.

### **1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
- B. 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.
- C. 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. Brick or concrete patching materials product data and application instructions.

### **1.4 QUALITY ASSURANCE**

- A. Restoration Specialist: Work must be performed by a firm having not less than 5 years successful experience in comparable masonry restoration projects and employing personnel skilled in the restoration processes and operations indicated.
- B. List of recently completed exterior masonry restoration cleaning projects, including project name , location, Resident Engineer Bailey, Aaron (CFM) [Aaron.Bailey2@va.gov](mailto:Aaron.Bailey2@va.gov) and Architect.
- C. Provide description of cleaning products used, substrates, environmental regulations and application procedures.
- D. Contractor shall survey entire building to determine all mortar joints conditions. Special attention shall be given to Western and Southern exposure.
- E. Provide complete report defining specific areas requiring extensive attention as it's performed under the required scope of this section.
- F. Pre-installation Conference: Conduct conference at the Project Site to review all masonry rehabilitation work to coordinate mockup locations and review existing site conditions. The Contractor, Contracting Officer, Resident Engineer and related sub-contractors should all be present.

### **1.5 MOCK-UPS**

- A. Scheduling Mock-ups: Contractor shall schedule mock-ups to coincide with Project Meetings. Contractor shall notify Resident Engineer in advance when mock-ups are complete and ready for review. If the Resident Engineer visits the site and the scheduled mock-up is not fully complete and ready for review, then the Contractor shall be responsible for all costs associated with additional services to visit the site.

- B. Field-Constructed Mock-Ups: Prior to start of general masonry restoration, prepare the following sample panels on building where directed by Resident Engineer. Obtain Resident Engineer's acceptance of visual qualities before proceeding with the work. Retain acceptable panels in undisturbed condition, suitably marked, during construction as a standard for judging completed work.
  - 1. Cleaning: Demonstrate materials and methods to be used for cleaning each type of masonry surface and condition on sample panels approximately 25 sq. ft. in area. Allow a minimum of 7 days drying time before inspection or longer if possible. Obtain approval of Resident Engineer for final cleaning methods to be used.
    - a. Demonstrate disposal and protection techniques, including neutralizing retention ditches, if required.
    - b. Test cleaners and methods on samples of adjacent non-masonry materials for possible reaction with cleaners, except where cleaners and methods are known to have a deleterious effect.
    - c. Confirm required dilutions and dwell times for each surface and condition. Adjust dilutions and dwell times as necessary to achieve acceptable results, using the minimum concentrations of chemical required to accomplish cleaning to the degree acceptable to Resident Engineer.
    - d. Allow a waiting period of not less than 7 calendar days, after completion of sample cleaning to permit a study of sample panels for negative reactions.
  - 2. Repointing: Prepare 2 separate sample areas of approximately 3 feet high by 6 feet wide for each type of repointing required, one for demonstrating methods and quality of workmanship expected in removal of mortar from joints and the other for demonstrating quality of materials and workmanship expected in pointing mortar joints.
  - 3. Ensure original mortar in control sample is cleaned prior to preparation to new mortar samples so that new mortar is matched to the clean original mortar not dirty mortar. Masonry Seals: Utilize the 2 separate sample areas for demonstrating the effects and changes upon application of chemical sealers/water repellant coatings.
    - a. Allow proper curing/drying of sealant in accordance with the manufacturer's instructions/specification prior to acceptance and application to the entire project.
- C. Masonry Patching Compound (Limited Application for patching bricks, as required where anchors are removed or bricks are spalled): Factory-mixed cementitious product that is custom manufactured for patching masonry.
  - 1. Products: Subject to compliance with requirements, provide the following:
    - a. Cathedral Stone Products, Inc.; Jahn Restoration Mortars and Anchor Setting Mortar.
    - b. Edison Coatings, Inc. with approval equal product
    - c. Or approved Equal.
  - 2. Use formulation that is vapor- and water permeable (equal to or more than the masonry), exhibits low shrinkage, has lower modulus of elasticity than the masonry units being repaired, and develops high bond strength to all types of masonry.
  - 3. Formulate patching compound in colors, textures, and grain to match masonry being patched.

