

SECTION 04 01 05 - MASONRY RESTORATION AND CLEANING**PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes cleaning of existing masonry surfaces; replacement of damaged brick units with new brick and recovered brick; repointing existing mortar joints; reanchoring brick veneer.
 - 1. Refer to drawings for locations.
- B. One hundred percent of exposed existing exterior masonry, including cast stone, shall be cleaned under the Work of this Project.

1.2 SUBMITTALS

- A. Product Data:
 - 1. Submit data on cleaning compounds and cleaning solutions.
 - 2. 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 four samples of face brick, units to illustrate color, texture, and extremes of color range to match existing.
- C. Representative of the cleaning agent manufacturer and restoration subcontractor shall visit the site and submit a written restoration plan and restorer's step-by-step written instructions tailored specifically for this Project.
 - 1. Submit written plan of procedures and materials to be used in complying with this Section, including written description of cleaning methods, spray working pressures, materials and equipment proposed for use in cleaning each type of masonry.
 - 2. Elaborate on methods to be used to assure safety of building occupants and visitors to site; disposal plan including location of approved disposal site; and detailed description of methods to be employed to control pollution.
- D. Submit letters to authenticate installer's required experience.

1.3 QUALITY ASSURANCE

- A. Performance Requirements:
 - 1. Perform Work in accordance with MSJC Code and MSJC Specification.
 - 2. Maintain one copy of each document on site.
- B. Qualifications:
 - 1. Manufacturer:
 - a. Company specializing in manufacturing products specified in this Section with minimum five years experience.
 - b. Manufacturer capable of providing field service representation during construction and approving application method(s).
 - 2. Installer: Company specializing in performing Work of this Section with minimum five years documented experience.
- C. Mockup:
 - 1. Restore and repoint a masonry wall, 8 feet long by 6 feet high, including mortar and accessories.

2. Clean a wall panel, 10 x 10 feet to determine extent of cleaning, cleaning methods and cleaning products.
 - a. Repeat, using same or different cleaning methods up to three different panels, until acceptable.
3. Location(s) shall be as directed by Architect.
 - a. Allow waiting period of not less than seven calendar days after completion of each sample cleaning to permit study of sample areas for negative reactions.
 - b. Written approval shall be obtained from the Architect on cleaning methods, spray working pressures, materials, equipment used, pre-soaking durations and mock-up areas before proceeding with general cleaning operations.
4. Acceptable panels illustrating results of restoration and cleaning will become standard for Work of this Section.

D. Pre-Installation Conference:

1. Convene minimum one week prior to commencing Work of this Section.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver masonry neatly stacked and tied on pallets; store clear of ground with adequate waterproof covering.
- B. Store restoration cleaner materials in manufacturer's packaging; keep containers tightly closed and away from open flames.
- C. Store mortar ingredients in manufacturer's packaging, or when delivered loose, with adequate weatherproof covering.
- D. Comply with manufacturer's recommendations for minimum and maximum temperature requirements for storage.

1.5 PROJECT CONDITIONS

- A. Environmental Requirements - Rebuilding Materials:
 1. Hot and Cold Weather Requirements: MSJC Specification.
- B. Environmental Requirements - Cleaning Operations:
 1. Do not apply at surface and air temperatures below 40 degrees F or above 95 degrees F unless otherwise indicated by manufacturer's written instructions.
 2. Do not apply when surface and air temperatures are not expected to remain above 40 degrees F for a minimum of eight hours after application, unless otherwise indicated by manufacturer's written instructions.
 3. Do not apply under windy conditions, which would cause cleaning products or protective treatments to be blown onto adjacent unprotected surfaces.
 4. Do not apply to frozen substrate; allow adequate time for substrate to thaw, if freezing conditions exist before application.
 5. Do not apply consolidation or protective treatments earlier than 24 hours after rain or if rain is predicted for a period of 6 hours after application, unless otherwise indicated by manufacturer's written instructions.
- C. Dispose of run-off from cleaning operations by legal means and in a manner which prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.

1.6 SEQUENCING

- A. Provide masonry restoration and cleaning materials and other construction in ample time to complete Work in a timely manner.
- B. Perform repointing before cleaning masonry surfaces.

PART 2 PRODUCTS

2.1 MASONRY RESTORATION AND CLEANING

- A. Cleaner Manufacturers:
 - 1. PROSOCO, Inc.
 - 2. Diedrich Chemicals Restoration Technology.

