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04100.00 MORTAR AND MASONRY GROUT

04100.10 GENERAL

04100.11 SUBMITTALS

Product Data: Required.

Samples: Required.

04100.12 QUALITY ASSURANCE

Quality Standards: Perform Work in accordance with ACI 530 and ACI 530.1.

04100.20 PRODUCTS

04100.21 MANUFACTURERS/PRODUCTS

Mortar Materials: Portland cement, ASTM C 150, Type I or II.

Mortar Aggregate: Natural; White; (_____) color, ASTM C 144.

Grout Aggregate: ASTM C 404.

Hydrated Lime : ASTM C 207, Type S.

Coloring Admixtures: (_____) type, (_____) color.

04100.22 ACCESSORIES/MIXES

Mortar Mixes:

Ready Mixed Mortar: ASTM C1142, Type (RM) (RS), (RN), (RO).

OR

Mortar for Load Bearing Walls and partitions: ASTM C270, Type (M), (S), (N).

Mortar for Non-Load bearing Walls and partitions: ASTM C270, Type (M), (S), (N), (O).

Mortar for Engineered Masonry: ASTM C270, Type (M), (S), (N).

Pointing Mortar: ASTM C270, Type (N), (O).

Mortar for Glass Unit Masonry: ASTM C270, Type (S), (N), (O).

Pointing Mortar for Glass Unit Masonry (ASTM C270, Type (O).

Mortar for Firebrick Masonry. (_____) Type.

-Grout Mix: (3,000) (_____) psi [(21) (_____) Mpa] strength at 28 days,
(premixed type in accordance with ASTM C94) (Mix in accordance with ASTM
C476 (Fine; Course) grout.)

04100.30 EXECUTION

04100.31 INSTALLATION

Refer to Sections (04270) (04300) (04400) and (04500).

04100.32 FIELD QUALITY CONTROL

Field Tests: Required, Not Required.

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Field Inspection: Required, Not Required.

04100.33 SCHEDULES

On Drawings.

04110.01 CEMENT AND LIME MORTARS

Pigmented mortars will not be used to avoid future problems of matching existing when tuck points or providing alterations.

04110.03 QUALITY ASSURANCE

Acceptable Manufacturers: Prepared masonry cement:
Huron
Medusa
Peerless
Or equal.

Reference Standards – The latest publication of the following standard shall establish the minimum requirements when not otherwise specified in this section:

Technical Notes on Brick Construction by the
Brick Institute of America
11490 Commerce Park Drive
Reston, Virginia 22091

4110.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

Masonry cements, Portland cements, and lime will be stored on wooden pallets or other material that will not collect condensation, and off the ground in a dry condition. Sand will be kept clean.

04110.10 PRODUCT DESCRIPTION

Masonry cements will be manufacturer prepared or site prepared to meet or exceed the requirements of ASTM C-270.

Materials –

Portland Cement – ASTM C150, Type I or Federal Specification SS-C-1292, Type I. Use non staining cement for stone setting, ASTM C-91.

Lime – ASTM C5 (quicklime), or ASTM C207 (hydrated) Type S.

Fine Aggregate – ASTM C144 natural sand, except that for joints ¼" or less in thickness, 100% shall pass a No. 16 sieve.

Water – Clean, potable, and free of alkalies, acids and organic material.

04110.70 EXECUTION

04110.72 MORTAR USES

Type M - Non-reinforced masonry below grade and in contact with earth such as foundations, retaining walls, walks, sewers, and manholes. Any face brick used below grade, (this conditions should be avoided).

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Type S - Exterior and interior brick veneer, and concrete masonry units used in brick veneer back-up or other interior block work.

Type N - Use only as required for tuck pointing any existing Type N or S mortar used in laying brick having absorption rates greater than 25 gr./min./30 sq. in.

"Non-Staining" – shall be used for setting of all limestone, and laying glazed facing tile.

04110.80 MIXING

Mix mortar materials in mechanical batch mixer in quantities needed for immediate use. Mix mortar 3 to 5 minutes. Quantities shall be box measured; shovel measurement is not permitted. Adjust mix due to climatic conditions, for best workability. Use no anti-freeze materials.