#### **1.6 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.

### **1.7 SEQUENCING/SCHEDULING**

- A. Perform masonry restoration work in the following sequence:
  - 1. Chemically clean brick, cut stone and concrete sills or lintels.
  - 2. Rake-out existing mortar from joints indicated to be repointed.
  - 3. Repoint existing mortar joints of masonry indicated or required to be restored.
  - 4. Chemically seal brick, cut stone and concrete sills or lintels.

### **1.8 REFERENCES:**

- A. Preservation Brief 2: Repointing Mortar Joints in Historic Brick Buildings, Robert C. Mack, FAIA, National Park Service, revised October, 1998.
- B. ASTM C91-01: Standard Specification for Mortar for Masonry
- C. ASTM C150-02ae1: Standard Specification for Portland Cement.
- D. ASTM C207-97: Standard Specification for Hydrated Lime for Masonry Purposes.

### **1.9 DEFINITIONS:**

- A. Repointing: The process of raking out (removing) mortar and replacing it with new mortar.
- B. Pointing: The process of placing new mortar in existing joint spaces that have previously been raked out. This term does not include the raking out process.
- C. Defective/Deteriorated Joint: Joints in which mortar is missing, loose, spalled, eroded, cracked, powdered, broken, hollow, unsound, soft, weathered more than 1/8 inch from original plane, or separated from masonry at one or more faces.

## **PART 2 - PRODUCTS**

### **2.1 MORTAR MATERIALS**

- A. Mortar materials
  - 1. Portland Cement: ASTM C 150, Type I.
  - 2. Hydrated Lime: ASTM C 207, Type S.
  - 3. 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.

### **2.2 MORTAR MIXES:**

- A. General: New pointing mortar is to match original mortar in color, composition, texture, and tooling. The following specification is intended as a starting point for appropriate mixing of historic mortar. Adjustments to the mix will be required to match the historic mortar following analysis.
- B. 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.
  - 1. 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 1 to 2 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.
  - 2. Mortar Color: Produce mortar of color required by use of selected ingredients. Do not adjust proportions without Resident Engineer's approval.

3. Do not use admixtures of any kind in mortar, unless otherwise indicated.
- C. Mortar Proportions: Mix proportions are examples and shall be revised to suit project requirements based on mortar analysis. Mix mortar materials in the following proportions:
  1. Setting / Pointing Mortar: Comply with ASTM C270, Proportion Specification, Type O, unless otherwise indicated, with cementitious material content limited to portland cement-lime. One part white portland cement, 2 parts lime, 9 parts mortar aggregate. Provide samples and revise as required to exactly match existing as determined by Resident Engineer.
- D. Masonry Patching Compound (Limited Application for patching bricks, as required where anchors are removed or bricks are spalled): Factory-mixed cementitious product that is custom manufactured for patching masonry.
  1. Products: Subject to compliance with requirements, provide the following:
  2. Cathedral Stone Products, Inc.; Jahn Restoration Mortars and Anchor Setting Mortar.
  3. Edison Coatings, Inc. with approval equal product
  4. Or approved Equal.
  5. Use formulation that is vapor- and water permeable (equal to or more than the masonry), exhibits low shrinkage, has lower modulus of elasticity than the masonry units being repaired, and develops high bond strength to all types of masonry.
  6. Formulate patching compound in colors, textures, and grain to match masonry being patched.

## 2.3 CLEANING MATERIALS AND EQUIPMENT

- A. Manufacturer's as indicated below for cleaning.
- B. Approved Manufactures
  1. ProSoCo Inc. (Used as standard)  
3741 Greenway Circle  
Lawrence, KS 66046  
800-255-4255  
FAX 785-830-9797
  2. Sika Corporation
  3. Thuro
- C. Materials: Exterior cleaners – Listed in order of aggressiveness, least to greatest.
  1. Enviro Klean 2010 All Surface Cleaner  
FORM: Clear Green liquid  
TOTAL SOLIDS: N/A  
SPECIFIC GRAVITY: 1.070  
pH: 10.5 Typical Rinse water 7.8 - 8.2  
WT./GAL.: 8.90 lbs.  
FLASH POINT: > 200 degrees F (> 93 degrees C) ASTM D 3278  
FREEZE POINT: 32 degrees F (0 degrees C)
  2. Vana Trol: Sure Klean® 600 VanaTrol  
FORM: Clear liquid with slight amber color  
SPECIFIC GRAVITY: 1.10  
TOTAL SOLIDS: N/A  
pH: 0.3 (1:6 dilution)  
WT./GAL.: 9.15 lbs.  
FLASH POINT: N/A  
FREEZE POINT: < -22 degrees F (< -30 degrees F)
  3. 101 Lime Solvent: Sure Klean® 101 Lime Solvent  
FORM: Clear liquid, brown color  
SPECIFIC GRAVITY: 1.12  
TOTAL SOLIDS: N/A

pH: 0.50 @ 1:6 Dilution  
WT./GAL.: 9.39 lbs.  
FLASH POINT: N/A  
FREEZE POINT: < -22 degrees F (< -30 degrees C)

