

Part II
Division 4
Masonry

SECTION 04 01 00

MAINTENANCE OF MASONRY

1 PART 1 GENERAL

1.1 SUMMARY

- A. Section includes water and chemical cleaning of brick masonry surfaces; replacement of brick units; repointing mortar joints; and repair of damaged masonry.
- B. Related Sections:
 - 1. All Division 4 Specification Sections.
 - 2. Section 07 90 00 - Joint Sealers.

1.2 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 530 - Building Code Requirements for Masonry Structures.
 - 2. ACI 530.1 - Specifications for Masonry Structures.
 - 3. National Park Service, Technical Preservation Services, Preservation Brief 1 – Assessing Cleaning and Water-Repellent Treatments for Historic Masonry Buildings.
 - 4. National Park Service, Technical Preservation Services, Preservation Brief 2 – Repointing Mortar Joints in Historic Masonry Buildings.

1.3 SUBMITTALS

- A. Section 01001 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on cleaning compounds, cleaning solutions, and mortar mixes.
- C. Samples: Submit four samples of face brick units to illustrate color, texture, and extremes of color range to match existing.
- D. Manufacturer's Installation Instructions: Submit installation procedures for products selected for use, manufacturer's installation instructions, perimeter conditions requiring special attention.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 530 and ACI 530.1 requirements.
- B. Maintain one copy of each document on site.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

- B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.6 MOCKUP

- A. Section 01 00 00 - Quality Requirements: Mockup requirements.
- B. Restore and repoint a sample concealed portion of masonry wall, 4 feet long by 2 feet high, including mortar and accessories, wall openings, flashings.
- C. Clean a wall panel, 10 x 10 ft to determine extent of cleaning, cleaning methods and cleaning products.
- D. Repeat, using different cleaning methods up to three different panels, until acceptable.
- E. Locate where directed by owner.
- F. Acceptable panel illustrating results of restoration and cleaning will become standard for work of this section.

1.7 PRE-INSTALLATION MEETINGS

- A. Section 01 00 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 00 00 - Product Requirements : Product storage and handling requirements.
- B. Deliver masonry neatly stacked and tied on pallets. Store clear of ground with adequate waterproof covering.
- C. Store restoration cleaner materials in manufacturer's packaging.
- D. Store mortar ingredients in manufacturer's packaging, or when delivered loose, with adequate weatherproof covering.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 00 01 - Product Requirements.
- B. Cold Weather Requirements: In accordance with ACI 530.1 when ambient temperature or temperature of masonry units is less than 40 degrees F (4 degrees C).
- C. Hot Weather Requirements: In accordance with ACI 530.1 when ambient temperature is greater than 100 degrees F (38 degrees C) or ambient temperature is greater than 90 degrees F (32 degrees C) with wind velocity greater than 8 mph (13 km/h).

1.10 SEQUENCING

- A. Section 01 00 00 – Basic Requirements.
- B. Perform repointing before cleaning masonry surfaces.

2 PART 2 PRODUCTS

2.1 MASONRY RESTORATION AND CLEANING

A. Manufacturers:

1. ProSoCo Inc; Sure Klean Light Duty Restoration Cleaner.
2. Substitutions: Equals permitted with approval of architect and Maine State Historical Preservation Commission.

2.2 COMPONENTS

- A. Cleaning Agent: Acid solution type.
- B. Mortar and Grout Materials: Conform to requirements of Section 04 10 00, and TPS Preservation Brief 2.
- C. Clay Brick: Red range brick to match existing.

3 PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 00 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify surfaces to be cleaned or restored are ready for work of this section.

3.2 PREPARATION

- A. Protect elements surrounding work of this section from damage or disfiguration.
- B. Immediately remove stains, efflorescence, or other excess resulting from work of this section.
- C. Protect roof membrane and flashings from damage.
- D. Carefully remove and store fixtures, fittings, finishing hardware, and accessories.
- E. Close off, seal, mask, and protect landscaping, materials, and surfaces not receiving work of this section to protect from damage.
- F. Construct dust proof and weatherproof partitions to close off occupied areas.

3.3 INSTALLATION

A. Rebuilding:

1. Cut out damaged and deteriorated masonry with care in manner to prevent damage to adjacent remaining materials.
2. Support structure in advance of cutting out units to maintain stability of remaining materials.
3. Cut away loose or unsound adjoining masonry as directed by Architect/Engineer to provide firm and solid bearing for new work.