2.2 COMPONENTS - EXTERIOR RESTORATION AND CLEANING

- A. Restoration Cleaner - Brickwork: Clear liquid; 1.050 specific gravity; no flash point; 3.0 pH (at 1.5 dilution); 8.75 lbs. wt./gal.
 - 1. Basis-of-Design: Sure Klean Restoration Cleaner or Sure Klean Heavy Duty Restoration Cleaner by PROSOCO, Inc.; cleaner to be used in various locations shall be determined by mockups.
- B. Restoration Cleaner - Cast Stone: Clear liquid; 1.12 specific gravity; no flash point; 1.5-2.0 pH.
 - 1. Basis-of-Design: Sure Klean Light Duty Restoration Cleaner by PROSOCO, Inc.
- C. Water for Cleaning: Clean, potable, free of oils, acids, alkalis, salts and organic matter.
- D. Brushes: Fiber bristle only.
- E. Mortar and Grout Materials: ASTM C270.
 - 1. Mortar strength shall not exceed strength in existing masonry construction.
 - 2. Tuck pointing mortar shall not be denser than original mortar; tuck pointing mortar shall be prehydrated.
 - 3. Color match to existing mortar.
- F. Brick:
 - 1. Recovered cleaned brick from areas of selective demolition.
 - 2. New Brick: To match existing in color, size and texture; to be accepted by Architect as match.

2.3 MASONRY VENEER REPAIR ANCHORS

- A. Masonry Repair Anchors, Expansion Type: Mechanical fasteners designed for masonry veneer stabilization consisting of 1/4-inch diameter, Type 304 stainless-steel rod with brass expanding shells at each end and water-shedding washer in the middle. Expanding shells shall be designed to provide positive mechanical anchorage to veneer on one end and backup masonry on the other.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. BLOK-LOK Limited; Torq-Lok.
 - b. Hohmann & Barnard, Inc.; #521RA-B Restoration Anchor.

PART 3 EXECUTION

3.1 PREPARATION

- A. Verify surfaces to be cleaned and restored are ready for Work of this Section.
 - 1. Clean substrates of substances that interfere with penetration or performance of surface treatments.
 - 2. Test for moisture content and pH level, according to manufacturer's instructions, to ensure surface is prepared and dry to receive surface treatments.
- B. Protect elements surrounding Work of this Section from damage or disfiguration.
- C. Immediately remove stains, efflorescence, or other excess resulting from Work of this Section.
- D. Protect roof membrane and flashings from damage; lay 1/2 inch plywood on roof surfaces over full extent of work area and traffic route.
- E. Protection:
 - 1. Close off, seal, mask and board up areas, landscaping, materials and surfaces not receiving Work of this Section to protect from damage.
 - 2. Protect persons and motor vehicles surrounding building whose masonry surfaces are being restored and surrounding buildings from injury resulting from masonry restoration Work.
 - 3. Protect glass, unpainted metal trim and polished stone from contact with acidic 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.
 - 4. Protect unpainted metal from contact with alkali chemical cleaners by covering them either with liquid strippable masking agent or polyethylene film and waterproof masking tape.
- F. Construct dust proof and weatherproof partitions to close off occupied areas.

3.2 INSTALLATION

- A. Rebuilding:
 - 1. Cut out damaged, spalled and deteriorated masonry with care in manner to prevent damage to adjacent remaining materials; cut off full units from joint to joint and in manner to permit replacement with full size units.
 - 2. Support structure in advance of cutting out units to maintain stability of remaining materials.
 - 3. Cut away loose or unsound adjoining masonry and mortar to provide firm and solid bearing for new Work.
 - 4. Salvage as many whole, undamaged bricks as possible.
 - 5. Remove mortar, loose particles and soil from salvaged brick by cleaning with brushes and water; store brick for reuse.
 - 6. Ensure anchors, ties, reinforcing, and flashing 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.
 - 8. Build in openings, accessories and fittings.
 - 9. Build in new and reclaimed masonry units following procedures for new Work specified in Sections 04 20 00.

