



SECTION 04 22 00.01

**CONCRETE MASONRY ASSEMBLIES - UNREINFORCED
(SINGLE WYTHE CMU)**

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes the following masonry assemblies:
 - 1. Concrete masonry units (CMU).
 - 2. Decorative concrete masonry units.
 - 3. Mortar and grout.
 - 4. Flashing materials
 - 5. Masonry accessories.

- B. Related Work:
 - 1. Division 1 Section ALLOWANCES for testing and inspection allowances, masonry unit allowances.
 - 2. Division 5 Section METAL FABRICATIONS for steel lintels.
 - 3. Division 7 Section WATER REPELLANTS for field applied water repellants.
 - 4. Division 7 Section JOINT SEALANTS for sealants and backer rods.

1.2 SUBMITTALS

- A. Product Data: for each indicated product.

- B. Samples: for types and colors of masonry units and pigmented mortar.

- C. Material Certificates: for each type of indicated product, include statement of properties, and compliance with these Specifications. Include mix design for mortar and grout.

- D. Masonry Material Cleaning Plan: include products and techniques for cleaning each masonry product of the assembly and the combined masonry assembly. Prior to submission, the plan shall be approved by the Mason Contractor, all Masonry Suppliers, all Masonry Unit Manufacturers and Cleaning Subcontractor.

1.3 QUALITY ASSURANCE

- A. Masonry Inspection: **<Review Quality Assurance Section of Project Manual. Consult ACI 530/ASCE 5/TMS 402, Section 1.14 for Quality Assurance Program requirements, and Tables 1.14.1, 1.14.2, & 1.14.3. Also, review Michigan Building Code, Chapter 17, Section 1704.5 and Tables 1704.5.1 & 1704.5.3. Edit as required. >**
 - 1. Level 3: Full time inspection. **<Essential facilities with engineered design.>**
 - 2. Level 2: Periodic inspection. **<Essential facilities with empirical design/veneers/or glass units; Non-essential facilities with engineered design.>**
 - 3. Level 1: Submission review only. **<Non-essential facilities with empirical design/veneers/or glass units.>**

- B. Comply with ACI 530/ASCE 5/TMS 402 Building Code requirements.

- C. Fire Ratings: Fire rated concrete masonry units shall be in compliance when:
 - 1. The CMU has been certified through the equivalent thickness method contained in Chapter 3 of ACI 216.1.
- D. Mock-Up Panels: Construct mock-up panels for each type of masonry construction of typical walls for Architect's approval. Size shall be no less than 48 inches wide by at least 48 inches high. Include flashing details, reinforcements, weeps, vents, cleaning techniques, etc. Panels shall establish the minimum quality for the project. Panels shall be removed upon approved acceptance of masonry work or if panel is not approved. Panels may be a permanent part of the walls if approved; coordinate locations with Architect.
- E. Temporary Bracing: Comply with Mason Contractors Association of America's Standard Practice for Bracing Masonry Walls Under Construction, and Masonry Wall Bracing Design Handbook, published by the Masonry Contractors Association of America.
- F. Masonry Flashing: Mechanics performing flashing operations shall hold a current certificate from the Masonry Institute of Michigan for completion of their "Flashing Masonry Workshop."
- G. Masonry Cleaning: Mechanics performing cleaning operations shall hold a current certificate from the Masonry Institute of Michigan for completion of their "Cleaning New Masonry Workshop."

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store aggregates on grades such that site drainage will not contaminate aggregate.
- B. Store masonry units, cementitious materials, and accessories on elevated platforms in a dry location. Materials shall be kept covered with waterproof sheeting and secured from the wind. Do not use saturated materials per NCMA TEK Note 3-1B.

1.5 PROJECT CONDITIONS

- A. Cold weather requirements: When ambient temperature is less than 40° F, comply with ACI 530.1/ASCE 6/TMS 602 Specification requirements. Provide specified admixtures only.
- B. Hot weather requirements: When ambient temperature is greater than 90° F, comply with ACI 530.1/ASCE 6/TMS 602 Specification requirements. Provide specified admixtures only.

