

PART I – GENERAL**WORK SPECIFIED HEREIN**

All labor, materials, equipment, labor and services necessary to provide all concrete masonry units, reinforcing, mortar, grout, anchors and accessories, and insulating fill for unit masonry work as indicated or specified. Scope of Work includes the furnishing and installation of masonry including the following:

1. Furnishing and placing masonry units, grout, mortar, masonry lintels, sills, copings, through-wall flashing, and connectors.
2. Furnishing, erecting and maintaining of bracing, forming, scaffolding, rigging and shoring.
3. Furnishing and installing insulating fill for unit masonry.
4. Furnishing and installing other equipment for constructing masonry.
5. Cleaning masonry and removing surplus material and waste.
6. Installing lintels, nailing blocks, inserts, window and door frames, connectors and construction items to be built into the masonry, and building in vent pipes, conduits and other items furnished and located by other trades.

SUBSTITUTIONS

In accordance with Section 01600.

SUBMITTALS

- The contractor shall prepare all shop drawings, product literature, etc. as required to properly coordinate and construct the project, and as per the requirements of the Project Manual.
- Submit the following items for review by the Professional of Record in accordance with Section 01300, Submittals.

QUALITY ASSURANCE

- Provided Special Inspections for masonry as shown on the drawings and as required by the Building Official.
- Unless otherwise required by the Building Official, field testing of the compressive strength of masonry units, mortar and grout is not required.
- See Section 01400 for required testing.
- See Section 01400 for payment provisions for testing.

PRODUCT DELIVERY, STORAGE AND HANDLING

- Do not accept damaged or contaminated masonry units, damaged components or structure, or damaged packaged material.
- Protect concrete masonry units and cementitious materials from precipitation and ground water. Store off the ground and under cover.
- Store different aggregates separately.

- Protect masonry units, reinforcement, ties, and metal accessories from permanent distortions and store them off the ground.

PROJECT CONDITIONS

- Do not apply construction loads that exceed the safe superimposed load-carrying capacity of the masonry and shores, if used.
- Cover top of unfinished masonry work at all times when work is not in progress to protect it from the weather.

COLD WEATHER CONSTRUCTION

- Implement the following when the ambient temperature falls below 40° F., or the temperature of masonry units is below 40° F.
- Do not lay masonry units having a temperature below 20° F. Remove visible ice on masonry units before the unit is laid in the mortar.
- Heat mortar sand or mixing water to produce mortar temperatures between 40° F and 120° F at the time of mixing. Maintain mortar above freezing until used in the masonry.
- When ambient temperature is between 25° F and 20° F use heat sources on both sides of the masonry under construction and install wind breaks when wind velocity is in excess of 15 mph.
- When ambient temperature is below 20° F provide an enclosure for the masonry under construction and use heat sources to maintain temperatures above 32° F within the enclosure.
- When mean daily temperature is between 40° F and 25° F, completely cover completed masonry with a weather-resistive membrane for 24 hours after construction.
- When mean daily temperature is 25° F or below, completely cover completed masonry, maintain masonry temperature above 32° F for 24 hours after construction by enclosure with supplementary heat, by electric heating blankets, by infrared heat lamps, or by other acceptable methods.

HOT WEATHER CONSTRUCTION

- When the ambient air temperature exceeds 100° F, or exceeds 90° F with a wind velocity greater than 8 mph implement the following:
 1. Maintain sand piles in a damp, loose condition.
 2. Provide necessary conditions and equipment to produce a mortar having a temperature below 120° F.
 3. Maintain temperature of mortar and grout below 120° F.
 4. Flush mixer, mortar transport container, and mortar boards with cool water before they come in contact with mortar ingredients or mortar.
 5. Maintain mortar consistency by retempering with cool water.
 6. Use mortar within 2 hours of initial mixing.
 7. Fog spray all newly constructed masonry until damp, at least three times a day until the masonry is three days old.

- When the ambient air temperature exceeds 115° F, or exceeds 105° F with a wind velocity greater than 8 mph implement the following in addition to the requirements above:

- Shade materials and mixing equipment from direct sunlight.
- 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 II – PRODUCTS**MORTAR MATERIALS**

- Provide mortar of the color specified on the drawings.
- All mortar shall conform to ASTM C270, Type S
- Proportion all mortar per the proportion specification of ASTM C270.

GROUT MATERIALS

- All grout shall conform with ASTM C476.
- Proportion all grout per the proportion specification of ASTM C476 for coarse grout.

MASONRY UNIT MATERIALS

- Provide concrete masonry units that conform to ASTM C-90, normal weight, with a minimum net area compressive strength of 1,900 psi.
- Provide sizes, shapes and finishes of units as indicated on the drawings.

