SECTION 04 43 00
NATURAL STONE VENEER

SPEC WRITER NOTES:
1. Use this section only for NCA projects.
2. Delete between //_____// if not applicable to project. Also delete any other item or paragraph not applicable in the section and renumber the paragraphs.
3. Use this section for both reinforced and unreinforced masonry construction or where steel bar reinforcement is used in cells of hollow masonry units, bond beams, lintel units, and between wythes of unit masonry in engineered design which is similar to reinforced concrete construction.

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies requirements for construction of natural stone veneer.

1.2 RELATED WORK

A. Mortars // and grouts //: Section 04 05 13, MASONRY MORTARING, Section 04 05 16, MASONRY GROUTING.
B. Steel lintels and shelf angles: Section 05 50 00, METAL FABRICATIONS.
C. Cavity insulation: Section 07 21 13, THERMAL INSULATION.
D. Flashing: Section 07 60 00, FLASHING AND SHEET METAL.
E. Sealants and sealant installation: Section 07 92 00, JOINT SEALANTS.
F. Color and texture of masonry units: Section 09 06 00, SCHEDULE FOR FINISHES.

1.3 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
B. Samples:
   1. Stone Veneer, sample, 200 mm by 400 mm (8 inches by 16 inches,) showing full color range and texture of stone, bond, and proposed mortar joints.
   2. Anchors, and ties, one each and joint reinforcing 1200 mm (48 inches) long.
C. Certificates:
1. Certificates signed by manufacturer, including name and address of contractor, project location, and the quantity, and date or dates of shipment of delivery to which certificate applies.
2. Indicating that the following items meet specification requirements:
   a. Stone veneer.
D. Manufacturer's Literature and Data:
   1. Anchors, ties, and reinforcement.
   2. Reinforcing bars.

SPEC WRITER NOTE:
For small projects verify use of following paragraph with the project manager.

1.4 SAMPLE PANEL

A. Before starting masonry, lay up a sample panel as specified
   1. Use stone units from random pallets of units delivered on site.
   2. Include reinforcing, ties, and anchors.
   3. Provide a 1.2m x 1.8m (4 feet x 5 feet) panel
B. Use sample panels approved by RE/COTR for standard of workmanship of new masonry work.
C. Use sample panel to test cleaning methods.

1.5 WARRANTY

Warrant exterior masonry walls against moisture leaks and subject to terms of "Warranty of Construction", FAR clause 52.246-21, except that warranty period shall be five years.

1.6 APPLICABLE PUBLICATIONS

A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.
B. American Society for Testing and Materials (ASTM):
   A82/A82M-07 ............ Standard Specification for Steel Wire, for Concrete Reinforcement
   A153/A153M-09 ............ Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
   A951-06 .................. Steel Wire for Masonry Joint Reinforcement
   C119-08 .................. Standard Terminology Relating to Dimension Stone
   C568-08a ................. Standard Specifications for Limestone Dimension Stone
   C615-03 ................. Standard Specification for Granite Dimension Stone
   C616-08 ................. Standard Specification for Quartz-Based Dimension Stone

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C1515-01 .............. Standard Guide to Cleaning of Exterior Dimension Stone, Vertical and Horizontal Surfaces, New or Existing
C1528-09 .............. Standard Guide for Selection of Dimension Stone for Exterior Use
D7089-06 .............. Standard Practice for Determination of the Effectiveness of Anti-Graffiti Coating for Use on Concrete, Masonry, and Natural Stone Surfaces by Pressure Washing

C. Masonry Industry Council:
D. Federal Specifications (FS):
   FF-S-107C-00 .......... Screws, Tapping and Drive

SPEC WRITER NOTE:
   Edit Stone Products below for type of stone being used on project. Add size grade, color, finish. Insert names of varieties and producers or distributors.