10. If cutting is required, use motor driven saw designed to cut masonry with clean, sharp unchipped edges.
 11. Lay replacement brick with completely filled bed, head and collar joints.
 12. Butter ends with sufficient mortar to fill head joints and shove into place.
 13. Wet clay bricks, which have ASTM C67 initial rates of absorption (suction) of more than 30 grams per 30 square inches per minute.
 14. Use wetting methods, which ensure that units are nearly saturated but surface dry when laid.
 15. Maintain joint width for replacement units to match existing.
 16. Tool exposed mortar joints in repaired areas to match joints of surrounding existing brickwork.
- B. Repointing:
1. Cut out loose or disintegrated mortar in joints to depths equal to 2-1/2 times their width, but not less than minimum 1/2 inch depth or until sound mortar is reached.
 2. Utilize power tools only after test cuts determine no damage to masonry units results.
 3. Do not damage masonry units, spall edge of masonry unit or widen joints; replace any masonry units which become damaged at the Contractor's expense.
 4. When cutting is complete, remove dust and loose material by brushing with air jet; brush, vacuum or flush joints to remove dirt and loose debris.
 5. Premoisten joint and apply mortar specified in Section 04 20 00; joint surfaces shall be damp but free of standing water.
 6. 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 inch until a uniform depth is formed; compact each layer thoroughly and allow to become thumb-print-hard before applying next layer.
 7. After joints have been filled to a uniform depth, place remaining pointing material in three layers with each of the 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 thumb-print-hard before applying next layer.
 8. Where existing units have rounded edges, recess final layer slightly from face.
 9. Take care not to spread mortar over edges onto exposed surfaces or to feather edge mortar.
 10. When mortar is thumb-print-hard, tool joints to match original appearance of joints, unless otherwise indicated.
 11. Tuck pointing mortar shall not be denser than original mortar.
 12. Moist cure for 72 hours.
 13. Where repointing Work precedes cleaning of existing masonry and stone, allow mortar to harden not less than 30 days before beginning cleaning Work.
- C. Cleaning Existing Exterior Masonry:
1. Restoration Cleaning:
 - a. Clean surfaces and remove large particles with wood scrapers or non-ferrous wire brush.
 - b. Unless otherwise indicated, dilute chemical cleaning materials with water to produce solutions of concentration indicated but not greater than that recommended by chemical cleaner manufacturer.
 - c. Brush coat brick masonry with restoration cleaner, mixed into solution identical to solution required for sample area.

- d. Provide second application when required by preliminary test of sample area.
 - e. Allow sufficient time for solution to remain on masonry and agitate with soft fiber brush or sponge.
 - f. Rinse from bottom up with potable water applied at 400 to 600 psi and at rate of 4 gallons per minute; older, more delicate masonry may require restricting water pressure to avoid damage.
2. Cleaning New Masonry: Refer to Section 04 20 00.

3.3 REANCHORING VENEERS

- A. Install masonry repair anchors in horizontal mortar joints and according to manufacturer's written instructions. Install at not more than 16 inches o.c. vertically and 16 inches o.c. horizontally unless otherwise indicated. Install at locations to avoid penetrating flashing.
- B. Recess anchors at least 5/8 inch from surface of mortar joint and fill recess with pointing mortar.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Provide manufacturer's field service consisting of product use recommendations and periodic site visit for inspection of product installation in accordance with manufacturer's instructions.
- B. Site Visits: Manufacturer's field service representative shall be required for Pre-installation Meeting, two visits during execution of Work, and for a final inspection of completed Work.

3.5 CLEANING

- A. As Work proceeds and on completion, remove excess mortar, smears, droppings, using stiff nylon bristle brushes and clean water, spray applied at low pressure (40 psi maximum); metal scrapers or brushes shall not be used; acid or alkali cleaning agents shall not be used.
- B. Remove temporary coverings and protection of adjacent work areas.
- C. Clean surrounding surfaces.
- D. Repair or replace damaged or deteriorated surfaces.
- E. Remove construction debris from project site and legally dispose of debris.

END OF SECTION

SECTION 04 20 00 - UNIT MASONRY**PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. Concrete Block.
- B. Concrete Brick.
- C. Clay Facing Brick.
- D. Mortar and Grout.
- E. Reinforcement and Anchorage.
- F. Flashings.
- G. Lintels.
- H. Accessories.

1.2 REFERENCE STANDARDS

- A. ACI 530/530.1/ERTA - Building Code Requirements and Specification for Masonry Structures; American Concrete Institute International.
- B. ASTM A82/A82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- D. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
- E. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
- F. ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
- G. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units.
- H. ASTM C140 - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units.
- I. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar.
- J. ASTM C150 - Standard Specification for Portland Cement.
- K. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes.
- L. ASTM C270 - Standard Specification for Mortar for Unit Masonry.
- M. ASTM C404 - Standard Specification for Aggregates for Masonry Grout.
- N. ASTM C476 - Standard Specification for Grout for Masonry.
- O. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
- P. ASTM C979 - Standard Specification for Pigments for Integrally Colored Concrete.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.