REINFORCING MATERIALS

- Provide deformed reinforcing bars that conform to ASTM A615, Grade 60.
- Provide joint reinforcement that conforms to ASTM A 951 and is galvanized to conform to ASTM A 153 Class B, ladder design only.

INTEGRAL WATER REPELLANT ADMIXTURE (CMU):

- Description: An integral liquid polymeric admixture mixed with concrete during production of CMU which cross links and becomes permanently locked into the CMU, at the rate prescribed by manufacturer. To provide resistance to water penetration to achieve a Class E rating when tested in accordance with ASTM E514-74.
- Product: See Material/Product Schedule on Drawings.

INTEGRAL WATER REPELLANT ADMIXTURE (MORTAR):

- Description: An integral liquid polymeric admixture designed specifically for use in a mortar mix at the rate prescribed by manufacturer which cross links and becomes permanently locked into mortar to provide resistance to water penetrations,

achieving a Class E rating when tested in a wall section in accordance with ASTM 514-74.

- Product: See Material/Product Schedule on Drawings.

METAL ANCHORS, TIES AND ACCESSORIES

- Provide anchors, ties and accessories that conform to the following specifications:
- Plate and bent bar anchorsASTM A 36, and galvanized to conform to ASTM A 153 Class B.
 - Sheet metal anchors and ties.....ASTM A 366, and galvanized to conform to ASTM A 153 Class B.
 - Wire mesh ties.....ASTM A 185, and galvanized to conform to ASTM A 153 Class B.
 - Wire ties and anchors.....ASTM A 82, and galvanized to conform to ASTM A 153 Class B.
 - Anchor bolts.....ASTM A 307, Grade A

ACCESSORIES

- Provide contraction joint material that conforms to one of the following standards:
- ASTM D 2000, M2AA-805 Rubber shear keys with a minimum durometer hardness of 80.
 - ASTM D 2287, Type PVC 654-4 PVC shear keys with a minimum durometer hardness of 85.
 - ASTM C 920.

INSULATING FILL MATERIAL (TYPICAL)

- Insulating fill material shall be vermiculite loose fill and shall be manufactured by the Zonolite processor. Material shall conform to ASTM C-516, Type II, Grade 4, or;
- Insulating fill material shall be silicone treated Perlite Loose Fill Insulation. Material shall conform to ASTM C-549.

MIXING

- For mortar, mix all cementitious materials and aggregates between 3 and 10 minutes in a mechanical batch mixer with a sufficient amount of water to produce a workable consistency. Do not hand mix mortar. Maintain workability of mortar by remixing and retempering. Discard all mortar which has begun to stiffen or is not used within 2 hours after initial mixing. Do not use admixtures containing more than 0.2 percent chloride ions.
- Mix grout to a consistency that has a slump between 8 and 11 inches.

FABRICATION

- Fabricate bars used in masonry reinforcement in accordance with the fabricating tolerances of ACI 315.
- Bend bars cold and do not heat bars. The minimum inside bend diameter shall be 6 bar diameters.

- Provide standard 90 degree hooks with a 90 degree bend plus a minimum extension of 12 bar diameters beyond the bend.

PART III – EXECUTION

INSPECTION

- Prior to the start of construction, the Contractor shall verify that the foundations are constructed with tolerances conforming to the requirements of ACI 117, and that the reinforcing dowels are positioned in accordance with the contract documents.

PREPARATION

- Clean all reinforcement by removing mud, oil, or other materials that will adversely affect or reduce bond at the time the mortar or grout is placed.
- Prior to placing masonry, remove laitance, loose aggregate, and anything else that would prevent mortar from bonding to the foundation.

PLACING MORTAR AND UNITS

- Do not use masonry materials that are damaged or contaminated.
- Unless otherwise noted on the drawings, construct masonry in running bond.
- Unless otherwise required, construct 3/8 inch thick bed and head joints except at foundation. Construct bed joint of the starting course of foundation with a thickness not less than ¼ inch and not more than ¾ inch.
- Face shells of bed joints shall be fully mortared. Head joints shall be fully mortared, a minimum distance from each face equal to the face shell thickness of the unit. Webs shall be fully mortared in all courses of pilasters, in the starting course on foundations, when necessary to confine grout or loose-fill insulation, and when otherwise required.
- Place units so that vertical cells to be grouted are aligned and unobstructed openings for grout are provided. Construct grout spaces free of mortar dropping, debris, loose aggregates, and any material deleterious to masonry grout. Remove masonry protrusions extending ½ inch or more into cells or cavities to be grouted.
- Install embedded items and accessories as required.
- Masonry walls have been designed to span vertically as simple span beams from floor to roof and are dependent upon the completed roof structure, metal roof deck, and completion of all masonry walls for stability and for resistance to wind and seismic forces. The contractor is solely responsible for providing all necessary bracing as required for construction loads, for stability, and for resistance to wind and seismic forces until the entire structure is complete. The shoring shall not rely on any moment resistance capacity of the footings.
- Erect masonry within the following tolerances:

1. Variation Of Plumb: For vertical lines and surfaces of columns, walls, and arises, do not exceed ¼ inch in 10 feet, nor 3/8 inch over the height of the wall. For external corners, control joints, and other conspicuous lines do not exceed ¼ inch in 20 feet, nor ¼ inch over the height of the wall. For vertical alignment of head joints, do not exceed plus or minus ¼ inch in 10 feet, nor ½ inch over the height of the wall.
2. Variation From Level: For bed joints and lines of exposed sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed ¼ inch in 20 feet, nor ½ inch in 40 feet or more. For top surface of bearing walls, do not exceed 1/8 inch in 10 feet, nor 1/16 inch within width of a single unit.
3. Variation In Linear Building Line: For position shown in plan and related portions of columns, walls and partitions, do not exceed ½ inch in 20 feet, nor ¾ inch in 40 feet or more.
4. Variation In Cross-Sectional Dimensions: For columns and thickness of walls, from dimensions shown, do not exceed minus ¼ inch nor plus ½ inch.
5. Variation In Mortar Joint Thickness: Do not vary from joint thickness indicated by more than plus or minus 1/8 inch with a maximum thickness limited to ½ inch. Do not vary bed joint thickness from bed joint thickness of adjacent course by more than 1/8 inch. Do not vary head joint thickness from adjacent head joint thickness by more than 1/8 inch.

REINFORCEMENT INSTALLATION

- Place reinforcement and accessories in accordance with the sizes, types, and locations specified in the Contract Documents. Do not place dissimilar metals in contact with each other.
- Reinforcement shall be secured in place prior to grouting by wire positioners or other suitable devices at intervals not exceeding 200 bar diameters.
- Tolerances for the placement of reinforcement shall be as follows:
 1. Tolerances for the placement of steel in walls and flexural elements shall be $\pm \frac{1}{2}$ inch.
 2. Place vertical bars within 2 inches of the required location along the length of the wall.
- Completely embed reinforcing bars in grout. Maintain a minimum clear distance between reinforcing bars and any face of masonry unit or formed surface of ½ inch.
- Lap splice reinforcement as indicated on drawings or as required. The minimum length of lap splice of reinforcement shall be 48 times the bar diameter, but not less than 24 inches, U.N.O. on drawings.
- Do not bend reinforcement after it is embedded in grout or mortar.
- Place joint reinforcement so that longitudinal wires are embedded in mortar with a minimum cover of 5/8 inch.

GROUT PLACEMENT

- Prior to grouting, the grout space shall be clean so that all spaces to be filled with grout do not contain mortar projections greater than ½ inch, mortar droppings or other foreign material.
- Place grout within 1½ hour from introduction of water in the mixture and prior to initial set.
- All cells containing reinforcement shall be filled with grout. Confine grout to the areas indicated on the drawings. Use materials to confine grout that permits bond between masonry units and mortar.
- Units may be laid to the full height of the grout pour and grout shall be placed in a continuous pour in grout lifts not exceeding 5 feet. Do not exceed the maximum grout pour heights as follows:

Maximum grout pour height (ft) dimensions (in x in)	Minimum grout space
1	1½ x 2
5	2 x 3
12	3 x 3
24	3 x 4

- Cleanouts shall be provided for all grout pours over 5 feet in height. Where required, cleanouts shall be provided in the bottom course at every vertical bar but shall not be spaced more than 32 inches on center for solidly grouted masonry. Cleanouts shall be sealed after inspection and before grouting.
- Consolidate grout at the time of placement by mechanical vibration and reconsolidate by mechanical vibration after initial water loss and settlement has occurred.
- Insulating Fill Placement

Plug all holes in the walls through which insulation can escape with permanent materials. Tightly caulk or otherwise permanently seal electrical outlets, and other apertures for conduits, pipes and all other wall openings prior to the installation of the insulation.

- Before any insulation is poured, place a temporary statement in each room, and no more than 20 feet o.c. on the interior face of all walls to be insulated, warning all trades who might subsequently cut into the wall to use caution to prevent the loss of insulation. Note: Gummed labels are available from one processor for this purpose.
- At all exterior building unit masonry walls completely fill ungrouted cells solid with insulating fill materials. Pour insulation directly into the wall from the bag or from a hopper placed on the top of the wall. Pours may be made at any convenient level. The height of any pour shall not exceed 20 feet or one story height, whichever is less.

CLEANING

- Clean exposed masonry surfaces of all stains, efflorescence, mortar or grout droppings, and debris.

END OF SECTION