1.6 MASONRY PRE-CONSTRUCTION CONFERENCE

- A. Masonry Pre-Construction Conference <Edit for GC or CM; Architect or Engineer>
 - 1. The **[General Contractor]** **[Construction Manager]** in conjunction with the **[Architect]** **[Engineer]** shall schedule a Masonry Pre-Construction Conference at the jobsite at approximately 3 weeks prior to start of masonry work at the site.
 - 2. All contractor submissions shall be submitted to the **[Architect]** **[Engineer]** and reviewed prior to this conference.
 - 3. Responsible assigned parties of the participants shall attend the conference. The **[General Contractor]** **[Construction Manager]** shall prepare and issue minutes of the meeting to all parties concerned.
 - 4. Masonry work may not proceed without the Masonry Pre-Construction Conference.
 - 5. Participants, representatives from: <Edit as required. >
 - Owner
 - [Architect]** **[Engineer]**
 - [General Contractor]** **[Construction Manager]**
 - Project Superintendent

Mason Contractor Mason Foreman
Masonry Inspector <See MBC, Ch. 17, Special Inspection>
Testing Laboratory

- B. The following is the agenda for the Masonry Pre-Construction Conference:
1. Review Contract Documents for Mason's clarifications, [Architect's] [Engineer's] intent, and Masonry Inspector responsibilities. <See Project Manual's Section "Quality Assurance">
 - a. [Architect's] [Engineer's] summary for typical/atypical aspects of the Project.
 - b. Locations of shear walls.
 - c. Locations of movement joints.
 - d. Contractor's concern for missing/incomplete details.
 - e. Verify use of up-to-date plans/specifications.
 - f. Contractor's responsibility for temporary wall bracing.
 - g. Installation procedures.
 - h. Coordination issues with other trades.
 - i. Protection of and scheduling of non-masonry construction that will interfere with masonry work.
 - j. Open issues/concerns.
 - k. Job-Site storage and staging areas.
 2. Submittal issues. <NOTE: All of these items supposedly have already been reviewed, approved, or approved as noted. Intent is to only re-hash the submittal items and clarify any areas of confusion.>
 - a. Mortar type, proportions and mix design.
 - 1) Specific locations/applications for different mortars.
 - b. Grout type, proportions and mix design.
 - 1) Specific locations/applications for different grouts.
 - c. Review manufacturer's literature for special requirements and conditions of use.
 - d. Review joint reinforcement and accessories shop drawings.
 - e. Review Vertical and Horizontal Reinforcing Steel shop drawings, splice lengths and bar positioners.
 - f. Lintels, door frames and other 'built-ins' materials status.
 - g. Review shelf angle shop drawings.
 - h. Review flashing details.
 - i. Review certificates of compliance.
 - j. Review each type and size of anchor, tie, and metal accessory.
 - k. Review specific ASTM Standards.
 - l. Review certificate(s) for at least Mason Foreman in "reinforced unit masonry assembly."
 - m. Review the approved masonry material cleaning plan.
 3. Verify material samples that have been reviewed/accepted.
 - a. Color ranges.
 - b. Textures.
 - c. Finishes.
 - d. Dimensions of units.
 - e. Mortar (pigmented).
 4. Review/critique [Mock-up] [Sample] Panel.
 - a. Dimensions.
 - b. Flashings details.
 - c. Joint details.
 - d. Bond pattern(s).
 - e. Mortar dropping procedures.
 - f. Workmanship and detailing.
 - g. Cleaning.
 5. Verify that required pre-construction tests have been performed and are acceptable to the [Architect] [Engineer].
 - a. Mortar tests.