4 . 600: Sure Klean® 600

Form: Clear Liquid  
PH: 0.1 (@1:9 Dilution)  
Specific Gravity: 1.130  
Freeze Point: -40degrees F  
Wt./Gal.: 9.4 lbs.

D. Restoration Cleaners for Atmospheric and Biological Staining

- 1 . Light Duty Restoration Cleaner: "SureKlean LD Restoration Cleaner". Highly effective gel cleaner for cleaning brick, terra cotta, sandstone and granite surfaces (for moderate atmospheric soiling and oxidation staining).

Form: Clear gel  
Color: Light amber  
pH: 1.6  
Specific Gravity: 1.124  
Flash Point: None

- 2 . Restoration Cleaner: "SureKlean Restoration Cleaner". Concentrated carbon solubilizer cleans brick, granite, sandstone and other masonry (loosens and dissolves dirt, paint oxidation carbon buildup and other atmospheric pollutants).

Form: Clear Liquid  
Specific Gravity: 1.050  
Flash Point: None  
PH: 3.0 (@1:5 dilution)

- 3 . EK Restoration Cleaner: "EnviroKlean Restoration Cleaner". Dissolves tough carbon deposits and other atmospheric staining using a near neutral pH formulation.

Form: Clear Amber Gel  
Specific Gravity: 1.06  
Flash Point: None  
PH: 5.5 (concentrate)

- 4 . Enviro Klean® BioWash®. Removes mold and mildew staining

FORM: Clear, low-odor liquid, slight amber color  
SPECIFIC GRAVITY: 1.00  
pH: 5.5 to 6.5  
WT/GAL: 8.34 pounds  
ACTIVE CONTENT: not applicable  
TOTAL SOLIDS: not applicable  
VOC CONTENT: not applicable  
FLASH POINT: not applicable  
FREEZE POINT: 32 degrees F (0 degrees C)  
SHELF LIFE: 3 years in tightly sealed, unopened container  
SOLUBILITY IN WATER: Complete

- E. Water for Cleaning: Clean, potable, free of oils, acids, alkalis, salts, and organic matter.

- F. Brushes: Fiber bristle only.

- G. 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 low-pressure tank or chemical pump suitable for chemical cleaner indicated, 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.

**2.4 POINTING MORTAR FOR CONCRETE SILLS AND BANDS:**

- A. One part white Portland cement, 1 part lime, 6 parts mortar aggregate.
- B. Match existing mortar profiles.

**2.5 CHEMICAL SEALERS**

- A. Chemical penetrating sealer is for brick, cut stone and rough cut stone. Is to be one of the following.
  - 1. ProsoCo (Used as standard)  
3741 Greenway Circle  
Lawrence, KS 66046  
800-255-4255  
FAX 785-830-9797
  - 2. Sika Corporation Silane/ Siloxane water repellent
  - 3. Throro Silane/siloxane water repellent.
- B. Sealer/Water Repellent
  - 1. Sure Klean® Weather Seal Siloxane WB concentrate is a self-emulsifying water repellent concentrate designed for dilution with fresh water at the jobsite. This solvent-free blend of silanes and oligomeric alkoxysiloxanes mixes easily with water to produce a penetrating water repellent
    - Form: Liquid
    - Color: Clear, amber
    - Specific Gravity: 1.000
    - Active Substance: Microemulsion concentrate of silanes and oligomeric alkyl alkoxysiloxanes
    - Solids: 100% concentrate
    - VOC: 318 grams/liters
    - Flash Point 900F (in concentrate) (>2080F @ 1:9 dilution) (>2080F @1:14 dilution)

**PART 3 - EXECUTION**

**3.1 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 run off 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. Cleaners:
  - 2010 All Surface Cleaner
    - 1. Working from bottom to top, prewet the surface with clean water.
    - 2. Apply the diluted cleaning solution to the masonry surface using a brush or low-pressure spray.