- C. Samples for Verification: For each type and color of the following:
 - 1. Face brick, in the form of straps of five or more bricks.
 - 2. Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project.
- D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.
- E. Shop Drawings:
 - 1. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement." Show elevations of reinforced walls.Fabricated
 - 2. Flashing: Detail inside/outside corner units, sill and head conditions; end-dam conditions; base-of-wall, lintel and low roof-to-wall conditions; and other special applications.
- F. Mix Designs: For each type of mortar and grout.
 - 1. Include description of type and proportions of ingredients.
 - 2. Include test reports, per ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
- G. LEED Report: Accurately document the use of recycled materials and local/regional materials, as required by Section 01 35 14, Section 01 35 15, Section 01 35 16 and appropriate forms, report recycled content for masonry units and reinforcement.
 - 1. Credit MR 5.1 and 5.2:
 - a. Provide product data indicating location of manufacturer and location of extraction/recovery of primary raw materials.
 - b. Include statement indicating cost for each regionally manufactured material.
 - 2. Credit MR 4.1 and 4.2: Product Data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
 - a. Contributions to this Credit include recycled content of fly ash and recycled content of steel reinforcement.
 - b. Requirements: CMU to be manufactured with 10 percent fly ash. Steel reinforcing to have 90 percent recycled content, 60 percent post-consumer recycled content manufactured in Electric Arc Furnace (EAF).
- H. LEED Submittals:
 - 1. Credit EQ 4.1: Product Data highlighting VOC content of cavity wall insulation adhesive.
- I. Coordinate with Construction Waste Management requirements.
- J. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.
- K. Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with hot-weather requirements.
- L. Temporary Bracing Plan:
 - 1. Provide a temporary bracing plan for the information-only of the Architect; plan to be submitted minimum two weeks prior to initiating masonry Work.
 - 2. The bracing plan must be based on the Mason Contractors Association of America's Standard Practice for Bracing Masonry Walls Under Construction, and Masonry Wall Bracing Design Handbook, or another industry recognized standard.

3. Bracing plan must be reviewed by a Professional Structural Engineer licensed in the State of Maryland; Professional Structural Engineer to provide a letter certifying his review of the plan and acknowledgement of its completeness.
4. The bracing plan and Professional Structural Engineer's letter must indicate project conditions unique to any referenced standard and provide for the unique bracing required for those conditions.
5. Maintain one copy of any industry standard referenced within the plan, on project site.

1.4 QUALITY ASSURANCE

- A. Masonry Contractor Qualification:
 1. Engage a trade contractor with at least 10 years experience in masonry construction of type and scope included in the construction documents.
 2. Demonstrate experience by submitting to the Owner a list of at least 10 masonry projects of similar size, complexity and scope.
 3. Submit resumes of all key personnel that will be assigned to the Project; dedicate assigned personnel to the Project for the entire scope of Work.
- B. Comply with provisions of ACI 530/530.1/ERTA, except where exceeded by requirements of the contract documents.
 1. Maintain one copy of each document on project site.
- C. Fire-Resistance Ratings: Where indicated, provide materials identical to those assemblies with fire-resistance ratings conforming to the Standard Method for Determining Fire Resistance of Concrete and Masonry Assemblies, ACI 216.1-97/TMS-0216-07, National Concrete Masonry Association TEK 7-1A, and ASTM E-119, and acceptable to authorities having jurisdiction.
 1. Certification of concrete masonry units for fire ratings must be provided by the National Concrete Masonry Association or qualified independent testing agency.
 2. Provide Letter of Certification for aggregates used in mix design assuring compliance with ASTM C 33 and ASTM C 331.
 3. Provide mix design and determined equivalent thickness, for units incorporating recycled content materials.

1.5 MOCK-UP

- A. Mock-up: Prior to installing unit masonry, construct sample wall panels to verify selections made under sample submittals and to demonstrate aesthetic effects as well as other qualities of materials and execution. Build mockups to comply with the following requirements, using materials for final unit of Work.
 1. Locate mockup on site within 4 weeks of Contract award in location as directed.
 2. List of Material Used in Construction Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to specifically identify exact materials used. Include mix proportions for mortar and grout and source of aggregates.
 3. Build mockup of typical wall.
 - a. Include exterior face brick wall with cast stone trim.
 - b. Include window complying with requirements of Division 8 Section "Aluminum Framed Storefronts" with applicable window lintel detail.
 - c. Seal perimeter of window complying with requirements of Division 7 Section "Joint Sealers."

- d. Include sealant-filled control joints complying with requirements of Division 7 Section "Joint Sealers."
- 4. Build mockup approximately 96 inches long by 96 inches high by full thickness, including face and back-up wythes as well as accessories; build with inside and outside corner.
- 5. Notify the Architect when mock-up is ready for inspection. Remove and replace defective and deficient parts of the wall as identified by the Architect, and replace until such time that all the work is acceptable to the Architect and Owner.
- 6. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - a. Acceptance of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.
 - b. Acceptance of mockups does not constitute approval of deviations from the Contract Documents contained in mockups, unless such deviations are specifically approved by Architect in writing.
 - c. When directed, demolish and remove mockups from Project site.

1.6 PRE-INSTALLATION MEETING

- A. Convene one week before starting work of this section.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
 - 2. Where 1 wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.
 - 3. Verify masonry protection at end of each day; inadequate protection by the trade contractor to be corrected or replaced by the Contractor, for proper protection; costs incurred by the Contractor is not the Owner's responsibility, but may be recovered under agreement with trade contractor.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.

3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold and Hot Weather Requirements: Comply with requirements of ACI 530.1/ASCE 6/TMS 602 or applicable building code, whichever is more stringent.

