

**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.
4. Follow Specification for Masonry Structures (ACI 530.1/ASCE 6/TMS 602), Brick Industry Associations "Technical Notes on Brick Construction" and National Concrete Masonry Association "TEK Manual for Concrete Masonry Design and Construction".

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies requirements for construction of natural stone veneer.

**1.2 RELATED WORK**

SPEC WRITER NOTES:

1. Modify this section and delete items that are not applicable.
- A. Cast-in-place concrete //columbarium/memorial wall// complexes:  
Section 03 30 53, (SHORT FORM) CAST-IN-PLACE CONCRETE.
- B. Precast Concrete Columbarium Niches: 03 48 24, PRECAST CONCRETE COLUMBARIUM UNITS.
- C. Precast Memorial Wall Units: Section 03 48 26, PRECAST CONCRETE MEMORIAL WALL UNITS.
- D. Mortars // and grouts //: Section 04 05 13, MASONRY MORTARING, Section 04 05 16, MASONRY GROUTING.
- E. Steel lintels and shelf angles: Section 05 50 00, METAL FABRICATIONS.
- F. Cavity insulation: Section 07 21 13, THERMAL INSULATION.
- G. Flashing: Section 07 60 00, FLASHING AND SHEET METAL.
- H. Sealants and sealant installation: Section 07 92 00, JOINT SEALANTS.

- I. 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 signed by stone source, including name and address of contractor, project location, and the quantity, and date or dates of shipment of delivery to which certificate applies; indicate that the stone veneer meets specification requirements.
- D. Manufacturer's Literature and Data:
1. Anchors, ties, and reinforcement.
  2. Reinforcing bars.

#### SPEC WRITER NOTES:

1. For small projects use the same mockup requirements as found in Paragraph 1.4 MOCKUP.

### 1.4 MOCKUPS

- A. Provide a full-scale mockup for each natural stone veneer type. Mockups shall represent the full range of colors, textures, cuts, finishes, grout color & texture, and setting methods for all stonework.
- B. Mockups shall be erected in location and orientation approved by the RE/COR & the Architect and shall be erected by the same team that will install stonework for the project.
- C. Sizes of mockups shall be approved in advance by the RE/COR & the Architect through the shop drawing process.
- D. In situ mockups of natural stone veneer are expressly prohibited.
- E. Completed mockups shall be inspected and approved by the RE/COR and the Architect before installation of any stonework.
- F. Approved mockups shall become the standard of workmanship and appearance for the project. All stone installed for this project shall especially match the appearance of approved mockups for stone quality, texture, color, grout, and the frequency and appearance of any blemishes, including but not limited to: color streaks, texture

- streaks, spots, fossil formations, pit holes, reedy formations, honeycomb, travertine-like formations, and grain formation variations.
- G. Any piece of stone that does not (as determined by the RE/COR and the Architect) match in appearance the stone used in an approved mockup shall be considered automatically rejected by VA and shall be immediately removed from the project site and replaced by the Contractor at no cost to the Government.
  - H. Mockups shall be complete in all respects and shall represent the final complete assembly for all conditions of stone placement abutting other surfaces. Mockups shall demonstrate reinforcing, ties, anchors, grout, jointing, termination of stone against caps in horizontal surfaces, termination of veneer on corners of piers and columns, termination of veneer against vertical concrete (whether precast or cast in place), and termination against filler strips.
  - I. Use mockups to test cleaning methods.
  - J. Where review of mockups may require revisions of designs or construction techniques, the RE/COR will provide such revisions in writing. Such revisions will be completed and final approval of all aspects of the mockup shall be achieved prior to stone work beginning for the finished project.
  - K. Do not install mockup components or materials in the completed project.
  - L. Mockups shall remain in place until the project is complete and accepted by VA after final inspection. Afterward, remove and dispose of mockups.

#### **1.5 WARRANTY**

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

#### **1.6 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

##### **SPEC WRITER NOTES:**

1. Remove reference citations that do not remain in Part 2 or Part 3 of edited specification.
2. Verify and make dates indicated for remaining citations the most current at date of submittal; determine

changes from date indicated on the TIL download of the section and modify requirements impacted by the changes.