3. Let the cleaner stay on the surface 1-10 minutes, based on testing. Gently scrub heavily soiled areas.
4. Working from bottom to top, rinse the surface 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 if necessary.  
Note: Do not let cleaning solution dry on the surface. If drying occurs, lightly wet surfaces with fresh water and reapply the cleaner in a gentle scrubbing manner.

Vana Trol

1. Thoroughly saturate a large portion of the masonry surface with fresh water.
2. Using a densely-packed, soft-fibered masonry-washing brush or low pressure spray (50 psi max), apply diluted solution freely. Do not apply diluted cleaning solution with pressure spray above 50 psi. Such application will drive the chemicals deep into the surface making it difficult to rinse completely.
3. Leave cleaning solution on the wall for about 5 minutes, depending on absorption rate of masonry and drying conditions. Do not let cleaner dry into the masonry. This may leave a residue and cause staining. Reapply cleaning solution and scrape off heavy buildup of excess mortar using a wooden scraper or piece of brick. Take care to avoid damaging the masonry surface. Do not use metal scrapers, which may contribute to metallic staining.
5. Rinse thoroughly with fresh water, removing all cleaning compound, free sand, loose material and debris. Thorough rinsing is extremely important to ensure that all residues are removed from the porous masonry. High-pressure rinsing equipment providing at least 400 psi with 4 to 6 gallons of water per minute will prove most effective. 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.

101 Lime Solvent

1. Prewet a large area with fresh water.
2. Using a densely-packed, soft-fibered masonry washing brush, or low-pressure spray (50 psi maximum), apply the diluted solution freely.
3. Let diluted cleaning solution stay on the wall for 1 - 3 minutes. Don't let cleaner dry into the masonry. This may leave residue and stains. Fresh water rinse the surfaces below areas being cleaned to prevent streaking.
4. Immediately reapply diluted cleaning solution and scrape off heavy buildup of excess mortar using a wooden scraper or piece of brick. Take care not to harm the masonry surface.
5. Rinse thoroughly with fresh water, removing all cleaning compound, free sand, loose material and debris. 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. Reapply as required following steps 1 through 5.

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2. Thoroughly prewet a large area with fresh water.
3. Using a densely-packed, soft-fibered masonry washing brush, or low-pressure spray (50 psi maximum), apply the diluted solution freely.
4. Let diluted cleaning solution stay on the wall for 3 to 5 minutes. Do not let cleaner dry into the masonry. This may leave residue or stains.
5. Reapply diluted cleaning solution and scrape off heavy buildup of excess mortar using a wooden scraper or piece of brick. Take care not to harm the masonry surface.

6. Rinse off all cleaning compounds, free sand, loose material and debris 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.

7. Reapply as needed following steps 1-5.

C. Restoration Cleaners:

SK Light Duty Restoration Cleaner

1. Wet thoroughly the area to be cleaned.
2. Use in concentrate.
3. Apply cleaning solution liberally.
4. Allow dwell time of 5 to 15 minutes.
5. Do not allow cleaning solution to dry on masonry.
6. Rinse using low pressure water flood rinse to remove initial acidic residue.
7. Rinse thoroughly using pressure water spray to assure all surface staining and cleaning residues are completely flushed from the treated surface.

SK Restoration Cleaner

1. Wet area to be cleaned
2. Dilute to appropriate concentration
3. Apply cleaning solution liberally
4. Allow dwell time of 3-5 minutes.
5. Reapply before first application dries out.
6. Apply light scrubbing action
7. Rinse using low pressure water flood rinse to remove initial acidic residue.
8. Rinse thoroughly using pressure water spray to assure all surface staining and cleaning residues are completely flushed from the treated surface.

EK Restoration Cleaner

1. Wet thoroughly the area to be cleaned.
2. Use in concentrate.
3. Apply cleaning solution liberally with a brush or roller.
4. Allow dwell time of 10-20 minutes.
5. Do not allow cleaning solution to dry on masonry.
6. Light scrubbing will improve performance.
7. Rinse using low pressure water flood rinse to remove initial acidic residue.
8. Rinse thoroughly using pressure water spray to assure all surface staining and cleaning residues are completely flushed from the treated surface.