- b. Masonry units.
- c. Prism testing.
- 6. Review contractor's proposed cold and hot weather construction procedures and Project Specification requirements.
- 7. Masonry Inspection: **<Review Quality Assurance Section of Project Manual. <Consult ACI 530/ASCE 5/TMS 402, Section 1.14 for Quality Assurance Program requirements, and Tables 1.14.1, 1.14.2, & 1.14.3. Also, review Michigan Building Code, Chapter 17, Section 1704.5 and Tables 1704.5.1 & 1704.5.3. Edit accordingly>**
 - a. Level 3. Full time inspection. **<Essential facilities with engineered design.>**
 - b. Level 2. Periodic inspection. **<Essential facilities with empirical design/veneers/or glass units; Non-essential facilities with engineered design.>**
 - c. Level 1. Submission review only. **<Non-essential facilities with empirical design/veneers/or glass units.>**
 - d. Review inspection submittal procedures and authority.
- 8. Adjourn.

PART 2 – PRODUCTS

2.1 CONCRETE MASONRY UNITS (CMU)

- A. Concrete Masonry Units: ASTM C 90, lightweight or medium weight. Unit compressive strength shall conform to ASTM C 90.
 - 1. Specified Size: Manufactured to 3/8 inches less than the nominal face of 16 inches long by 8 inches high, width as indicated.
 - 2. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bond beams, and other special conditions as indicated on the Drawings.
- B. Decorative Concrete Masonry Units: ASTM C 90. Unit compressive strength shall conform to ASTM C 90.
 - 1. Specified Size: Manufactured to 3/8 inches less than the nominal face of 16 inches long by 8 inches high, width as indicated.
 - 2. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bond beams, and other special conditions as indicated on the Drawings.
 - 3. Integral Water Repellant: Provide units made with integral water repellant admixture for exposed exterior units. CMU manufacturer shall be certified by water repellant manufacturer to produce water repellant CMU.
 - 4. Integral Color: As selected by Architect from manufacturer's full range.
 - 5. Pattern and Texture for Decorative CMU:
 - a. Standard pattern, smooth finish.
 - b. Standard pattern, split-faced finish.
 - c. Standard pattern, fluted.
 - d. Scored.
 - e. Striated.
 - f. Ground-Face (burnished).
 - g. Pigmented.
- C. Masonry Lintels: Field assembled CMU in color, pattern, size and texture matching adjacent CMU wall, with reinforcing bars as indicated placed and filled with grout, or as otherwise noted.
- D. Precast Lintels: Precast units matching concrete masonry units with reinforcing bars indicated or as required to support loads indicated, ASTM C 1623.

2.2 MORTAR AND GROUT MATERIALS

- A. Cement for mortar shall be as follows **<Select one or more of the following. The properties of Mortar Cement and Portland Cement-Lime mortars allow for taller walls.>**
1. Portland Cement:
 - a. Portland Cement: ASTM C 150, Type I or II, except Type III may be used when temperature is below 40° F during construction. Provide natural or white color cement as required to produce mortar color indicated.
 - b. Hydrated Lime: ASTM C 207, Type S.
 - c. Portland Cement-Lime Mix: Packaged blend of Portland cement and hydrated lime as specified above.
 2. Masonry Cement: ASTM C 91.
 3. Mortar Cement: ASTM C 1329.
- B. Cement for Grout: Portland Cement, ASTM C 150.
- <Delete the following paragraph if no pigmented mortar is specified and natural color mortar is desired>**
- C. Mortar Pigments: Iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortar.
1. Formulate blend as required to produce color **[as selected by Architect] [to match Architect's sample]**
- D. Aggregate for Mortar: ASTM C 144.
- E. Aggregate for Grout: ASTM C 404.
- F. Admixtures: Comply with ASTM C 1384, containing not more than 0.2 percent calcium ions, and as recommended by the manufacturer for use in masonry mortar indicated.
1. Water Repellant Admixture for Mortar: Liquid water repellant mortar admixture intended for use with CMU with integral water repellant. Manufacturer shall be the same as that used for CMU integral water repellant as indicated above.
 2. Admixtures for Grout: As approved by Architect.
- G. Water: Potable, clean and free of deleterious materials.