PART 2 PRODUCTS

2.1 CONCRETE MASONRY UNITS

- A. Concrete Block: Comply with referenced standards and as follows:
1. Size: Standard units with nominal face dimensions of 16 x 8 inches and nominal depths as indicated on the drawings for specific locations.
 2. Special Shapes:
 - a. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 - b. Provide bullnose units for outside corners, unless otherwise indicated.
 - c. Bullnose units are not to be used at areas scheduled to be covered with tile.
 3. Load-Bearing Units: ASTM C90, normal weight.
 4. Recycled Content: Provide units having a minimum fly ash content of 10 percent.
 - a. Provide testing of recycled materials.
 - b. Properly modify the equivalent thickness of fire-rated concrete masonry units, as may be necessary due to the selection and percentage of recycled content materials.
 5. Regional Material: Provide concrete block manufactured and of raw materials extracted and/or recovered within 500 miles of project site.

2.2 BRICK UNITS

- A. Manufacturers:
1. Selections:
 - a. Brick 3: Glen-Gery, Tuscan Series, Sable Brown, Modular
 - b. Brick 2: Belden Brick Company, Ebony Black A, Modular
 - c. Brick 1: Taylor Clay Products, #1-17 Red Ironspot, Modular, Smooth
- B. Facing Brick: ASTM C 216, Type FBS, Grade SW.
1. Size: Modular.
 2. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.
 3. Regional Material: Provide brick manufactured and of raw materials extracted and/or recovered within 500 miles of project site.

2.3 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C150, Type I; custom color as required to produce approved color sample. Basis-of-Design color to be: Flamingo C224 by ESSROC Cement Corp.
- B. Packaged blend of portland cement complying with ASTM C 150, Type II/I or Type III, and hydrated lime.
1. Not more than 0.60 percent alkali.
 2. Hydrated Lime: ASTM C207, Type S.
 3. Mortar Aggregate: ASTM C144.

4. Grout Aggregate: ASTM C404.
- C. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979.
 1. Manufacturers:
 - a. Davis Colors: www.daviscolors.com.
 - b. Lambert Corporation: www.lambertusa.com.
 - c. Solomon Colors: www.solomoncolors.com.
 - d. ESSROC Cement Corp.; Flamingo.
 - e. Lehigh Cement Company.
- D. Admixtures: Permitted for cold- and hot-weather masonry work as permitted by referenced standards; non-chloride types.
- E. Water: Clean and potable.
- F. Integral Liquid Polymeric Water-repellent Mortar Admixture:
 1. Include liquid polymeric admixture to the mortar for exterior decorative block walls at the time of mixing.
 2. Warranty: Integral liquid polymeric water-repellent mortar admixture shall be warranted by admixture manufacturer to be free of defects and to meet manufacturer's published physical and chemical properties.
 3. Installer shall warrant that only mortar containing integral liquid polymeric water-repellent mortar admixture has been used to set decorative block in exterior walls.
 4. Description:
 - a. Integral liquid polymeric admixture, added to mortar during mixing, capable of attaining Class E Rating under ASTM E514.
 - b. When tested in walls containing CMUs with compatible integral liquid polymeric water-repellent CMU admixture, walls shall exhibit no decrease in flexural strength or compressive strength of prisms when compared to "control", under ASTM E72.
 - c. Project Standard: Dry-Block Integral Liquid Polymeric Water-repellent Mortar Admixture as manufactured by Grace Construction Products.

2.4 REINFORCEMENT AND ANCHORAGE

- A. Manufacturers of Joint Reinforcement and Anchors:
 1. AA Wire Products Co.
 2. Dur-O-Wal: www.dur-o-wal.com.
 3. Heckman Building Products, Inc.
 4. Hohmann & Barnard, Inc (including Dur-O-Wal brand): www.h-b.com.
 5. WIRE-BOND: www.wirebond.com.
 6. National Wire Products Industries.
- B. Reinforcing Steel: ASTM A615/A615M Grade 60 (420) deformed billet bars; uncoated.
 1. Provide minimum 90 percent recycled content including 60 percent post-consumer recycled content.
 2. Provide steel manufactured and extracted or recovered within 500 miles of Project Site.
- C. Joint Reinforcement - General:
 1. Provide in lengths of not less than 10 feet.
 2. Provide with prefabricated corner and tee units of same design type, wire thickness and finish as adjoining joint reinforcement.