Proportions:

Prepared masonry cements will be proportioned according to the manufacturer. Field prepared mortar shall be proportioned within the limits given in the following table:

Proportions by Volume: To be specified by the Architect:

Type	Portland Cement	Hydrated Lime	sand
M	1	¼	Not less than 2 ¼ and not
S	1	½	more than 3 times the sum of the volumes
N	1	1	of cement and lime used.
Non- Staining	1	1	6

Prehydrate all mortars used for tuck-pointing. Thoroughly mix all ingredients except water; then, mix again, adding only enough water to produce a damp workable mix, which will retain its form when pressed into a ball. After 1 to 2 hours, add sufficient water to bring it to the proper consistency; that is, somewhat drier than conventional masonry mortars.

Mortars that have stiffened because of evaporation of water from the mortar shall be retempered by adding water as frequently as needed to restore the required consistency. Mortars shall be used and placed in final position within 2 ½ hours after initial mixing.

Brands of cementitious materials and the source of supply of sand should remain the same throughout the entire job and should not be changed.

04150 MASONRY ACCESSORIES

04160 JOINT REINFORCEMENT

04160.03 QUALITY ASSURANCE

Acceptable Manufacturers

AA Wire Products Company
Dur-O-Wall, Inc.
Masonry Reinforcement Corporation
National Wire Products Corporation
Ty-Wal Products, Inc.
Or approved equal.

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04160.10 MATERIAL DESCRIPTION

Wire joint reinforcement shall be used for masonry block walls shall be standard weight ladder type, with two longitudinal side rods at 15" on center. Width of reinforcement shall be approximately 2" less than thickness of block wall as required for the side rods to lay fully in the mortar bed. Reinforcement, side rods and cross rods, shall be a welded unit of 9 gauge wire (ASTM A82), with mill hot dipped galvanized finish (ASTM A-116). Reinforcement used below grade, against grade, shall be hot dip galvanized after fabrication (ASTM A-153). Corners and tee reinforcements shall be premanufactured.

04160.70 INSTALLATION

Reinforcement shall be laid in a full bed of mortar and set in place by frequent lifting of the cross ties. Center the reinforcement between the faces of the block. Reinforcement shall be placed in every other horizontal joints (16"o.c.), and at first course above all openings. Reinforcement above openings shall extend 24 inches each side of opening or to end of panel. Splice all sections by overlapping 6".

04170 ANCHORS AND TIE SYSTEMS

General:

The types of anchors and ties will be selected to allow for the types of movement required in the masonry veneer.

04171 BOX TYPE CAVITY WALL TIES

04171.03 QUALITY ASSURANCE

AA Wire Products Company
Dur-0-Wall, Inc.
Heckmann Building Products, Inc.
Ty-Wal Products, Inc.
Or approved equal.

04171.10 PRODUCT DESCRIPTION

Cavity wall ties shall be rectangular wire loop type design, manufactured of 3/16 inch stainless steel wire. Tie loop shall be approximately 4 inches wide x length as required.

This box type tie may be an integral part of the wire joint reinforcement where applicable.

04171.70 INSTALLATION

Ties shall be laid in full bed of mortar at 16" vertically and 24" horizontally, and project at least 2" into the brick veneer and block back up. The ties will not be closer than $\frac{3}{4}$ " from exterior face of brick veneer.

04172 STONE ANCHORS

04172.03 QUALITY ASSURANCE

Acceptable Manufacturers:

Hohmann and Barnard
Contact: Genesee Cut Stone & Marble Co.
Phone No (313) 743 – 1800

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04172.10 PRODUCT DESCRIPTION

Stone anchors shall be fabricated from 304 alloy stainless steel, brass, or bronze to fit the conditions detailed or as required to match existing conditions. Channel slot anchors and strap anchors shall be not less than 1/8" thick by 1 1/2" wide, split and bent at outer end to form 2-way anchorages extending at least 1" into each stone. Wire loop and dowel type shall be 3/16" diameter. Straps and wire anchors shall be sized to extend not less than 4" into back-up masonry with 1" turn-up.

04172.70 INSTALLATION

Unless detailed otherwise install anchors in horizontal joints at not more than 2 feet apart. Each stone shall have at least 2 anchors near the corners. Anchors shall be mortared solidly into the back-up masonry, or welded or bolted to steel structure. Anchor stones at corner joints across the joint. All anchors shall be in place before the vapor barrier and shall be bolted or drilled into solid back-up masonry.

04200 UNIT MASONRY

04200.01 GENERAL

Brick Selection:

Normally the Architect/engineer will select three or more brick he feels are acceptable for the project and include these in his Specifications. An allowance method is not acceptable.

Brick selected should be compatible with surrounding buildings and contribute to a unified expression for the WMU Campus. These brick selected must be approved by WMU representatives before inclusion in the Specifications.