2.3 REINFORCEMENTS

- A. Reinforcing bars: ASTM A 615/A 615M, Grade 60.
- B. Horizontal Joint Reinforcement: ASTM A 951, hot-dipped galvanized per ASTM A 153, carbon-steel wire for exterior walls. Interior walls may be mill galvanized in lieu of hot-dipped for rooms that are below 75% relative humidity. Provide ladder type.
1. Wire Sizes for Side and Cross Rods: W1.7 or 0.148 inch diameter.
 2. Spacing of Cross Rods: 16 inches on center.
- C. Connector for Intersecting Shear Walls:
1. Rigid Z-strap Anchors: Fabricate from ASTM A 36 steel bars, 1-1/2 inches wide by 1/4 inch thick by 24 inches long with ends turned up 2 inches.
- D. Connectors for Intersecting Non-Shear Walls:
1. Wire Mesh Ties: Fabricate from 1/2 inch by 1/2 inch mesh, 16 gauge, in width 2 inches less than the nominal thickness of the CMU wythe and length not less than 14 inches. Hot dip galvanize per ASTM A 153.

2.4 EMBEDDED FLASHING MATERIALS

- A. Metal Drip Edges: ASTM A 167, Type 304, stainless steel, 0.0156 inches thick.
 - 1. Metal Configuration: Extend at least 3 inches horizontally into wall and 1/2 inch out from exterior face of wall with outer edge bent down 30 degrees and hemmed.
 - 2. Sealant: One part non-skinning butyl sealant conforming to ASTM C 1085.

- B. Flexible Membrane Flashing: For membrane flashing not exposed to the exterior, provide one of the following:
 - 1. Copper-Laminated Flashing: 5 oz/sq. ft. copper bonded with asphalt between 2 layers of glass-fiber cloth.
 - 2. Rubberized-Asphalt Flashing: Composite bonded flashing product of a rubberized-asphalt adhesive compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.040 inch.
 - 3. Elastomeric Thermoplastic Flashing: Composite of rubberized-asphalt adhesive, 0.025 inch thick, bonded to a polyester-reinforced ethylene interpolymer alloy.
 - 4. EPDM Flashing: ASTM D 4637, ethylene-propylene-diene terpolymer, 0.040 inches thick.
 - 5. Adhesives, Primers, and Seam Tapes for Flexible Membrane Flashings: Provide manufacturer's standard products.

- C. Single Wythe Embeddable Flashing System:
 - 1. System of CMU flashing pans and interlocking CMU web bridges made from high-density polyethylene incorporating chemical stabilizers that resist ultra-violet degradation. Flashing pans laid in CMU bed joints have integral weep spouts extending from the center to each pan to the outside face of the CMU to reduce mortar clogging, collect and divert moisture to the exterior. Comply with ASTM E 514.

2.5 MISCELLANEOUS ACCESSORIES

- A. Compressible Filler: Filler strips conforming to ASTM D 1056, Class 2A1, 25% oversized in thickness. Width shall match the masonry wythe minus 1/2 inch.

- B. Preformed Control Joint Gasket: ASTM D 2000, BC810, Designation M2AA-805, or complying with ASTM D 2287, Type PVC-654-4, formed with shear key to fit into sash block ends.

- C. Bond-Breaker Strips: Asphalt saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt). (As typically used in the "Michigan Control Joint")

- D. Grout Retainer: Mesh screen, width of CMU less 1 inch. Use at bottom of horizontal grout cell to retain grout without the use of special shaped CMUs.