- D. Single Wythe Joint Reinforcement: Truss type; ASTM A 82/A 82M steel wire, mill galvanized to ASTM A 641/A 641M, Class 3; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.
- E. Multiple Wythe Joint Reinforcement: Ladder type; fabricated with moisture drip; ASTM A 82/A 82M steel wire, hot dip galvanized after fabrication to ASTM A 153/153M, Class B; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.
- F. Adjustable Multiple Wythe Joint Reinforcement: Ladder type with adjustable ties or tabs spaced at 16 in on center and fabricated with moisture drip; ASTM A 82/A 82M steel wire, hot dip galvanized after fabrication to ASTM A 153/153M, Class B; 0.1875 inch side rods with 0.1483 inch cross rods and adjustable components of 0.1875 inch wire; width of components as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from each masonry face.
 - 1. Vertical adjustment: Not less than 2 inches.
- G. Strap Anchors: Bent steel shapes configured as required for specific situations, 1-1/4 in width, 0.105 in thick, lengths as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face, corrugated for embedment in masonry joint, hot dip galvanized to ASTM A 153/A 153M, Class B.
- H. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face.
 - 1. Steel frame: Crimped wire anchors for welding to frame, 0.25 inch thick, with trapezoidal wire ties 0.1875 inch thick, hot dip galvanized to ASTM A 153/A 153M, Class B.
- I. Two-Piece Wall Ties: Formed steel wire, 0.1875 inch thick, adjustable, eye and pintle type, hot dip galvanized to ASTM A 153/A 153M, Class B, sized to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face and to allow vertical adjustment of up to 1-1/4 in.
 - 1. Fabricate to locate eyes 3 inches from face of masonry when installed.
- J. Masonry Veneer Anchors: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:
 - 1. Anchor plates: Designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
 - a. Structural Performance Characteristics: Capable of withstanding a 100-lbf load in both tension and compression without deforming or developing play in excess of 0.05 inch.
 - b. Fabricate sheet metal anchor sections and other sheet metal parts from minimum 14 gage, steel sheet, galvanized after fabrication.
 - 2. Wire ties: Manufacturer's standard shape, 0.1875 inch thick.
 - 3. Vertical adjustment: Not less than 3-1/2 inches.
 - 4. Products:
 - a. Hohmann & Barnard, Inc.; SBRA Anchor.
 - b. Construction Tie Products; CTP Veneer Anchoring System.
 - c. Organic-Polymer-Coated, Steel Drill Screws:

- 1) Dril-Flex; Elco Industries, Inc.
 - 2) Traxx; ITW-Buildex.
- K. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches unless otherwise indicated.
1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.
- L. Reinforcing Bar Positioners:
1. Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells, or as indicated on Drawings. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication. Provide units with either two loops or four loops as needed for number of bars indicated. Provide units at all reinforced walls.
 2. Products:
 - a. Dayton Superior Corporation, Dur-O-Wal Division; D/A 810, D/A 812 or D/A 817.
 - b. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
 - c. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
 - d. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.

2.5 FLASHINGS

- A. Flexible Flashing - CMU Backup: For flashing not exposed to the exterior, refer to specification section 07 21 27 "Enclosed Cavity Foamed Insulation".
- B. Flexible Flashing - Stud Wall Backup: For flashing not exposed to the exterior, use the following, unless otherwise indicated:
1. Surface Adhered Flashing System:
 - a. Basis-of-Design: Hyload Cloaked Flashing System by Hyload.
 2. Surface Adhered Membrane with Rubberized Adhesive:
 - a. Surface adhered membrane to be a composite 40 mil membrane consisting of 25 mils of elastomeric/thermal plastic membrane incorporating DuPont Elvaloy and 15 mils of SBS asphaltic adhesive; 1-1/2 inch sealant compatible drip edge and silicone release sheet added.
 - b. Reinforce with synthetic fibers, calendered into sheet form, rolled and cut to standard widths.
 3. Performance Requirements:
 - a. Elongation: ASTM D412; 225 percent.
 - b. Tensile Strength: ASTM D412; 875 psi.
 - c. Tear Strength: ASTM D624; 270 psi.
 - d. Low Temperature Flexibility: ASTM D146; -25 degrees F Pass.
 - e. Water Absorption: ASTM D471; less than 0.1 percent.
 - f. Color as selected by Architect from manufacturer's range of black, grey, buff or white.
 - g. Compatible with urethane and silicone sealant.
 - h. UV stable.
 4. Pre-Formed Three-Dimensional Shapes:
 - a. System cloaks are pre-formed, three-dimensional flexible units used to detail corners, level changes, stop ends, and special applications.
 - b. Standard type cloaks and special designs to be fabricated as required by the design.
 5. Related Materials:

