

SECTION 04 22 00
CONCRETE UNIT MASONRY

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):
 - a. A82/A82M, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
 - b. A153/A153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - c. C33, Standard Specification for Concrete Aggregates.
 - d. C90, Standard Specification for Loadbearing Concrete Masonry Units.
 - e. C140, Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
 - f. C144, Standard Specification for Aggregate for Masonry Mortar.
 - g. C150, Standard Specification for Portland Cement.
 - h. C207, Standard Specification for Hydrated Lime for Masonry Purposes.
 - i. C270, Standard Specification for Mortar for Unit Masonry.
 - j. C404, Standard Specification for Aggregates for Masonry Grout.
 - k. C476, Standard Specification for Grout for Masonry.
 - l. C618 12 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
 - m. C744, Standard Specification for Prefaced Concrete and Calcium Silicate Masonry Units.
 - n. C979, Pigments for Integrally Colored Concrete.
 - o. C989, Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
 - p. C1314, Standard Test Method for Compressive Strength of Masonry Prisms.
 - q. C1403, Standard Test Method for Rate of Water Absorption of Masonry Mortars.
 - r. E514/E514M, Standard Test Method for Water Penetration and Leakage through Masonry.
2. International Code Council (ICC):
 - a. International Building Code (IBC).
 - b. ICC Evaluation Service (ICC-ES) Reports.

3. The Masonry Society (TMS):
 - a. TMS 402/ACI 530/ASCE 5; Building Code Requirements for Masonry Structures and Companion Commentaries. (MSJC Code and Commentary).
 - b. TMS 602/ACI530.1/ASCE6; Specification for Masonry Structures.
 - c. 602/American Concrete Institute ACI 530.1/ASCE 6, Specification for Masonry Structures and Companion Commentaries. (Masonry Standards Joint Committee Specifications and Commentary).

1.02 SUBMITTALS

A. Action Submittals:

1. Shop Drawings.
2. Data Sheets:
 - a. Horizontal joint reinforcement.
 - b. Preformed control joint materials.
 - c. Water repellent masonry sealer.
 - d. Water repellent admixture.
 - e. Grout mix design.
 - f. Mortar mix design. Prebagged mortar properties and data sheets.
 - g. Grout sand gradation in accordance with ASTM C404.
3. Samples:
 - a. Sample: One of each type of masonry unit to be used on Project from the proposed manufacturer.
 - b. Mortar colors for color selection.

B. Informational Submittals:

1. Method and Location of Placing Grout: High lift or low lift.
2. Mix design test results.
3. Certifications:
 - a. Units comply with ASTM C55 and ASTM C90.
 - b. Grout test results conform to ASTM C1019.
 - c. Grout aggregates conform to requirements of ASTM C33, including nonreactivity.
 - d. Mortar sand conform to requirements of ASTM C144.
4. Test results of Project samples from masonry unit manufacturer stating that units comply with ASTM C90. Documentation of material testing shall be one less than 1 year old.
5. Test results of proposed grout mix design stating that units comply with ASTM C1019. Documentation of material testing shall be 1 year old or less.

6. Test reports stating aggregates for mortar meet requirements of ASTM C144.
7. Test reports or letter of certification stating aggregates for grout meet requirements of ASTM C404.
8. Letter from water repellent admixture manufacturer verifying masonry unit manufacturer's proper use of product.
9. Method and materials for removal of efflorescence.
10. Field test results to qualify materials.
 - a. Grout tests in accordance with ASTM C1019.

1.03 QUALITY ASSURANCE

A. Mockups:

1. Lay up Sample panel for each type of masonry at Site.
2. Use both types of CMU finishes to simulate building appearance.
3. Dimensions: Minimum 6 feet high by 6 feet long.
4. Include one opening.
5. Use approved materials and procedures.
6. Leave intact after approval until acceptance of permanent masonry work and then remove at the end of the project.
7. Approved panels shall serve as basis of color, texture, bond, quality of finished joints, surface applied finishes, and for acceptance of permanent construction.
8. Demonstrate ability to keep insulation and grout isolated and in certain cells during any sequence of placement, and to demonstrate materials will be restricted to cells and bond beams intended to receive insulation and grout.
9. Construction shall show areas required to receive mortar, including webs on each side of each grouted cell to prevent grout from entering adjacent cells or courses. Show insulation is prevented from entering cells to receive grout or to prevent grout from entering cells to receive insulation.
10. Where bond beams are to be used, demonstrate proper placement of both insulation and grout to bond beam level, and proper placement of bond beam prior to placement of insulation and grout above bond beam level.
11. Demonstrate proper use of running bond.
12. Compliance Requirements: For masonry finish and appearance, dimension tolerances, tolerances of construction, joint tolerances, and wall plumb tolerances, comply with the requirements and criteria of NCMA, ASTM C90, and TMS 602.1.