- E. Weep/Vent: Provide one of the following products:
 - 1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made of UV-resistant polypropylene copolymer, 3/8 inches wide by 1-1/2 inches high by depth of outer wythe less 1/8 inch. Color to match mortar.
 - 2. Rectangular Plastic Weep/Vent: Clear butyrate, 3/8 inch wide by 1-1/2 inches high by depth of outer wythe less 1/8 inch.
 - 3. Mesh Weep/Vent: Free-draining polyethylene strand mesh, 3/8 inch wide by 1-1/2 inch high by depth of outer wythe less 1/8 inch. Color to match mortar.
 - 4. Partially Open Head Joint.

- F. Cavity Drainage Material: Provide one of the following:
1. Pea Gravel: Clean, hard, durable free-flowing naturally rounded particle of rock, free of clay, silt, and fine particles, with 100% passing a 3/8 inch sieve and not over 5% passing a #8 sieve.
 2. Free-Draining Mesh: Free-draining polyethylene strand mesh designed to catch mortar droppings and prevent weep holes from being clogged.
- G. Insulation: Provide one of the following:
1. Loose Granular Fill Insulation: Provide granular asphalt coated vermiculite loose-fill insulation in accordance with ASTM C 516, Type II or perlite loose-fill insulation in accordance with ASTM C 549, Type II (surface treated for water repellency and limited moisture absorption).
 2. Molded Polystyrene Insulation Insert Units: Expanded Polystyrene Masonry Insulation: Individually molded to fit CMU core profile, 1.0 pounds per cubic foot minimum density and maximum water vapor transmission of 1.4 perm inch, and conforming to ASTM C-578, for width indicated.
- H. Field-Applied Surface Conditioner for Ground-Face (burnished) Concrete Masonry Units: Ground-Face Concrete Masonry Unit manufacturer's recommended surface conditioner, compatible with integral water repellent.
- I. Masonry Cleaners: Proprietary cleaner designed for cleaning masonry and removing mortar/grout stains without damaging masonry diluted per manufacturer's recommendations. Use one of the products below for the appropriate masonry surface unless otherwise recommended by the masonry material manufacturer, and as indicated in the approved Masonry Material Cleaning Plan.
1. Cleaners for architectural concrete masonry units (smooth, split-faced, ribbed):
 - a. Diedrich Technologies, Inc., "202 Vana-Stop."
 - b. ProSoCo, Inc., "Custom Masonry Cleaner."
 2. Cleaners for architectural concrete masonry units (burnished):
 - a. Diedrich Technologies, Inc., "222 Cultured Stone Cleaner."
 - b. ProSoCo, Inc., "Burnished Custom Masonry Cleaner."
 3. Cleaners for concrete brick:
 - a. Diedrich Technologies, Inc., "202 Vana-Stop."
 - b. ProSoCo, Inc., "Custom Masonry Cleaner."

2.6 MORTAR AND GROUT MIXES

- A. General: Specified admixtures may be provided as indicated below. If admixture is used, add at same rate for all exposed mortar to ensure consistent mortar color, regardless of weather. Test for compatibility with other products and assemblies.
- B. Mortar Mix: ASTM C 270, Proportion Specification.
1. Type M or S for masonry below grade or in contact with earth.
 2. Type S for above grade masonry, load or non-load bearing walls and partitions, and all other work.
 3. Admixture: Specified mortar admixtures.
 4. Pigmented Mortar: Use colored cement product or select proportion pigments with other ingredients to produce selected color. Do not add pigments to colored cement products.
 - a. Pigments shall not exceed 5 percent of mortar cement by weight.
- C. Grout Mix: ASTM C 476, slump of 8 to 11 inches measured per ASTM C 143.
1. Provide fine or coarse grout per ACI 530/ASCE 5/TMS 402, Table 1.15.1, Grout Space Requirements, based upon height and CMU cell size.
 2. ASTM C 476 grout mix shall be determined by the following method:
 - a. Table 1 Grout Proportions By Volume.