Sample Walls:

On new construction and additions, before laying up any face brick or special masonry pattern work, a sample wall (approximately 4'-0" x 5'-0") should be constructed for approval.

Extra Brick:

The Contractor shall provide 2,000 extra bricks for future building work. At completion of the project, the extra brick will generally be stored in a dry secure space in the building.

04210.02 RELATED WORK SPECIFIED ELSEWHERE

Cement and Lime Mortars – see section 04110.

Anchors and Tie Systems – see section 04170.

04210.03 QUALITY ASSURANCE

Reference Standards:

The latest publication of the following standard shall establish the minimum requirements when not otherwise specified in this section:

Technical Notes on Brick Construction by the
Brick Institute of America
11490 Commerce Park Drive
Reston, Virginia 22091

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04210.10 PRODUCT DESCRIPTION

Brick must meet A.S.T.M. designation C-216, Grade S.W., Type FBS, with minimum compressive strength of 8,000 psi. The initial rate of absorption shall not exceed 20 grams or be less than 6 grams per minute per 30 square inches. Brick shall show no efflorescence. The size of the brick in all dimensions should be specified and allowances for tolerance will be made from these dimensions.

The limits of chipping allowed by Type FBS are too lax. The following limits of chipping are reasonable, but can be better. The size and percentage of chipping will vary with the material and finish selected. The exact limits should be negotiated with the brick supplier based on the exact brick to be supplied and the "sample walls" laid for the project.

LIMITS OF CHIPPING

<u>Percentage of the perimeter allowed</u>	<u>Percentage of the shipment allowed</u>	<u>Size limits edges – corners</u>
3%	100%	1/8" – 1/4"
7%	25%	1/8" – 1/4"
10%	5%	1/4" - 3/8"

04210.70 EXECUTION

04210.72 LAYING

Brick having absorption rates greater than 25 grams per minute per 30 square inches, shall be wetted sufficiently so that the rate of absorption when laid does not exceed this amount. All units shall be free from water adhering to their surfaces when they are laid in the wall.

With fresh masonry that is partially set or totally set, clean the exposed surfaces of the set masonry, and wet if lightly so as to obtain the best possible bond with the new work. Remove all loose brick and mortar.

04210.73 PROTECTION

Lay masonry when the temperature of the outside air is 40F or above unless suitable means as approved by the Architect/engineer/Engineer are provided to heat materials, protect work from cold and frost.

Keep top of wall covered with non-staining waterproof coverings when work is not in progress. When work is resumed, top surface of work shall be cleaned of all loose mortar and in drying weather thoroughly wet.

04210.75 CLEANING

Dry-brush exposed masonry at the end of each day's work.

Upon completion of masonry work, clean all work carefully, using water, fiber brushes and soap, as required. Use of wire brushes, acids, or solutions which might cause discoloration and/or damage to the factory-applied finish is expressly prohibited.

After cleaning, remove traces of cleaning compounds by flushing with clear water. Reclean all surfaces showing efflorescence after cleaning.

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04220 CONCRETE UNIT MASONRY

04220.02 RELATED WORK SPECIFIED ELSEWHERE

Cement and Lime Mortars – see section 04110.

Anchors and Tie Systems – see section 04170.

04220.03 QUALITY ASSURANCE

Reference Standards:

“Guide Specification for Concrete Masonry,” by the National Concrete Masonry Association.

“ASTM Specifications for Concrete Masonry Units”

04220.10 PRODUCT DESCRIPTION

Block units will have nominal face dimensions of 16” x 8”.

Masonry block units shall be air cured for not less than 30 days, or steam cured to an equivalent condition.

All units, except in contact with earth, should be manufactured with light weight expanded blast furnace slag aggregate. Cinder aggregate is not acceptable.

Block units shall be certified by test to have a linear shrinkage potential percentage of not more than 0.04 per modified British Method of Test.

04220.12 CONCRETE UNIT MASONRY TYPES

Hollow Concrete Masonry Units (load bearing) –

ASTM C90 – Type I Grade N.

Hollow Concrete Masonry Units (non-load bearing) –

ASTM C129 – Type I, medium weight unless required to match existing texture.

Solid Concrete Masonry Units –

ASTM C145 – Type I Grade N.

Concrete Brick –

ASTM C55 – Type Grade N.

04220.70 EXECUTION

Lay masonry units plum and true to line. Finished surfaced shall not deviate from required line or plane more than 1/8” in any 10 foot dimension.

Build in items furnished by other trades. Grout hollow metal door frames full.