PART 2 - PRODUCTS
2.1 ACCEPTABLE STONE PRODUCTS

//A. Limestone Veneer: Meet ASTM C568, Classification: //I Low-Density//- //II Medium-Density//- //III High-Density///.
   1. Face Size: As indicated
   2. Color Range, finish, manufacturer/producer//insert//.
//A. Granite Veneer: Meet ASTM C615.
   1. Face Size: As indicated
   2. Color Range, finish, manufacturer/producer//insert//.
//A. Quartz Based Stone: Comply with ASTM C 616, Classification //I Sandstone//- //II Quartzitic Sandstone//- //III Quartzite///.
   1. Face Size: As indicated
   2. Color Range, finish, manufacturer/producer//insert//.
//A. Other //insert type// Stone Provide sound natural stone as follows:
2. Minimum Compressive Strength per ASTM C 170: //Insert value//.
3. Minimum Flexural Strength per ASTM C 880: //Insert value//.
4. Minimum Modulus of Rupture per ASTM C 99: //Insert value//.
5. Face Size: As indicated
6. Color Range, finish, manufacturer/producers//insert//.

2.2 REINFORCEMENT AND ANCHORAGES
A. Materials: Provide ties and anchors specified in subsequent paragraphs that are made from materials that comply paragraphs below, unless otherwise indicated.
B. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but at least 16mm (5/8 inch) cover on outside face. Outer ends of wires are bent 90 degrees and extend 50 mm (2 inches) parallel to face of veneer.
C. Individual Wire Ties: Rectangular units with closed ends and not less than 100 mm (4 inches).
1. Where wires do not align or are of different materials, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 32 mm (1-1/4 inches).
2. Wire: Fabricate from 4.8 mm (3/16 inch) diameter, hot-dip galvanized steel wire. Mill-galvanized wire ties may be used in interior walls, unless otherwise indicated.
D. Adjustable Masonry-Veneer Anchors
1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:
a. Structural Performance Characteristics: Capable of withstanding a 445 N (100 lbf) load in both tension and compression without deforming or developing play in excess of 1.3 mm (0.05 inch).
2. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.
a. Anchor Section: Zinc-alloy barrel section with flanged head with eye and corrosion-resistant, self-drilling screw. Eye designed to receive wire tie and to serve as head for drilling fastener into framing. Barrel length to suit sheathing thickness, allowing
screw to seat directly against framing with flanged head covering hole in sheathing.

b. Wire Ties: Triangular-, rectangular-, or T-shaped wire ties fabricated from 4.8 mm (0.188 inch) diameter, hot-dip galvanized steel wire.


2.3 ACCESSORIES

A. Joint Sealant: Refer to Section 07 92 00.

B. Nailing Strips: Western softwood, preservative treated, sized to masonry joints.

C. Weep Holes: Leave-out of full head mortar joints.

D. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

1. Strips, full-depth of cavity and 250 mm (10 inches) wide, with dovetail shaped notches 175 mm (7 inches) deep that prevent mesh from being clogged with mortar droppings.

E. Mortar: Refer to Section 04 05 13.


PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Verify items provided by other Sections of work are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

D. Beginning of installation means installer accepts existing conditions.

3.2 PREPARATION

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

B. Establish lines, levels, and coursing. Protect from disturbance.

C. Provide temporary bracing during erection of masonry work. Maintain in place until building structure provides permanent bracing.

D. Scaffolding: Provide, erect, maintain, move, and finally remove scaffolding and staging required for masonry installation. Construct and maintain scaffolding in compliance with applicable ordinances, laws, rules and regulations. Scaffolding shall be sufficiently substantial to support workmen, and necessary materials and equipment. Provide adequate guard rails for protection of property, workmen, and passerby.
3.3 COURSING
A. Place masonry to lines and level indicated.
B. Arrange and trim stones for adequate fit in a range ashlar Pattern with
course heights as indicated, random lengths, uniform joint widths with
offset between vertical joints as indicated.

3.4 PLACING AND BONDING
A. Lay masonry in full bed of mortar (horizontal, vertical, and collar
joints), properly jointed with other work. Buttering corners of joints
and deep or excessive furrowing of mortar joints is not permitted.
B. Fully bond intersections, and external and internal corners.
C. Do not shift, or tap masonry units after mortar has taken initial set.
   Where adjustment must be made, remove mortar and replace.
D. Remove excess mortar on surface and in cavities.
E. Perform job site saw cutting with proper tools to provide straight
   unchipped edges. Take care to prevent breaking masonry unit corners or
   edges.