BioWash

1. Working from bottom to top, apply generously to dry surface until surface is thoroughly wet.
2. Leave on the surface for 2-3 minutes. If needed, apply more to keep the surface wet.
3. Mist treated surfaces with water and gently scrub with a non-metallic, short-fibered scrub brush to loosen biological soiling.
4. Working from bottom to top, rinse thoroughly with clean water. Pressure rinsing is highly effective at removing all product and biological soiling from surfaces. Reduce rinsing pressure as needed for fragile or deteriorated stone. Severely deteriorated stone may require consolidation prior to cleaning. 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. If used on food-contact surfaces (such as, but not limited to picnic benches or bench-table combos, food-stand counters, eating-or food-preparation surfaces, etc.) a potable water rinse must follow cleaning.

Note: It may take several days for the full cleaning effect to be realized. When practical, allow two or more weeks for biological soiling to disappear. Repeat as necessary to remove remaining biological soiling.

### **3.2 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 raked-out 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 Resident Engineer 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.

### **3.4 MASONRY PATCHING**

#### **A. Protection / Site Conditions for Restoration Mortar:**

1. Cold Weather Requirements: Do not work in temperatures below 40° F, when the substrate is colder than 40° F, or when the temperature is expected to fall below 40° F for 48 hours after installation of repair mortars.
2. Hot Weather Requirements: Protect repair mortar from direct sunlight and wind. Do not use or prepare mortar when ambient air temperature is above 90° F.

#### **B. Preparation for Repairs**

1. Remove all loose mortar and masonry prior to installation of the repair mortar. "Sound" masonry with a hammer to verify its integrity. If necessary, cut away an additional 1/2" of the substrate to ensure the surface to be repaired is solid and stable. Remove any sealant residue.
  2. Cut the edges of the repair area to provide a minimum depth of 1/4". The edges of the repair should be square cut. Do not allow any feathered edges in the repair area.
  3. Clean all dust from surface and pores of the substrate, using clean water and a scrub brush.
  4. For very dry or porous surfaces, pre-wet the substrate ahead of time to prevent the substrate from drawing moisture out of the repair too quickly. Re-wet the surface immediately before applying the repair material.
- C. Mixing Mortar and Application of Repair Material
1. Mix per Manufacturer's Recommendations.
  2. Apply the mortar mix using a trowel in a series lifts with no waiting period or scratch coat necessary between layers, up to a total maximum thickness of 3". If applied in layers, scrape off any cement skin that has formed and continue application. Dampen the surface before applying the next layer. Work mortar firmly into the surface of the masonry, including the corners, and under and around all mechanical anchors.
  3. Build up repair material so that it is slightly above the adjacent masonry surface. Allow mortar 15 to 30 minutes to set slightly (wait time will vary with temperature and humidity—longer in cool weather), then scrape off excess material using a straight edge (a plasterer's miter rod is good for this). Do not press down or "float" the repair. Where repairs occur at panel edges or corners, form mortar to match the profile of the surrounding masonry. In all cases, finish repair so that it is as indistinguishable as possible from the adjacent masonry.
  4. Clean any mortar residues from area surrounding the repair by sponging as many times as necessary with clean water. This should be done before repair material sets. Repeat several times with clean water to prevent a halo effect (staining of adjacent masonry). Cured mortar may only be removed chemically or mechanically.
- D. Curing Procedure
1. Lightly mist the repair with water to wet the entire surface of the finished repair approximately 30 minutes to 1 hour after completion on hot sunny days, and approximately 2 hours or longer, on cool or cloudy days. Time will vary with temperature and humidity. Mist several times a day on the three days following the repair installation. Never cover repairs with plastic immediately after finishing—the water in the repair will be trapped on the surface, causing it to lighten.

### 3.5 MASONRY SEALING

- A. Protection: mask windows and window frames as sealer is being applied.
- C. Do not apply sealer in windy when air temperature is above 95 degrees F
- D. Test each surface to be covered. Wet each surface with as a test to determine suitability and results. Wet surfaces without creating drip or rundowns.
- E. 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.
- F. Treated surfaces are dry too tough in one hour and protect from rain for six hours following application.

### 3.6 FINAL CLEANING

- A. Clean site of all unused chemicals, products, residues, rinse water, wastes and effluents – all in accordance with environmental regulations.
- B. Remove and dispose of all materials used to protect surrounding areas and nonmasonry surfaces, following completion of the work defined herein.

--- E N D ---