04220.73 PROTECTION

Lay masonry when the temperature of the outside air is 40F or above unless suitable means as approved by the Architect/engineer/Engineer are provided to heat materials, protect work from cold and frost.

Keep top of wall covered with non-staining waterproof coverings when work is not in progress. When work is resumed, top surface of work shall be cleaned of all loose mortar and in drying weather thoroughly we.

04270 GLASS UNIT MASONRY

DIVISION 4 - MASONRY

04270.10 GENERAL

04270.11 SUBMITTALS

Product Data: Required, Not Required.

Shop Drawings: Required, Not Required.

Samples: Required, Not Required.

04270.12 QUALITY ASSURANCE

Mock-up: (_____) feet [(_____) m] long by (_____) feet [(_____) m] high, including glass units with head, jamb, and sill conditions.

04270.20 PRODUCTS

04270.21 MANUFACTURERS/PRODUCTS

Glass Block Units:

Hollow units, unit core filled with white thermal insulation; Solid Units.

Special corner units, curved units, special end units and (_____)

Normal Size (____x____x____) inch [(____x____x____) mm].

Color: Clear; Bronze tint; Grey tint; (_____).

Pattern and design: (_____) as manufactured by (_____).

04270.22 ACCESSORIES/MIXES

Panel Reinforcement and panel Anchors: Galvanized steel

Expansion Strips: Dense glass fiber matting.

Perimeter Channel: (Extruded aluminum; mill, anodized finish) Formed steel; (uncoated; galvanized) finish.

Mortar: As specified in Section 04100.

04270.30 EXECUTION

04270.31 INSTALLATION

Secure perimeter metal chase.

Coat (sill; surface) under units with asphalt emulsion.

Maintain uniform joint width of (1/4 (_____) inch [(6) (_____) mm].

Place panel reinforcement at every (second) (_____) horizontal joint.

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- ASTM C90, Type (I – Moisture Controlled) (II – Non-moisture Controlled), (hollow; solid) non-load bearing, (normal; medium; light) weight. Size and shape: Nominal modular size of (___x___x___) inches [(___x___x___) mm].

- Decorative Block Unit:

ASTM C90, Type (I- Moisture Controlled) (II – Non-moisture Controlled; single scored horizontally), (single scored vertically; double scored vertically), (triple scored vertically; split face with (____) vertical ribs), (ground face) (____) (____) color, (____) as manufactured by (____). Size and Shape: Nominal modular size of [(___x___x___) mm]. Source (____), Product (____), Model (____).

Concrete Brick Units:

ASTM C55, (Grade (N) (S), Type (I – Moisture Controlled.) (II – Non – Moisture Controlled. (normal; light weight) (____) Color, (____) as manufactured by (____).

Size and shape: Nominal modular size of (___x___x___) inches [(___X___X___) mm].

Source: (____), Product (____), Model (____).

Face Brick:

ASTM C216, Type (FBS), (FBX), (FABA), Grade (MW) (SW), (NW): (____) color; (____) as manufactured by (____).

Size and Shape: Nominal modular size of (___x___x___) inches [(___x___x___) mm].

Source (____), Product (____), Model (____).

Hollow Facing and Building Brick:

ASTM C652, Grade (SW), (MW), (NW), Type (HBS), (HBX), (HBA), (HBB): (____) color; (____) as manufactured by (____).

Size and Shape: Nominal modular size of (___x___x___) inches [(___x___x___) mm].

Source: (____), Product (____), Model (____).

Fire Brick:

ASTM C27, Class (Super Duty; High Duty; Semi-silica), (Medium-duty, Low-duty).

Size and Shape: Nominal modular size of (___x___x___) inches [(___x___x___) mm].

Source: (____), Product (____), Model (____).

Giant Hollow Facing (and Building) Brick:

ASTM C652, Grade (SW), (MW), (NW), Type (HBS), (HBX), (HBA), (HBB): (____) color, (____) as manufactured by (____).

Size and Shape: Nominal modular size of (___x___x___) inches [(___x___x___) mm].

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Source: (_____), Product (_____), Model (_____).

04300.22 ACCESSORIES/MIXES

Joint Reinforcement: (single; double) wythe, (truss; ladder) type, (steel wire; hot dip galvanized; stainless steel).

Wall Ties: (corrugated formed sheet metal; formed steel wire; adjustable; eye and pintel type; hot dip galvanized; uncoated) finish.

Dovetail Anchors: Bent steel strap (galvanized; uncoated) finish.

Mortar and Grout: As specified in Section 04100.

Flashings: (Sheet; polyvinyl chloride, polyvinyl chloride; polyethylene), (copper; draft paper) (pre-coated galvanized steel).

Weeps: Preformed plastic (tube – cotton wick filled/ hollow) (vents with sloping louvers; cotton rope)

04300.30 EXECUTION

04300.31 INSTALLATION

(Concrete Masonry; Giant Brick) Units.

Bond: (Running; Stacked; _____)

Coursing: One unit and one mortar joint to equal (8) (_____) inches [(299) (_____) mm]

Mortar Joints: (Concave, raked, flush, beveled, extruded, _____)

Brick Units:

Bond: (Running, Stacked, Common, _____).

Coursing: Three units and three mortar joint to equal (8) (_____) inches [(200) (_____) mm]

Mortar Joints: (Concave, raked, flush, beveled, extruded, _____)

Install weeps (in veneer) at (24) (32) (_____) inches [(1600) (800) (_____) mm] oc horizontally (above through-wall flashing) (above shelf angles and lintels) (at bottom of walls) and (_____).

(Single; Double) Wythe Walls: Install horizontal joint reinforcement (16) (_____) inches [(400) (_____) mm] oc.

Veneer: Secure with (wall ties; dovetail) spaced to provide one another per (2) (_____) square feet [(0.186) (_____) sq. M] at maximum 6 inches (150 mm) oc each way within 12 inches (300 MM) around openings.

Install flashings (at foundation walls) (above ledge or shelf angles and lintels) (under parapet caps) (at bottom of walls) and (_____).

Install (loose steel) (precast concrete) lintels over (openings) and (_____).

04300.32 FIELD QUALITY CONTROL

Field Tests: Required, Not Required.

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Field Inspection: Required, Not Required.

04300.33 SCHEDULES

On Drawings:

-OR-

The Following examples may assist in developing a detained schedule.

Exterior Walls at Entrance: Brick veneer on metal studs.

Exterior Walls at Ground Floor: Brick and concrete block composite

Interior Partitions: Concrete block, non-bearing.

04400 STONE

04423 LIMESTONE

04423.02 RELATED WORK SPECIFIED ELSEWHERE

Cement and Lime Mortars – see section 04110.

Anchors and Tie Systems – see section 04170.

04423.03 QUALITY ASSURANCE

Reference Standards:

The latest publication of the following standard shall establish the minimum requirements when not otherwise specified in this section.

Indiana Limestone Handbook by the:
Indiana Limestone Institute of America, Inc.
Stone City Bank Building
Suite 400
Bedford, Indiana 47421

04423.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

Stone shall be delivered and stored on planks or timbers, off of the ground. Store stone in a protected area away from dirt, dust, soot, mud, grease, and other disfiguring elements. Cover the stone if directed. Stone will generally be stacked in the same position in which it will be set. If flat stone is shipped laying flat, and will be stored more than one month, the stone will be restacked and stored on edge in the position it will be set. Wood used for planks and spacers shall be dry cypress, white pine, or yellow pine. Do not use walnut, oak, fir or other woods containing tannin.

This also applies to storing of salvages stone that will be reinstalled.

04423.10 PRODUCT DESCRIPTION

All limestone used at WMU will normally be “select” grade buff free from cracks, pits, spalls, seams and mineral stains. Corners and edges should be chamfered to lessen chipping.

All stone shall be obtained from one quarry.

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Before stone is shipped from shop, all surfaces which will be concealed after setting pieces of stone shall receive a shop application of clear water repellent. This coat shall terminate one inch from back surface.

Water repellent coating shall be "Chemstop" for regular masonry; or a clear silicone type, having not less than 5% silicone, equal to "Sika Transparent."

04423.70 EXECUTION

All anchors should be nonferrous metal and clearly detailed on the Architect/engineer's drawings.

Point all stone joints and joints between stone and other adjacent surfaces with the proper colored elastomeric sealant $\frac{1}{4}$ " to $\frac{3}{8}$ " deep. All joints such as "wash" joints that can retain moisture shall be caulked with elastomeric sealant.

The exposed faces of all stone work shall be thoroughly cleaned on completion of all work. This cleaning shall be done with soap in clean water, applied vigorously with stiff fiber brushes. After cleaning, the exposed surfaces shall be drenched with clean water and rinsed thoroughly clean.

Stone which, later clouds and shows stains, shall be allowed a reasonable length of time to dry out. If stains remain, stone shall be washed down. Acids or wire brush will not be allowed. If stains remain, stone work in question shall be removed and new stone installed.