B. Masonry Unit Manufacturer: Qualified by manufacturer of water repellent admixture to use product.

C. Preinstallation Conference:

1. Required Meeting Attendees:
 - a. Masonry subcontractor, including masonry foreman.
 - b. Ready-mix producer.
 - c. Admixture representative.
 - d. Testing and sampling personnel.
 - e. Contracting Officer.
 - f. Project Architect for coating system and appearance.
2. Schedule and conduct prior to start of masonry construction.
3. Notify Contracting Officer of location and time.
4. Agenda shall include:
 - a. High lift and low lift procedures.
 - b. Mortar, grout, unit, and reinforcing submittals.
 - c. Types and locations of rebar splices.
 - d. Joint tooling.
 - e. Admixture types, dosage, performance, and redosing at Site.
 - f. Mix designs and test of mix.
 - g. Placement methods, techniques, equipment, consolidation, and reconsolidation.
 - h. Protection procedures for environmental conditions.
 - i. Other specified requirements requiring coordination.
5. Submit conference minutes as specified in Section 01 31 00, Project Management and Coordination.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Storage and Protection: Keep units and mortar/grout cementitious ingredients, including lime, dry.

PART 2 PRODUCTS

2.01 COMPRESSIVE STRENGTH OF MASONRY ASSEMBLAGE

- A. Minimum 28-Day Specified Compressive Strength (f'_m) of Masonry:
2,000 psi.

2.02 CONCRETE MASONRY UNITS (CMU)

- A. Manufacturer:
 1. Echelon, An Oldcastle Company.
 2. Or equal.

B. ASTM C90: Normal weight.

1. Net Area Compressive Strength: 2,800 psi minimum, in accordance with TMS 602, Table 2.
 - a. Water Repellent Admixture:
 - 1) Structural concrete masonry units in weather exposed exterior wall shall be manufactured with integral liquid polymeric admixture to provide resistance to water penetration.
 - 2) Manufacturers and Products:
 - a) GCP Technologies; Dry-Block Block Admixture.
 - b) Or equal.
 - 3) Physical Characteristics: Integral water-repellent mortar admixture.
 - 4) Functional Characteristics: None.
 - 5) Performance Characteristics: Provides water-repellency as part of a system including CMU block water-repellent admixture.
2. Nominal Size: 16 inches long by 8 inches high by thickness shown on the Drawings.
3. Color and Surface Texture of Units:
 - a. Colors and finishes listed to match the Facility Maintenance Division Building.
 - b. Smooth Face: Beige tone as shown.
 - c. Split Face: Medium brown with red undertone as shown.
4. Smooth Face: Beige tone Locations of units as shown.
5. Surface Texture on Exposed Surfaces: Split face
6. Surface Texture: Smooth on interior and on concealed exterior.

C. General Concrete Masonry Unit (CMU) Requirements:

1. Furnish or cut special shapes for corners, jambs, lintels, and other areas shown or required.
2. Special units shall match color and texture of standard units.
3. Where units are placed so end of unit is exposed, such as at a corner or intersection, exposed end of that block shall have surface to match color and texture of sides of other units.
4. Furnish sound, dry, clean units free of cracks, prior to placing in structure.
5. Vertical Cells to be Grouted: Capable of alignment sufficient to maintain clear, unobstructed continuous vertical cell dimensions in accordance with TMS 602, Table 7.
6. Masonry unit size and shape shall allow for all placement patterns. Use vertical grout dams to prevent materials, such as grout or poured insulation, from escaping from cell being filled to adjacent cells where material is not intended to be placed.

2.03 PRECAST CONCRETE COLUMN CAP

- A. Physical Characteristics: Four-piece precast concrete cap that abut and form a square low peak design.
 - 1. Dimensions: 2 feet 6 inches square by 5 inches high.
 - 2. Color: Natural gray.
- B. Functional Characteristics: None.
- C. Performance Characteristics: None.

2.04 MORTAR MATERIALS

- A. Portland Cement-Lime Mortar:
 - 1. Manufacturer:
 - a. Amerimix.
 - b. Or equal.
 - 2. ASTM C270.
 - 3. Cement: ASTM C150, Type I and Type II portland cement.
 - 4. Lime: ASTM C207, Type S hydrated.
 - 5. Aggregates:
 - a. Nonreactive in accordance with ASTM C33, Appendix X1.
 - b. Mortar: ASTM C144, sand.
- B. Mortar Cement Mortar: ASTM C1329.
- C. Water: Fresh, clean, and potable.
- D. Water Repellent Admixture:
 - 1. Mortar for concrete masonry units in weather exposed exterior walls shall include an integral liquid polymeric admixture to provide resistance to water penetration.
 - 2. Manufacturers and Products:
 - a. GCP Applied Technologies; Dry-Block Mortar Admixture.
 - b. Or equal.
 - 3. Physical Characteristics: Integral water-repellent mortar admixture.
 - 4. Functional Characteristics: None.
 - 5. Performance Characteristics:
 - a. Provides water-repellency as part of a system including CMU block water-repellent admixture.
 - b. ASTM C1403.

- E. Mortar Color Admixture:
 - 1. Meet the requirements of ASTM C979.
 - 2. Color shall be as shown.

2.05 GROUT MATERIALS

- A. Manufacturer:
 - 1. Amerimix.
 - 2. Or equal.
- B. Cement: ASTM C150, Type I and Type II portland cement.
- C. Fly Ash: Fly Ash (Pozzolan): Class F and Class C fly ash in accordance with ASTM C618.
- D. Slag Cement: In accordance with ASTM C989, Grade 100 or Grade 120.
- E. Lime: ASTM C207, Type S hydrated.
- F. Aggregates:
 - 1. ASTM C404, fine and coarse.
 - 2. Non-reactive in accordance with ASTM C33, Appendix X1.
- G. Water: Fresh, clean, and potable.

2.06 REINFORCEMENT

- A. Reinforcement: Clean and free from loose rust, scale, and coatings that reduce bond.
- B. Deformed Bars: As specified in Section 03 21 00, Steel Reinforcement.

2.07 PREFORMED CONTROL JOINTS

- A. Manufacturers and Products:
 - 1. Dayton Superior/Dur-O-Wal Dayton, OH; DA 2001 Control Joint Regular Rubber.
 - 2. Or equal.

- B. Physical Characteristics: Solid rubber cross-shape rubber extrusion designed for masonry wall control joints.
- C. Functional Characteristics: None.
- D. Performance Characteristics: None.

2.08 MORTAR MIXES

- A. In accordance with ASTM C270, Type S and MSJC Specifications.
- B. Mix Method:
 - 1. Property Method: Minimum average mortar 28-day compressive strength 1,800 psi.
- C. Mixing:
 - 1. Machine mix in approved mixers in accordance with ASTM C270. Time addition of approved admixtures in accordance with manufacturer's instructions. Procedure used for adding it to mix shall provide good dispersion.
 - 2. Follow manufacturer's instructions for mortar color admixture.
 - 3. Follow manufacturer's instructions for water repellent admixture.
 - 4. Review compatibility with other mortar admixture.
- D. Where colored masonry units are used, color mortar to match. Inert coloring pigments may be added, but shall not exceed 6 percent by weight of cement.

2.09 GROUT MIXES

- A. Compressive Strength Property:
 - 1. Minimum 2,000 psi at 28 days. Grout strength shall not exceed two times the minimum specified strength.
 - 2. Proportions: Conform to ASTM C476, Table 1.
- B. Mix Design:
 - 1. Proportions:
 - a. Design mix to meet property/strength requirements.
 - b. Where fly ash or slag is included in mix, fly ash or slag content shall be a minimum of 25 percent and a maximum of 25 percent of weight of total cementitious materials.
 - 2. Slump: 8-inch minimum, 11-inch maximum.

C. Mixing:

1. Do not use water reducers, air entrainment, plasticizing, high-range water reducers, or other non-specified admixtures in grout mixes.
2. Transit-Mixed Grout: Meet requirements of ASTM C476.
3. For high lift grouting, add approved grout expansion admixture in accordance with manufacturer's recommendations.
4. Fluid consistency suitable for placing without segregation with a slump of 8 inches to 11 inches.

2.10 WATER REPELLENT MASONRY SEALER

A. Manufacturers and Products:

1. BASF Construction Chemicals; Enviroseal PBT.
2. Or equal.

B. Physical Characteristics:

1. Water-based blend of silanes and siloxanes.
2. VOC compliant.

C. Functional Characteristics: None.

D. Performance Requirements:

1. Water Absorption: 95 percent reduction in weight gain when tested in accordance with ASTM C140.
2. Water Repellency: 99 percent reduction in weight gain when tested in accordance with ASTM E514.

PART 3 EXECUTION

3.01 GENERAL

- A. Meet requirements of 2021 IBC, Chapter 21 and 2016 The Masonry Society (TMS) 602/American Concrete Institute (ACI)530.1/ASCE 6, Specification for Masonry Structures and Companion Commentaries (MSJC), Part 3, Execution, except as modified in this section.

B. Moisture Protection:

1. Keep units dry while stored on Site.
2. Do not wet units prior to laying.

- C. Provide measures to prevent moisture from entering incomplete walls and open cells.

- D. Cold Weather: Meet requirements of MSJC Specification Section “Cold Weather Construction”.
- E. Hot Weather: Meet requirements of MSJC Specification Section “Hot Weather Construction”.
- F. After construction during cold weather, maintain newly constructed masonry temperature above 32 degrees F for a minimum of 24 hours using MSJC or other approved cold weather methods.
- G. After construction and during hot weather, fog spray newly constructed masonry in accordance with MSJC hot weather construction requirements.

3.02 PREPARATION

- A. Concrete Foundations: Meet tolerance requirements of ACI 117 prior to starting any masonry work.
- B. Prepare surface contact area of foundation concrete for initial mortar placement by removing laitance, loose aggregate, and other materials, and anything that would prevent mortar from bonding to foundation.
- C. Patch or grind out-of-tolerance foundation surfaces to receive mortar prior to starting masonry work.
- D. Clean reinforcement dowels and projecting embeds by removing laitance, spillage, or items that will adversely affect grout bond.
- E. Prevent surface damage to foundation concrete that will be exposed to view outside of contact area.

3.03 LAYING MASONRY UNITS

- A. General:
 - 1. Finish Tolerances (Measured on Interior Surfaces): Meet requirements of “Site Tolerance” requirements of Part 3, Execution, of the MSJC Specifications.
 - 2. Place units with chipped edges or corners such that chipped area is not exposed to view.
- B. Wall Units:
 - 1. General:
 - a. If necessary to move a unit after once set in-place, remove from wall, clean, and set in fresh mortar.
 - b. Toothing of masonry units is not permitted.

2. Running Bond:
 - a. Unless otherwise shown, lay up walls in straight, level, and uniform courses using a running bond pattern.
 - b. Place units for continuous vertical cells and mortar joints to prevent materials, such as grout, from escaping from cell being filled to adjacent cells where material is not intended to be placed.
 - c. Corners: Lay standard masonry bond for overlapping units and grout solid.
 - d. Intersecting Walls: Half unit appearance shall not extend and be visible on exterior side of intersecting wall. Provide hooked corner bars in bond beam units as shown on the Drawings.
3. Stack Bond: Not used.

C. Precast Concrete Cap:

1. Notch as needed to fit around column structural members.
2. Seal seams per Section 07 92 00, Joint Sealants.

3.04 BUILT-IN ITEMS

- A. Position door frames, windows, vents, louvers, and other items to be built in wall, and construct wall around them.
- B. Install masonry anchors to secure items to wall.
- C. Fill spaces around items with grout except use mortar at mortar joints.
- D. Do not place electrical, instrumentation, or water conduits in a cell containing parallel reinforcement, unless approved in writing by Contracting Officer. Additionally, pipes, sleeves, and conduits shall meet requirements of TMS 402/ACI 530/ASCE 5, Building Code Requirements for Masonry Structures (MSJC Code) and MSJC specification construction requirements.

3.05 MORTAR JOINTS

- A. General:
 1. Meet masonry erection requirements of MSJC, Part 3, Execution, 3.3B.
 2. As units are laid, remove excess mortar from grout space of cells to be filled. Final grout space, including any remaining mortar projections, shall be as required by MSJC Table "Grout Space Requirements".
 3. Place mortar before initial setting of cement takes place. Retemper only as required for it to remain plastic. Retempering of colored mortar is not allowed.
 4. Remove mortar containing water repellent admixture from face of masonry before it sets.

B. Exposed Joints:

1. Tool joints exposed to view after final construction, unless otherwise noted or shown.
2. Cut joints flush and as mortar takes its initial set; tool to provide a concave joint.
3. Perform tooling with tool that compacts mortar, pressing excess mortar out.
4. Perform tooling when mortar is partially set, but still sufficiently plastic to bond rather than dragging it out.
5. Rake out joints that are not tight at time of tooling, point, and then tool.
6. Rake and tool joints at split-face surfaces, interior and exterior.

C. Concealed Joints: Strike flush with no further treatment required.

3.06 CONTROL JOINTS

A. Preformed Control Joints:

1. Omit mortar from vertical joints.
2. Place in units fabricated to receive rubber control joint material as wall is built.
3. After wall is grouted, cured, and cleaned, install backing rod and sealant as specified in Section 07 92 00, Joint Sealants.
4. Place and tool sealant to match depth of typical joint.

3.07 REINFORCING

A. Foundation Dowels:

1. Locate first foundation dowel at end of wall in center of first cell; typically 4 inches from end of wall.
2. Locate at each side of control joints and openings and below beam and joist seats, and then locate at maximum required spacing between these bars.
3. Size, number, and location of foundation dowels shall match all typical and additional vertical wall reinforcing, unless otherwise noted.
4. When foundation dowel does not line up with vertical core, do not slope more than 1 horizontal to 6 vertical to bring it into alignment.

B. Vertical Reinforcing:

1. Use deformed bars.
2. Hold in position near ends of bars by wire ties to dowels or by reinforcing positioners.
3. For high lift grouting, hold in position at maximum intervals of 160 bar diameters by reinforcing positioners.

4. Lap reinforcing bars as shown or approved.
5. Wire tie splices together.
6. Minimum Bar Clearance: 1/2-inch from masonry for coarse grout
1/4-inch from masonry for fine grout, from formed surfaces, and from parallel bars in same grout space.

C. Horizontal Reinforcing:

1. Use deformed bars.
2. Lay on webs of bond beam units and place as wall is built. Increase web depth to ensure 1/2-inch cover over top of rebar.
3. Lap reinforcing bars where spliced and wire tie together.
4. Minimum Bar Clearance: 1/2 inch from masonry for coarse grout
1/4 inch from masonry for fine grout, from formed surfaces, and from parallel bars in same grout space.
5. Terminate reinforcing bars 2 inches clear from control joints except horizontal bars at roof and floor courses shall be continuous through joints.

3.08 MORTAR PRODUCTION

- A. Mix bulk materials in accordance with MSJC Specification.
- B. Mix prebagged materials with water to produce a workable consistency.
- C. Remix or retemper to maintain workability. Discard mortar that has begun to stiffen or is not used within 2-1/2 hours after initial mixing.

3.09 GROUT PLACEMENT

- A. Do not mix, convey, or place with equipment constructed of aluminum.
- B. Secure vertical and horizontal reinforcement, ties, bolts, anchors, and other required embedments in place; inspect and verify before placing grout.
- C. Grout beams over openings in one continuous operation.
- D. Maintain vertical alignment in accordance with ACI 530.1, Table 7:
 1. Place grout within 1-1/2 hours of addition of water to mix.
 2. Use reinforcing positioners to secure vertical reinforcement.
- E. Grouting Requirements:
 1. Solid grout walls with vertical bar spacing less than or equal to 24 inches. Partial grout walls with vertical bar spacing greater than or equal to 32 inches.
 - a. Slump: 8 inches to 11 inches.

- b. Do not start grouting until wall mortar has cured for 24 hours, minimum.
2. Fully embed horizontal steel with grout in an uninterrupted pour.
3. Do not construct wall more than one course above top of grout pour prior to placing grout.
4. Partial Grouting Requirements:
 - a. Fill cells containing reinforcing steel, anchor bolts, and other embedded items as shown with grout.
 - b. Construct cells to be filled to confine grout within cell.
 - c. Cover tops of unfilled vertical cells under a bond beam with metal lath to confine grout fill to bond beam section.
 - d. Form horizontal construction joints between pours by stopping grout pour 1-1/2 inches below a mortar joint, except at a bond beam; stop pour 1/2 inch below top of masonry unit.

F. Vibration:

1. Use internal “pencil” type, low energy vibrator to thoroughly consolidate grout and reduce amount of air voids. Do not use concrete vibrators.
2. After initial water loss and settlement has occurred, but before it has taken any set, reconsolidate grout.
3. Waiting period for reconsolidation will vary depending upon weather conditions and block absorption rates, but under “normal” weather conditions with average masonry units the waiting period should be between 30 minutes and 60 minutes.

G. Cleanouts:

1. Construct in accordance with MSJC specification.
2. Provide for grout pours heights over 5 feet 4 inches in accordance with the 2021 IBC.
3. Provide of sufficient size to permit cleaning of cell, positioning of reinforcing, and inspection at bottom of every vertical cell containing reinforcing and maximum of 32 inches on center.
4. Location: Concealed from view after final construction, unless otherwise approved by Contracting Officer.
5. After wall has been inspected and approved and prior to grouting, cap cleanouts in a manner that will seal them from grout leakage and provide a flush finish.

3.10 WATER REPELLENT MASONRY SEALER

- A. Remove efflorescence prior to applying water repellents. Dispose of waste generated.
- B. Apply to exposed exterior concrete masonry walls.

- C. Repoint loose, cracked, or disintegrating mortar at least 7 days prior to application. Ensure joint sealants and caulking are fully cured and wall surfaces are clean, dry, and free of chemical cleaners, efflorescence, dirt, oils, mortar smears, and other surface contaminants.
- D. Follow manufacturer's recommendations for weather conditions during application.
- E. Test a 5-foot by 5-foot wall area to ensure proper coverage, desired water repellency properties, and desired surface appearance when sealer is fully dried.
- F. Apply with spray, brush, or roller following manufacturer's recommendations, at a coverage rate of 50 square feet to 150 square feet per gallon, as determined by testing. Use two-coat application where recommended by manufacturer.

3.11 FIELD QUALITY CONTROL

- A. Contractor-Furnished Quality Assurance, in accordance with IBC Chapter 17 requirements, is provided in the Statement of Special Inspections Plan in Supplement located at end of Section 01 45 33, Special Inspection, Observation, and Testing. Contractor responsibilities and related information are included in Section 01 45 33, Special Inspection, Observation, and Testing.
- B. Contractor-Furnished Quality Control: Inspection and testing as required in Section 01 40 00, Quality Requirements.
- C. Masonry shall be tested by testing agency retained by Contracting Officer.
- D. Provide adequate facilities for safe storage and proper curing of masonry prisms, mortar samples, and grout samples, as applicable, onsite for first 24 hours, and for additional time as may be required before transporting to test lab.
- E. Masonry Testing:
 - 1. Masonry strength shall be determined using unit strength method as shown.
 - 2. Masonry test prisms, when required or desired, shall be constructed onsite with same materials and workmanship to be used for Project and in accordance with ASTM C1314. Method and frequency of prism testing shall be as shown on the Special Inspection and Testing Plan.

3. Unit Strength Method:
 - a. Method and frequency for mortar, grout, and masonry unit sampling and testing shall be as shown.
 - b. Provide masonry units for test samples required.

F. Corrective Action:

1. If compressive strength tests made prior to construction of permanent structure fail to meet these Specifications, adjustments shall be made to mix designs for mortar, or grout, or both, as needed to produce specified strength.
2. If strength tests performed on materials representative of in-place construction fail to meet these Specifications, prisms or cores shall be cut from constructed walls in sufficient locations to adequately determine strength in accordance with MSJC.
3. Water Repellent Performance Test: Masonry using concrete masonry units and mortar with integral water repellent additives, and water repellent masonry sealer, shall achieve a Class E rating when evaluated in accordance with ASTM E514, with the test extended to 72 hours.

3.12 CLEANING

- A. Immediately after completion of grouting, clean masonry surfaces of excess mortar, grout spillage, scum, stains, dirt, and other foreign substances using clean water and fiber brushes.
- B. Clean walls not requiring painting or sealing so there are no visible stains.

3.13 PROTECTION OF INSTALLED WORK

- A. Do not allow grout and mortar stains to dry on face of exposed masonry.
- B. Protect tops of walls at all times. Cover tops of walls with waterproof paper when rain or snow is imminent and when the Work is discontinued.
- C. Adequately brace walls until walls and roof are completed.
- D. Provide sufficient bracing to protect walls against damage from elements, including wind and snow.
- E. Protect masonry against freezing for minimum 72 hours after being laid.
- F. Protect masonry from damage until final acceptance of the Work. Damaged units will not be accepted.

END OF SECTION