<Select either the above paragraph or below>

- b. By the specified compressive strength tested in accordance with ASTM C 1019, minimum compressive strength of 2,000 psi.
3. Approved specified admixtures.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Inspect concrete foundations for compliance with tolerances of ACI 117, and shall verify that reinforcing dowels are positioned in accordance with the Drawings.
- B. Foundation and/or Load-Bearing Masonry Wall Discrepancies: <Edit for GC or CM>
 1. Notify the Architect/Engineer, [the General Contractor], [the Construction Manager] in writing of discrepancies.
 2. Do not proceed with masonry work until conditions have been corrected.
 3. Foundation discrepancies affecting the masonry work shall be resolved by the Foundation Contractor and the Mason Contractor (through the [General Contractor] [Construction Manager] without cost to the Owner.

3.2 PREPARATION

- A. Contractor shall prepare the foundation surface for adequate masonry bond.
- B. Do not wet CMUs before placing.
- C. Place steel reinforcement free of mud and other debris in grout spaces prior to grouting.
- D. Provide cleanouts in CMU walls to be grouted when height of constructed wall exceeds 5 feet in height.
- E. Protect non-masonry adjacent surfaces during construction until cleaned as determined in the Masonry Pre-Construction Conference.

3.3 FIELD QUALITY CONTROL

- A. Testing for Mortar Consistency: When required, for mortar consistency, test in accordance with ASTM C 780, Annex A4 Mortar Aggregate Ratio Test Method.
- B. Testing for Grout: When the grout compressive strength is specified, test in accordance with ASTM C 1019.
- C. All Field Technicians sampling, making, and curing specimens for acceptance testing shall be certified by the National Concrete Masonry Association or equivalent.

3.4 PLACEMENT

- A. Place CMUs in running bond pattern unless indicated otherwise.
- B. Construct 3/8 inch (+/- 1/8 inch) mortar bed joints when CMU is compressed onto mortar.
- C. Construct 3/8 inch (-1/4, +3/8 inch) mortar head joints when CMU is shoved into mortar.
- D. Construct full mortar bed joint on foundation. Joints shall not be less than 1/4 inch and not more than 3/4 inch when CMU is compressed onto mortar.

- E. Tool mortar joints to a concave profile when mortar is thumbprint hard.
- F. Remove mortar joint protrusions extending 1/2 inch or more into CMU cells to be grouted.
- G. Place hollow CMU with mortared face shells on head and bed joints.
- H. Mortar bed joints on CMU cross webs where individual CMU cells are to be grouted.
- I. Place solid CMU with full-mortared head and bed joints.
- J. Discard mortar mixed 2-1/2 hours after initial mixing. Retempering of non-colored mortar within the 2-1/2 hours is permitted. Retempering of colored mortar is not permitted.
- K. Where indicated, at integral corners, overlap units 8 inches on alternating courses
- L. Where indicated, at shear wall intersecting walls, provide metal straps at maximum spacing of 4 feet. Grout ends of straps into CMU cells.
- M. Where indicated, at non-shear intersecting walls, provide mesh in joints at 16 inches maximum spacing. Grout mesh into CMU cells.
- N. Install connectors, and other accessories.
 - 1. Embed wall ties 1/2 inch in outer faceshell of hollow units and 1-1/2 inches in solid units.
 - 2. Place connectors in accordance with the sizes, type and locations indicated.
- O. Construct chases as CMUs are placed.
- P. Install and maintain temporary bracing.
- Q. Place CMU materials within the following tolerances:
 - 1. Bed joints and top of bearing walls can vary from level +/- 1/4 inch in 10 feet up to +/- 1/2 inch maximum.
 - 2. Variation from plumb and true to a line may vary from +/- 1/4 inch in 10 feet, +/- 3/8 inch in 20 feet up to +/- 1/2 inch maximum.
 - 3. Alignment of the bottom of the wall to the top may vary +/- 1/2 inch for load-bearing walls and +/- 3/4 inch for non-load-bearing walls.
 - 4. Do not tooth masonry unless specifically permitted in writing.
- R. Install flashing, weep holes and cavity drainage material on clean and undamaged surface. Provide flashing at all locations indicated. Extend flashings to outside face of wall and terminate as indicated. Install weeps immediately on top of flashing. For flexible membrane flashing, form end dams at horizontal terminations of flashing. Lap flexible membrane joints a minimum of 6 inches and seal with compatible material. Install single wythe embeddable flashing system in accordance with manufacturer's written instructions.
- S. Construct expansion and/or control (movement) joints as indicated on the Drawings. Terminate horizontal reinforcing on both sides of the movement joint. Reinforcement for bond beams may be continuous or discontinuous depending on indicated structural requirements.
- T. Keep masonry surfaces clean during construction. Remove all mortar drippings, tags and stains before they cure. Use a light brush sweep across the exposed masonry surfaces upon initial mortar set.
- U. Cover tops of CMU walls at completion of each day's work as practicable as possible. Maintain covering to minimize water and debris intrusion of ungrouted cells until permanent closure of walls occurs.