- a. Two-sided, self-adhering tape used must seal the top of cloaks against the back-up wythe; system adhesive to be used as an alternative.
 - b. Mastic must be used to seal laps, joints, and top terminations.
- C. Flexible Flashing at Stud Wall Backup - Contractor Option: Contractor may select to use the Flex-Flash Flashing System with #T1 Termination Bar by Hohmann & Barnard, Inc., at the Contractor's discretion, instead of the Hyload System without additional cost to the Owner.
 1. Sheet Material: 40 mil membrane with DuPont Elvaloy Kee; pressure sensitive clear adhesive for full bond to backup construction.
 2. Provide system with preformed corners and end dams fabricated by Hohmann & Barnard, Inc.; Elvaloy Kee or stainless steel material.
 3. Termination bar to be predrilled; fastening provided directly at steel framing locations.
 4. Conforms to ASTM D412, ASTM D2240, ASTM D624 Die C, and ASTM G154.
- D. Stainless Steel Drip Plates:
 1. Provide at flexible flashing locations, as indicated.
 2. Material: Minimum 26 gage stainless steel.
 3. Profile:
 - a. Provide with closed hemmed drip edge to extend past face of wall.
 - b. Provide vertical leg extending up backup wall minimum 2 inches.
 - c. Provide pitch in drip plate as indicated on Drawings.
 - d. Provide shop fabricated inside and outside corner.
 - e. At lip brick profiles, match profile with step in drip plate.
 4. Flexible flashing will cover drip plate; cut flush with face of mortar joint.
 5. Provide 1/8 inch thick sealant tape between drip plate and steel structural member.
 6. Bond flexible flashing to drip plate as recommended by flexible flashing manufacturer; product selection to ensure against adhesive drool beyond face of brick.
 7. Backer rod and sealant to be provided under drip edge per Division 7, at locations protecting steel.
- E. Drip Plate Fasteners - CMU Backup: Use low-velocity powder actuated ballistic point fastener with pre-mounted washer; submit ICC-ES Evaluation Report under product data submittals indicating fastener selection appropriate for intended use.
- F. Drip Plate Fasteners - Stud Backup: Corrosion-resistant screws located at every stud line.
- G. Self-adhering Flashing Seam Tape:
 1. Sheet Material: 40 mil membrane with DuPont Elvaloy Kee; pressure sensitive clear adhesive for full bond to stainless steel drip plate and backup construction.
 2. Conforms to ASTM D412, ASTM D2240, ASTM D624 Die C, and ASTM G154.
 3. Basis-of-Design Product: Flex-Flash 8-inch wide roll by Hohmann & Barnard, Inc.

2.6 ACCESSORIES

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
- B. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of air space, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
 1. Mortar Diverter: Panels designed for installation at flashing locations.
 - a. Manufacturers:
 - 1) Mortar Net USA, Ltd; Product Mortar Net: www.mortarnet.com.

- C. Cavity Vents: Cellular insect-resistant vents.
 - 1. Locations: All flashing locations and as shown on the drawings.
 - 2. Manufacturers:
 - a. CavClear/Archovations, Inc: www.cavclear.com.
 - b. Hohmann & Barnard, Inc; Product Quadro-Vent: www.h-b.com.
 - c. Mortar Net USA, Ltd; Product Cell Vent: www.mortarnet.com.
- D. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials, as recommended by brick manufacturer.

2.7 LINTELS

- A. Concrete Lintels: Precast units made from concrete matching concrete masonry units in color, texture, and compressive strength and with reinforcing bars required to support loads indicated. Cure precast lintels by same method used for concrete masonry units.

2.8 MORTAR AND GROUT MIXES

- A. Mortar for Unit Masonry: ASTM C270, using the Property Specification.
 - 1. Masonry below grade and in contact with earth: Type M.
 - 2. Exterior, loadbearing masonry: Type S.
 - 3. Exterior, brick veneer: Type N.
 - 4. Interior, loadbearing masonry: Type N, except reinforced masonry to be Type S.
 - 5. Interior, non-loadbearing masonry: Type O or Type N (Contractor's discretion).
- B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.
- C. Grout: ASTM C476. Consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 COLD AND HOT WEATHER REQUIREMENTS

- A. Comply with requirements of ACI 530/530.1/ERTA or applicable building code, whichever is more stringent.

3.4 INSTALLATION - GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
- D. Do not install cracked, broken or chipped masonry units for any location to be exposed in completed work; do not install cracked, broken or chipped masonry units exceeding ASTM allowances in work to remain concealed or within mechanical or electrical spaces.
- E. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- F. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
 - 1. Mix units from several pallets or cubes as they are placed.
- G. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.
- H. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.
- I. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above, unless otherwise indicated.
 - 1. Install compressible filler in joint between top of partition and underside of structure above.
 - 2. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 07 84 46.

3.5 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- D. Concrete Masonry Units:
 - 1. Bond: Running.
 - 2. Coursing: One unit and one mortar joint to equal 8 inches.
 - 3. Mortar Joints: Concave.
- E. Brick Units:
 - 1. Bond: Running.