3.5 TOLERANCES
A. Alignment of Columns: Maximum of 6 mm (1/4 inch) from true line.
B. Variation from Unit to Adjacent Unit: 0.8 mm (1/32 inch) maximum.
C. Variation from Plane of Wall: 6 mm (1/4 inch) in 3 m (10 feet) and 12 mm
   (1/2 inch) in 6 m (20 feet) or more.
D. Variation from Plumb: 6 mm (1/4 inch) per story non-cumulative, 12 mm
   (1/2 inch) in two stories or more.
E. Variation from Level Coursing: 3 mm (1/8 inch) in 1 m (3 feet); 6 mm
   (1/4 inch) in 3 m (10 feet); 6 mm (1/4 inch) maximum.
F. Variation of Joint Thickness: 3 mm (1/8 inch) in 1 m (3 feet).
G. Maximum variation from Cross Sectional Thickness of Walls: Plus or
   minus 6 mm (1/4 inch).

3.6 REINFORCEMENT AND ANCHORAGES
A. Attach wall ties to wall studs (or other solid and secure framing
   members) for veneer construction at maximum 400 mm (16 inches) oc
   vertically and 400 mm (16 inches) oc horizontally. Place at maximum 200
   mm (8 inches) oc (or every third course) each way around perimeter of
   openings, within 300 mm (12 inches) of openings.
B. Anchor stone veneer to unit masonry with metal veneer anchors as
   follows:
   1. Secure wire anchors by inserting pintles into eyes of masonry wall
      reinforcement projecting from horizontal mortar joints.
   2. Embed anchors in veneer mortar joints to within 25 mm (1 inch) of
      face.
3.7 MASONRY FLASHINGS
A. Extend flashings to exterior face of veneer, turn up a minimum of 200 mm (8 inches) and seal onto face of sheathing over stud framed back-up.
B. Lap end joints minimum 150 mm (6 inches) and seal watertight per manufacturer’s recommendation.
C. Use flashing manufacturer’s recommended adhesive and termination sealant.
D. Create end dams at end of window heads, and other vertical elements to channel water to nearest weep hole away from windows and other items which might allow water to travel vertically.

3.8 LINTELS
A. Install loose steel lintels as scheduled or shown. Leave space at end of lintels to expand.

3.9 WEEPS AND VENTS
A. Install weep holes in veneer at 600 mm (24 inches) on center horizontally for clay masonry and 800 mm (32 inches) on center for 400 mm (16 inch) long concrete masonry, above through-wall flashing, above shelf angles, and at bottom of walls.

3.10 CONTROL/EXPANSION JOINTS
A. Do not continue horizontal joint reinforcing across control joints.
B. Size control joints in accordance with Section 07 92 00 for sealant performance, but in no case larger than adjacent mortar joints in exposed face brick.
C. Provide expansion joints as indicated.

3.11 BUILT-IN WORK
A. As work progresses, build-in metal door frames, fabricated metal frames, window frames, wood nailing strips, anchor bolts, plates, and other items to be built in the work supplied by other Sections.
B. Build-in items plumb and level.
C. Bed anchors of metal door and glazed frames in mortar joints. Fill frame voids solid with mortar. Fill masonry cores with grout minimum 300 mm (12 inches) from framed openings.
D. Do not build-in organic materials subject to deterioration.

3.12 CUTTING AND FITTING
A. Cut and fit for chases, pipes, conduit, sleeves, and grounds. Cooperate 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.
3.13 CLEANING
A. Remove excess mortar and smears.
B. Replace defective mortar. Match adjacent work.
C. Clean soiled surfaces with non-acidic solution which will not harm masonry or adjacent materials. Consult masonry manufacturer for acceptable cleaners. Leave surfaces thoroughly clean and free of all mortar and other soiling.
D. Use non-metallic tools in cleaning operations.
E. ASTM C1515 and D7089.

3.14 PROTECTION
A. Maintain protective boards at exposed external corners which may be damaged by construction activities.
B. Provide protection without damaging completed work.
C. Keep expansion joint voids clear of mortar.

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