3.5 REINFORCEMENT

- A. Place steel reinforcement in accordance with the sizes, types, and locations indicated.
 - 1. Lap splices: As indicated.
- B. Place joint reinforcement in bed joints at no more than 16 inches on center, and place in additional locations when indicated. Locate joint reinforcement so that longitudinal wires are embedded in mortar, including wires within the lap length. Lap length of joint reinforcement a minimum of 6 inches. Do not extend joint reinforcement through movement joints.
- C. Secure steel reinforcement to prevent displacement from the placement of grout within the following tolerances:
 - 1. Embed steel reinforcement in grout and maintain a clear distance of at least 1/4 inch for fine grout and 1/2 inch for coarse grout.
 - 2. Place joint reinforcement with at least 5/8 inch mortar cover when exposed to weather or earth and 1/2 inch when not exposed to earth or weather.
 - 3. Place vertical reinforcing bars within +/- 1/2 inch from specified location across the thickness of the wall.
 - 4. Place vertical reinforcing bars within +/- 2 inches from specified location along the length of the wall.

3.6 GROUT PLACEMENT

- A. Place grout within 1-1/2 hours from mixing and prior to initial set of grout.
- B. Do not exceed the grout pour heights of ACI 530.1/ASCE 6/TMS 602.
- C. Place grout in lifts not exceeding 5 feet high.
 - 1. If there is a significant delay, stop grout a minimum of 1-1/2 inches below top of masonry to form a shear key with the next lift.
- D. Consolidate grout at time of placement for pours of 12 inches or less by mechanical vibration or puddling.
- E. Consolidate grout at time of placement for pours exceeding 12 inches by mechanical vibration and reconsolidate by mechanical vibration while grout is still plastic.
- F. Solidly fill cells below lintel or beam bearing minimum of 24 inches high.
- G. Bond Beams and Masonry Lintels:
 - 1. Allow masonry lintels to attain sufficient strength to support the loads imposed during construction before removing temporary supports.
- H. Alternatively, place masonry units and grout using construction procedures employed in the accepted grout demonstration panel.

3.7 MASONRY CLEANING

- A. Before cleaning masonry, protect masonry surfaces requiring different cleaning products. Protect non-masonry surfaces, pedestrians, vehicles, landscaping, etc. from contact with the cleaning solutions.
- B. When there are bands of different masonry materials to be cleaned, individual bands shall be cleaned by one of the following methods:
 - 1. Soaking the individual band,

2. Applying a sacrificial coating, or
 3. Using a protective membrane.
- C. Apply masonry cleaners to masonry substrates in accordance with the manufacturer's written instructions and approved submittals. Use non-metallic tools on masonry surfaces.
- D. If pressure washer is to be used, cleaning procedures shall not damage finished masonry.

3.8 CLEAN UP

- A. Remove mock-up panels upon completion of all masonry.
- B. Remove all debris and properly dispose of off site.

END OF SECTION