4. Build in new and reclaimed units following procedures for new work specified in Section 04 20 00.
5. Mortar Mix: Colored and proportioned to match existing work. [
6. Ensure anchors, ties, reinforcing, and flashings are correctly located and built in.
7. Install built in masonry work to match and align with existing, with joints and coursing true and level, faces plumb and in line. Build in openings, accessories and fittings.

B. Repointing:

1. Cut out loose or disintegrated mortar in joints to minimum 1/2 inch depth or until sound mortar is reached.
2. Utilize hand tools, or power tools only after test cuts determine no damage to masonry units results.
3. Do not damage masonry units.
4. When cutting is complete, remove dust and loose material with water jet.
5. Premoisten joint and apply mortar specified in Section 04 05 03. Pack tightly in maximum 1/4 inch layers. Form smooth, compact concave joint to match existing.
6. Moist cure for 72 hours.

C. Cleaning New Masonry:

1. Verify mortar is fully set and cured.
2. Carefully clean surfaces and remove large particles with wood scrapers, brass or nylon wire brushes.
3. Use acid solution mixed with water. Apply acid solution and scrub brick masonry with stiff fiber brushes. Do not scrub mortar joints.
4. Protect area below cleaning operation and keep brick type masonry soaked with water and flushed free of acid and dissolved mortar continuously for duration of cleaning.
5. Before solution dries, rinse and remove acid solution and dissolved mortar, using clean, pressurized water.

D. Restoration Cleaning:

1. Carefully clean surfaces and remove large particles with wood scrapers or non-ferrous wire brush.
2. Spray coat brick type masonry with acid type restoration cleaner, mixed into solution identical to solution required for sample area as per manufacturers recommendation.
3. Provide second application when required by preliminary test of sample area.
4. Allow sufficient time for solution to remain on masonry and agitate with soft fiber brush or sponge.
5. Rinse from bottom up with potable water applied at 400 psi and at rate of 4 gal/min.
6. Take care not to over clean masonry surfaces.

3.4 CLEANING

- A. Section 01001 - Execution and Closeout Requirements: Final cleaning.
- B. As work proceeds and on completion, remove excess mortar, smears, and droppings.
- C. Clean surrounding surfaces.

...END OF SECTION

SECTION 04 05 00

MORTAR AND MASONRY GROUT

1 PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract including General and Supplementary Conditions and Division 1 and Division 4 specification sections apply to Work of this section.

1.2 SECTION INCLUDES

- A. Mortar and grout for masonry.

1.3 SUBMITTALS

- A. Samples: Submit two samples of mortar, illustrating mortar color and color range.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 530 and ACI 530.1.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Cold Weather Requirements: IMIAC - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.
- B. Hot Weather Requirements: IMIAC - Recommended Practices and Guide Specifications for Hot Weather Masonry Construction.

2 PART 2 PRODUCTS

2.1 MATERIALS

- A. Portland Cement: ASTM C150, Type I, color as selected by architect from full range available to closely match existing masonry mortar.
- B. Mortar Aggregate: ASTM C144, standard masonry type.
- C. New Construction Locations: Hydrated Lime: ASTM C207, Type S.
- D. Repointing Locations: Hydrated Lime: ASTM C207, Type N.
- E. Grout Aggregate: ASTM C404.
- F. Water: Clean and potable.
- G. Bonding Agent: Epoxy type.

2.2 MORTAR MIXES

- A. Mortar for Load Bearing Walls and Partitions: ASTM C270, Type S using the Property Method.

2.3 MORTAR MIXING

- A. Thoroughly mix mortar ingredients in quantities needed for immediate use in accordance with ASTM C270 C780.
- B. Add mortar color and admixtures in accordance with manufacturer's instructions.
- C. Do not use anti-freeze compounds to lower the freezing point of mortar.

3 PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Apply bonding agent to existing concrete surfaces.

3.2 INSTALLATION

- A. Install mortar in accordance with ASTM C780.
- B. Work grout into masonry cores and cavities to eliminate voids. Do not displace reinforcement.

3.3 SCHEDULES

- A. Masonry Chimneys: Type S mortar with Type N pointing mortar.

...END OF SECTION

SECTION 04 20 00
CONCRETE UNIT MASONRY

1 PART 1 GENERAL

1.1 SUMMARY

- A. Section includes face concrete masonry units, structural concrete masonry units and reinforcement, anchorage, and accessories.
- B. Allowances: Not used.

1.2 SUBMITTALS

- A. Product Data: Submit concrete masonry units and fabricated wire reinforcement, wall ties, anchors and other accessories.
- B. Samples: Submit four samples of face concrete masonry units to illustrate color, texture and extremes of color range.

1.3 QUALITY ASSURANCE

- A. Perform Work in accordance with MSJC Code (ACI 530/ASCE 5/TMS 402) and MSJC Specification (ACI 530.1/ASCE 6/TMS 602).
- B. Maintain one copy of each document on site.

1.4 ENVIRONMENTAL REQUIREMENTS

- A. Hot and Cold Weather Requirements: MSJC Specification.

2 PART 2 PRODUCTS

2.1 CONCRETE MASONRY UNIT ASSEMBLIES

- A. Manufacturers: Concrete Masonry Units
 - 1. Genest Concrete Works, Inc.
 - 2. Gagne and Son Concrete Block, Inc.
 - 3. Trenwyth Industries, Inc.
 - 4. Substitutions: Permitted.

2.2 COMPONENTS

- A. Decorative solid load-bearing concrete masonry units, ASTM C90-05, smooth face, type 1 – Moisture Controlled, normal weight, with integral color as indicated Series 4001SC-SM by Gagne & Sons or equal, color G&S -7G:

1. 8x16x4 inches single score 1 face only (exterior fence columns)
 2. 8x16x12 inches single score 2 faces (exterior fence wall)
- B. Hollow Load Bearing Concrete Masonry Units: ASTM C90, Type I - Moisture Controlled; normal weight.
- C. Solid Load-Bearing Concrete Masonry Units: ASTM C90, Type I - Moisture Controlled; normal weight.
- D. Hollow, Solid Non-Load Bearing Concrete Masonry Units: ASTM C129, Type I - Moisture Controlled; normal weight.
- E. Concrete Brick Units: same Grade, Type, and Weight as block units.
- F. Concrete Masonry Unit Size and Shape: Nominal modular size of 8x16x8 inches, 12x8x12 inches, or 8x16x4 inches, as indicated. Furnish special units for 90 degree corners, bond beams, lintels, and bullnosed corners.
- G. Precast Concrete Column Caps: Size as indicated on drawings, color from full available range as selected by architect. Refer to Specification 03 45 00 - PRECAST CONCRETE PRODUCTS.

2.3 ACCESSORIES

- A. Single Wythe Joint Reinforcement: Truss type; ASTM A 580 stainless steel wire, 3/16 inch side rods with 9 ga. cross ties.
1. Hohmann & Barnard "Lox-All Truss-Mesh", or equal.
- B. Multiple Wythe Joint Reinforcement: Truss type; with moisture drip; adjustable type, ASTM A 580 stainless steel wire, 3/16 inch side rods with 9 ga. cross ties.
1. Hohmann & Barnard "Cavity Truss Twin-Mesh", or equal.
- C. Reinforcing Steel: ASTM A615/A615M, 60 ksi yield grade, deformed billet bars, galvanized finish at exterior walls, uncoated finish at interior construction.
- D. Strap Anchors: bent steel shape, 8x2 inch size x 1/8 inch thick, hot dip galvanized to ASTM A153/A153M B2 finish.
- F. Mortar and Grout: As specified in Section 04 05 16.
- G. Copper/Kraft Paper Flashings: 5 oz/sq ft rolled sheet copper bonded to fiber reinforced asphalt treated Kraft paper.
- H. Lead Coated Copper Flashings: 16 oz lead coated copper, hemmed edge.
- H. Lap Sealant: Butyl type as specified in Section 07 90 00.
- I. Preformed Control Joints Neoprene material. Furnish with corner and tee accessories, cement fused joints.
- J. Joint Filler: Closed cell polyethylene; oversized 50 percent to joint width; self expanding.

- K. Building Paper: ASTM D226, No. 30 asphalt saturated felt.
- L. Weeps: Preformed polypropylene 'maze' cells, hollow.
 - 1. Hohmann & Barnard "Quadro-Vent", or equal.
- M. Cavity Protection: Preformed HDPE or nylon mesh, 90 % open to allow passage of water and prevent mortar clogging of cavity.
 - 1. Hohmann & Barnard "Mortar Net", or equal.
- N. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials, recommended by masonry unit manufacturer.
 - 1. PROSOCO "Sure-Klean Restoration Cleaner", or equal.

3 PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify field conditions are acceptable and are ready to receive Work.

3.2 PREPARATION

- A. Coordinate placement of anchors supplied by other sections.

3.3 INSTALLATION

- A. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- B. Coursing of Concrete Masonry Units:
 - 1. Bond: Running.
 - 2. Coursing: One unit and one mortar joint to equal 8 inches.
 - 3. Mortar Joints: Concave.
- D. Cut mortar joints flush where ceramic or quarry wall tile is scheduled, cement parging is required, resilient base is scheduled, cavity insulation vapor barrier adhesive is applied, or bituminous dampproofing is applied.
- E. Placing and Bonding:
 - 1. Isolate masonry partitions from vertical structural framing members with movement joint as indicated on Drawings.
 - 2. Isolate top of masonry from horizontal structural framing members and slabs or decks with compressible joint filler.
- F. Weeps and Vents: Install weeps and vents in outer wythe at 24 inches oc horizontally above through-wall flashing, above shelf angles and lintels, at bottom of walls.

- G. Cavity Wall: Do not permit mortar to drop or accumulate into cavity air space or to plug weep holes. Build inner wythe ahead of outer wythe to receive cavity insulation air/vapor barrier adhesive.
- H. Joint Reinforcement and Anchorage - Single Wythe Masonry:
1. Install horizontal joint reinforcement 16 inches oc. Place joint reinforcement continuous in first and second joint below top of walls.
 2. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- I. Joint Reinforcement and Anchorage - Masonry Veneer:
1. Install horizontal joint reinforcement 16 inches oc vertically. Place joint reinforcement continuous in first and second joint below top of walls.
 2. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
 3. Masonry Backing: Embed wall ties for bonding veneer at maximum 16 inches oc vertically and 24 inches oc horizontally.
 4. Stud Framed Backing: Secure wall ties and embed into masonry veneer at maximum 24 inches oc horizontally and 16 inches oc vertically at interior zones, and 16 inches horizontally and 16 inches vertically at corner zones, as indicated on structural drawings..
- J. Joint Reinforcement and Anchorages - Multiple Wythe Unit Masonry:
1. Install horizontal joint reinforcement 16 inches oc. Place joint reinforcement continuous in first and second joint below top of walls.
 2. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- K. Masonry Flashings:
1. Extend flashings horizontally through outer wythe at foundation walls, above ledge or shelf angles and lintels, at bottom of walls and turn down on outside face to form drip.
 2. Turn flashing up minimum 8 inches and bed into mortar joint of masonry, seal to sheathing over wood framed back-up.
 3. Lap end joints and seal watertight.
 4. Turn flashing, fold, and seal at corners, bends, and interruptions.
- L. Lintels:
1. Install loose steel or masonry lintels over openings as indicated.
 2. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled or indicated.
 3. Maintain minimum 8 inch bearing on each side of opening.
- M. Grouted Components:
1. Reinforce bond beam and pilasters as detailed.
 2. Support and secure reinforcing bars from displacement.
 3. Place and consolidate grout fill without displacing reinforcing.

4. At bearing locations, fill masonry cores with grout for minimum 12 inches both sides of opening.

N. Control and Expansion Joints:

1. Do not continue horizontal joint reinforcement through control and expansion joints.
2. Install preformed control joint device in continuous lengths. Seal butt and corner joints.
3. Size control joint in accordance with Section 07900 for sealant performance.
4. Form expansion joint as detailed.

O. Built-In Work:

1. As work progresses, install built-in metal door and glazed frames, fabricated metal frames, anchor bolts, plates and other items to be built in the work furnished by other sections.
2. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout or mortar. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.

O. Cutting And Fitting:

1. Cut and fit for chases, pipes, conduit, sleeves, and grounds. Coordinate with other sections of work to provide correct size, shape, and location.

P. Parging:

1. Dampen masonry walls prior to parging.
2. Parge masonry walls in two uniform coats of mortar to total thickness of 3/4 inch.

Q. CLEANING

1. Remove excess mortar and mortar smears as work progresses.
2. Clean soiled surfaces with cleaning solution.

R. TOLERANCES

1. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
2. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.

...END OF SECTION