2. Mortar Joints: Concave.

3.6 PLACING AND BONDING

- A. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- B. Remove excess mortar and mortar smears as work progresses.
- C. Interlock intersections and external corners.
- D. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- E. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- F. Cut mortar joints flush where wall tile is scheduled, resilient base is scheduled, cavity insulation vapor barrier adhesive is applied, or bitumen dampproofing is applied.
- G. Pointing:
 - 1. During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar.
 - 2. Point joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance.
 - 3. Prepare joints for sealant application, where indicated.
- H. Isolate masonry partitions from vertical structural framing members with a control joint .
- I. Isolate masonry partitions from vertical structural framing members with a control joint and flexible anchors.
- J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.7 CAVITY VENTS

- A. Place cavity vents such as two consecutive vertical joints will include vent followed by a vertical joint without; repeat this placement for full length of application.
- B. Install vents in contact with flashing, full-width of head joint and uninterrupted by mortar.

3.8 CAVITY MORTAR CONTROL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.
- C. Install cavity mortar diverter at base of cavity and at other flashing locations indicated on Drawings and as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

3.9 REINFORCEMENT AND ANCHORAGE - GENERAL

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere.
 - 1. Space reinforcement not more than 16 inches o.c.
 - 2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
 - 3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.
 - a. Reinforcement of this subparagraph 3 is in addition to continuous reinforcement.

- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- F. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches horizontally and 24 inches vertically.
 - 1. Provide an open space not less than 1/2 inch in width between masonry and structural member, unless otherwise indicated.
 - 2. Keep open space free of mortar and other rigid materials.

3.10 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. Install horizontal joint reinforcement 16 inches on center.
- B. Typical: Place masonry joint reinforcement in first and second horizontal joints above and below openings.
 - 1. Extend minimum 16 inches each side of opening.
 - 2. Modify placement where flashing occurs in joint; flashing takes precedent; joint reinforcement location adjusted as accepted by Architect.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches on center vertically and 16 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.
- F. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches on center vertically and 24 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.
- G. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.

3.11 MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
 - 1. Extend flashings full width of openings and at least 4 inches into adjacent masonry at each end; turn up not less than 2 inches to form end dams.
 - 2. Carry flashing across air space behind veneer and up face of backup construction at least 8 inches to form watertight pan; extend flashing into masonry backup minimum 1-3/4 inches; secure flashing at non-masonry construction with termination bar and seal.
 - 3. Remove or cover protrusions or sharp edges that could puncture flashings.
 - 4. Embed flashings in mortar joint; place flashing on sloping bed of fresh mortar and cover with fresh mortar
 - 5. Seal lapped seams of stainless steel drip plates with self-adhering flashing seam tape; stop self-adhering flashing seam tape 3/8 inch of brick face and extend over turned up edge 3 inches onto backup construction; center tape on overlapping edge.

6. Seal lapped ends and penetrations of flashing with adhesive or sealant, as recommended by flashing manufacturer, before covering with mortar.
- B. Lap end joints of flashings at least 6 inches and seal watertight as recommended by flashing manufacturer.
- C. Cut flashing flush with face of mortar joint after masonry construction is complete and inspected.

3.12 LINTELS

- A. Install loose steel lintels over openings.
- B. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.

3.13 GROUTED COMPONENTS

- A. Lap splices minimum 48 bar diameters.
- B. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- C. Place and consolidate grout fill without displacing reinforcing.
- D. At bearing locations, fill masonry cores with grout for a minimum 12 inches either side of opening.

3.14 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
 1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 2. Limit height of vertical grout pours to not more than 48 inches.

3.15 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control and expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

3.16 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames and other items to be built into the work and furnished under other sections.

- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
 - 1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
- D. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.
- E. Do not build into masonry construction organic materials that are subject to deterioration.

3.17 TOLERANCES

- A. Maximum Variation from Alignment of Columns: 1/4 inch.
- B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- F. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.

3.18 CUTTING AND FITTING

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

3.19 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00.
- B. Clay Masonry Unit Tests: Test each variety of clay masonry in accordance with ASTM C67 requirements, sampling 5 randomly chosen units for each 50,000 installed.
- C. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140 for conformance to requirements of this specification.
- D. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.
 - 1. Test three samples for each 5,000 square feet of wall or portion thereof; test one sample at 7 days and two at 28 days for each set.
- E. Test weep holes by pouring a bucket of water in cavity space at appropriate intervals of brick laying; clear weep holes that do not weep water from cavity space, including removal of wall as necessary to provide a proper functioning cavity drainage. Test frequency as necessary to confirm working condition of minimum 75 percent of weep vents. Testing to be witness by a third-party inspector/agency.

3.20 REPAIRING WORK

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units; install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

3.21 CLEANING

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.
- D. Use non-metallic tools in cleaning operations.

3.22 PROTECTION

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION