SECTION 04200 - UNIT MASONRY ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Mortar and grout.
2. Anchorage
3. Reglet

B. Work Installed But not Furnished under this Section: Support plates and angles with anchor studs, sleeve anchors, expansion bolts, adhesive anchors, and anchor bolts which are embedded in masonry for supporting structural members.

C. Related Requirements:
1. Section 05090 – Concrete and Masonry Post Installed Anchors. Mechanical and adhesive type anchor studs, expansion bolts, sleeve anchors, adhesive anchors, and anchor bolts embedded in masonry for supporting structural members.
2. Section 05500 - Metal Fabrications: Loose steel lintels and other metal components embedded in masonry.
3. Section 07900 - Joint Sealers: Filler, backer rod and sealant at control and expansion joints.

1.2 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. Publications are referenced within the text by the basic designation only.

B. American Concrete Institute (ACI):
1. ACI 315 - ACI Detailing Manual.

C. Masonry Standards Joint Committee (MSJC):
1. TMS 402/ACI 530/ASCE5 and TMS 602/ACI 530/ASCE 6 - Building Code Requirements and Specifications for Masonry Structures.

D. American Society for Nondestructive Testing (ASNT)
1. Recommended Practice No. SNT-TC-1A - *Personnel Qualification and Certification in Nondestructive Testing*.

E. ASTM International (ASTM):
1. ASTM A 36 – Standard Specification for Carbon Structural Steel
2. ASTM A 153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
3. ASTM A 615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
4. ASTM C 34 - Structural Clay Load-Bearing Wall Tile.
5. ASTM C 144 - Aggregate for Masonry Mortar.
6. ASTM C 150 - Portland Cement.
7. ASTM C 207 - Hydrated Lime for Masonry Purposes.
8. ASTM C 270 - Mortar for Unit Masonry.
9. ASTM C 404 - Aggregates for Masonry Grout.
10. ASTM C 476 - Grout for Masonry.
11. ASTM C 618 - Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
12. ASTM C 979 - Pigments for Integrally Colored Concrete.
13. ASTM C 1019 - Method of Sampling and Testing Grout.
14. ASTM C 1142 - Extended Life Mortar for Unit Masonry.
15. ASTM C 1329 - Mortar Cement.
16. ASTM C 1384 - Admixtures for Masonry Mortars.

17. ASTM C 1714 - Preblended Dry Mortar Mix for Unit Masonry.
18. ASTM F 1554 – Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength

F. Mason Contractors Association of America (MCAA):
1. Standard Practice for Bracing Masonry Walls Under Construction

1.3 PERFORMANCE REQUIREMENTS

A. Provide unit masonry, mortar, and grout that develops compressive strength (f'm) at 28 days as indicated on Drawings.

1.4 SUBMITTALS

A. Section 01330 - Submittal Requirements: Procedures for Submittals. Submit required submittals prior to pre-installation meeting.

B. Masonry Grout Mix Design: Complete and submit Masonry Grout Mix Design Form found at the end of this Section for each type of grout. Submit by email to Structural Engineer of Record as specified in Section 01330 within 5 working days of Contract Date.

C. Masonry Mortar: Submit dry pre-blended masonry mortar manufacturer's certification letter and lab test reports verifying conformance to ASTM C270 and ASTM C1714. Include description of mortar type. Submit by email to Structural Engineer of Record and Owner's Construction Testing Laboratory as specified in Section 01330 within 5 working days of Contract Date.

D. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net area compressive strength of masonry units, mortar type, and resulting net area compressive strength of masonry.

1.5 QUALITY ASSURANCE

A. Source Limitations:
1. Mortar Materials: Obtain mortar ingredients of uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from one source or producer for each aggregate.

1.6 DELIVERY, STORAGE AND HANDLING

A. Transport, handle, store, and protect products in compliance with the requirements of Section 01600 and manufacturer's recommendations..

B. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

D. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

E. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.

F. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Follow cold and hot weather procedures of MSJC.

B. Cold Weather Construction: When ambient air temperature is below 40 F, implement cold weather procedures and comply with the following:
   1. Construction: These requirements apply to work in progress and are based on ambient air temperature. Do not heat water or aggregates used in mortar or grout above 140 F. Comply with the following requirements during construction during the following ambient air conditions:
      a. 40 F to 32 F: Heat sand or mixing water to produce mortar temperature between 40 F and 120 F at the time of mixing. Grout does not require heated materials, unless the temperature of the materials is below 32 F.
      b. 32 F to 25 F: Heat sand and mixing water to produce mortar temperature between 40 F and 120 F at the time of mixing. Maintain mortar temperature above freezing until used in masonry. Heat grout aggregates and mixing water to produce grout temperature between 70 F and 120 F at the time of mixing. Maintain grout temperature above 70 F at the time of grout placement.

C. Hot Weather Construction: Comply with the following provisions:
   1. Preparation: Prior to conducting masonry work:
      a. When the ambient air temperature exceeds 100 F or exceeds 90 F with a wind velocity greater than 8 mph:
         1) Maintain sand piles in a damp, loose condition.
         2) Provide necessary conditions and equipment to produce mortar having a temperature below 120 F.
      b. When the ambient temperature exceeds 115 F or exceeds 105 F with a wind velocity greater than 8 mph, implement the requirements above for ambient air temperature exceeding 100 F and shade materials and mixing equipment from direct sunlight.
   2. Construction: While masonry work is in progress:
      a. When the ambient air temperature exceeds 100 F, or exceeds 90 F with a wind velocity greater than 8 mph:
         1) Maintain temperature of mortar and grout below 120 F.
         2) Flush mixer, mortar transport container, and mortar boards with cool water before they come into contact with mortar ingredients or mortar.
         3) Maintain mortar consistency by retempering with cool water.
         4) Use mortar within 2 hr of initial mixing.
      b. When the ambient temperature exceeds 115 F or exceeds 105 F with a wind velocity greater than 8 mph, implement the construction requirements above for ambient air temperature exceeding 100 F and use cool mixing water for mortar and grout. Ice is permitted in the mixing water prior to use. Do not permit ice in the mixing water when added to the other mortar or grout materials.

PART 2 - PRODUCTS

2.1 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, normal-Type I or Type II; gray color. Fly ash, slag, and pozzolans not permitted as substitutes for Portland cement except as otherwise specifically allowed.

B. Mortar Cement: ASTM C 1329, Type S

C. Fly Ash for Grout: ASTM C 618, Type C or F maximum 4 percent loss in ignition shall be used as a replacement for Portland cement in grout. Fly ash shall be a minimum of 25 percent and a maximum of 30 percent of the total cementitious content. Use of fly ash in the grout mix is mandatory.

D. Fly ash, slag and pozzolans not permitted as substitutes for Portland cement in mortar.

~~E.~~ Masonry Cement: ASTM C 91.

F. Mortar Aggregate: ASTM C 144, standard masonry type; clean, dry, protected against dampness, freezing, and foreign matter.

G. Grout Aggregate: ASTM C 404; use of blast furnace slag is not permitted. Maximum coarse aggregate size, 3/8 inch.

H. Calcium chloride: Not permitted in mortar or grout. Chemicals containing Thyocyanates, Calcium Chloride or more than 0.1 percent chloride ions shall not be used.

I. Hydrated Lime: ASTM C 207, Type S.

J. Water: Potable.

K. Admixtures: Not permitted in mortar or grout except as otherwise specifically allowed or required herein.

2.2 MIXES - MORTAR

A. Mortar: Type S, in accordance with the Property Specification of ASTM C 270 for dry pre-blended mortar.
1. Site batching of components is prohibited.
2. Mixing on-site water and packaged dry blended mix is acceptable.
3. Provide pre-blended mortar produced, packaged and delivered per ASTM C 1714 from one of the following manufacturers:
   a. Quikrete, Inc., Atlanta, GA (800) 282-5828.
   b. Amerimix, Charlotte, NC, 888-313-0755.
   c. Pro-Mix Masonry Mortar Type S by Ash Grove Packaging Group, Little Rock, AR (888) 289-1117.
4. Use of ready mix mortar (ASTM C 1142) is prohibited.
5. Do not add admixtures of any kind to mortar mix except as otherwise specifically required herein.

2.3 MIXING – MORTAR

A. Thoroughly mix mortar ingredients in accordance with ASTM C 270, in quantities needed for immediate use.
1. Do not use anti-freeze compounds.
2. If water is lost by evaporation, retemper only within 2 hours of mixing. Do not retemper mortar more than 2 hours after mixing.

2.4 MIXES - GROUT FILL

A. Grout fill: Conform to ASTM C 476.
1. Compressive Strength: 2000 psi minimum at 28 days, as determined in accordance with the provisions of ASTM C 1019.
2. Slump: 10 inches minimum; 11 inches maximum, taken in accordance with ASTM C 143.
3. Use coarse grout when grout space is equal to or greater than 4 inches in both directions.
4. Use fine grout when grout space is smaller than 4 inches in either direction.
5. Air entrainment shall not be used.
6. Do not add admixtures to grout.

2.5 MIXING – GROUT

A. Batch and mix grout in accordance with ASTM C 94 or ASTM C 476 for site batched and mixed grout. Do not use anti-freeze compounds to lower the freezing point of grout.

2.6 REINFORCEMENT

A. Anchor bolts and threaded rods as shown embedded in masonry on structural drawings: ASTM F 1554 for anchor bolts and ASTM A 36 for threaded rods.

2.7 ACCESSORIES

A. Prefabricated Masonry Reglet: Springlok Flashing System as manufactured by Fry Reglet Corporation.
   1. Type MA-4, 24 ga. galvanized steel reglet.

PART 3 - EXECUTION

3.1 PREPARATION

A. Verify items provided by other sections of work are properly sized and located.

B. Provide temporary bracing for walls.

3.2 INSTALLATION - GENERAL

A. 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.

B. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

3.3 REINFORCEMENT AND ANCHORAGES

A. Anchorage of Masonry Walls: Comply with applicable requirements of MSJC for Seismic Design Category (SDC) indicated on structural drawings.

B. Verify that anchorages embedded in masonry are properly placed.
   1. Proper placement of embed anchors shall be full depth penetration of scheduled anchorage without contact of embed stud with interior surface of exterior shell face.

3.4 BUILT-IN WORK

A. Build in metal door frames, fabricated metal frames, window frames, anchor bolts, diaphragm anchors, embedded plates, and other items included in the work supplied by other Sections.
   1. Masonry Reglet: Install reglet level and parallel to building lines. Set reglet as indicated to coordinate with sloped roof surface.

B. Install items plumb and level.

C. Bed anchors of metal door and glazed frames in mortar joints. Fill frame voids solid with grout or mortar. Fill masonry cores with grout minimum 12 inches from framed openings.

D. Do not build in organic materials subject to deterioration.

3.5 CUTTING AND FITTING

A. Cut and fit for bearing plates, chases, pipes, conduit, sleeves, and grounds. Coordinate with other Sections of work to provide correct size, shape, and location.

B. Obtain approval prior to cutting or fitting any area not indicated or where appearance or strength of masonry work may be impaired.

3.6 CLEANING

A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears

before tooling joints.

B. Final Cleaning: After mortar or grout is thoroughly set and cured, clean exposed masonry as follows:
   1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
   2. Protect non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.

C. Remove excess mortar and smears. Replace defective mortar. Match adjacent work.

D. Clean soiled surfaces with a non-acidic solution which will not harm masonry or adjacent materials. Consult masonry manufacturer for acceptable cleaners.

E. Use non-metallic tools in cleaning operations.

3.7 PROTECTION

A. Maintain protective boards at exposed external corners which may be damaged by construction activities.

B. Provide protection without damaging completed work.

3.8 FIELD QUALITY CONTROL

A. Field quality control shall be the responsibility of the Contractor in accordance with Section 01452. Except as specified as mandatory, field quality control testing and inspection shall be at the discretion of the Contractor as necessary to assure compliance with Contract requirements. Owner T&I specified in Appendix B shall not preclude Contractor's responsibility to perform similar routine, necessary, and customary testing and inspection of the methods and frequency suitable for the type of work involved.

3.9 OWNER TESTING AND INSPECTION (T&)

A. The Owner will perform testing and inspection as specified in Appendix B (Section 04200).

END OF SECTION

WALMART STORES

MASONRY GROUT MIX DESIGN SUBMITTAL FORM
(Section 04200 – Unit Masonry Assemblies)

Date_____

☐ **SUPERCENTER** ☐ **NEIGHBORHOOD MARKET** ☐ **SAM'S CLUB**

STORE INFORMATION

STORE # _____
ADDRESS _____
CITY, ST _____
GENERAL CONTRACTOR
COMPANY _____
JOBSITE PHONE _____

A. GROUT INFORMATION

Supplier Mix Design # _____

Design Strength (f'_c) _____ psi

Water / Cementitious Ratio _____

Mix Developed From:

Density

Wet _____ pcf Dry _____ pcf

Slump

_____ " (± 1")

B. MIX DESIGN

Mix Proportions (per cubic yard)

	Identification (Type, size, source, etc.)	**Weight** (pounds)	**Density** (SSD)	**Volume** (cubic feet)
Cement				
Fly Ash				
Aggregate #1				
#2				
Water				
TOTALS				

C. MASONRY SUBCONTRACTOR INFORMATION

Company Name		**Tel. #**	( )
Address			
City, ST Zip			
Technical Contact		**Cell #**	( )
		e-mail	
Sales Contact		**Cell #**	( )