B. American Society for Testing and Materials (ASTM):

A82/A82M-07	Steel Wire, Plain, for Concrete Reinforcement
A153/A153M-09	Zinc Coating (Hot-Dip) on Iron and Steel Hardware
A951/A951M-11	Steel Wire for Masonry Joint Reinforcement
C97/C97M-09	Absorption and Bulk Gravity of Dimension Stone
C99/C99M-09	Modulus of Rupture of Dimension Stone
C119-11	Standard Terminology Relating to Dimension Stone
C170/C170M-09	Compressive Strength of Dimension Stone
C568/C568M-10	Limestone Dimension Stone
C615/C615M-11	Granite Dimension Stone
C616/C616M-10	Quartz-Based Dimension Stone
C880/C880M-09	Flexural Strength of Dimension Stone
C1242-12ae1	Selection, Design, and Installation of Dimension Stone Attachment Systems
C1353-09	Abrasion Resistance of Dimension Stone Subjected to Foot Traffic Using a Rotary Platform, Double-Head Abraser
C1515-11	Cleaning of Exterior Dimension Stone, Vertical and Horizontal Surfaces, New or Existing
C1528-12b	Selection of Dimension Stone
D1056-07	Flexible Cellular Materials - Sponge Expanded Rubber
D7089-06	Determination of the Effectiveness of Anti-Graffiti Coating for Use on Concrete, Masonry, and Natural Stone Surfaces by Pressure Washing

C. Masonry Industry Council:

All Weather Masonry Construction Manual, 2000

D. International Masonry Industry All Weather Council (IMIAC):

Recommended Practices and Guide Specification for Cold Weather Masonry Construction

**1.7 PRE-INSTALLATION CONFERENCE**

- A. Convene a meeting on site, after submittals are received and approved but before any work, to review drawings and specifications, submittals, schedule, manufacturer instructions, site logistics and pertinent

matters of coordination, temporary protection, governing regulations, tests and inspections; participants to include RE/COR and all parties whose work is affected or related to the work of this section.

SPEC WRITER NOTES:

1. 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 as basis design for acceptable products. Whenever possible, match existing should be used with specific location to match indicated.

**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// as demonstrated on approved project site mockup.

//A. Granite Veneer: Meet ASTM C615.

1. Face Size: As indicated.
2. Color Range, finish, manufacturer/producer//insert// as demonstrated on approved project site mockup.

//A. Quartz Based Stone: Comply with ASTM C616, Classification //I Sandstone//II Quartzitic Sandstone//III Quartzite//.

1. Face Size: As indicated.
2. Color Range, finish, manufacturer/producer//insert// as demonstrated on approved project site mockup.

//A. Other //insert type// Stone Provide sound natural stone as follows:

1. Maximum Absorption per ASTM C97: //Insert value// percent.
2. Minimum Compressive Strength per ASTM C170: //Insert value//.
3. Minimum Flexural Strength per ASTM C880: //Insert value//.
4. Minimum Modulus of Rupture per ASTM C99: //Insert value//.
5. Face Size: As indicated.
6. Color Range, finish, manufacturer/producer//insert// as demonstrated on approved project site mockup.

## 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.
1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A82; with ASTM A153/153M, Class B-2 coating.
- 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 withes 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.
  3. Basis of Design for Acceptable Product: Heckman Building Products, Inc.; No. 262.
- 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 more than 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.

- c. Acceptable Product: Heckmann Building Products, Inc.; No. 75  
Pos-I-Tie.

### 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 and as demonstrated on approved project site mockup.
- F. Expansion Joint Fillers: ASTM D1056 Class RE-11.

SPEC WRITER NOTES:

1. Review need for dampproofing applied to back of limestone or quartz-based stone panels with cavity space.

- G. Cementitious Dampproofing: Cementitious formulation nonstaining to stone; compatible with joint sealants and noncorrosive to anchors and attachments.

SPEC WRITER NOTES:

1. Add requirements or reference to anti-graffiti coatings as applicable to project.

## 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 has erected a fully approved on-site mockup and accepts existing conditions.

### 3.2 PREPARATION

- A. Verify final approval of the mockup as detailed in section 1.4 herein.
- B. Verify items provided by other Sections of work are properly sized and located.

- C. Establish lines, levels, and coursing; protect from disturbance.
- D. Provide temporary bracing during erection of masonry work. Maintain in place until building structure provides permanent bracing.
- E. 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 must be sufficiently substantial to support workmen, and necessary materials and equipment. Provide adequate guard rails for protection of property, workmen, and passerby.
- F. Clean dirty or stained stone surfaces by removing soil, stains, and foreign materials before setting. Clean stone by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives.

SPEC WRITER NOTES:

- 1. Add coating for back of limestone or quartz-based stone panels as applicable for project.
- G. Coat stone with dampproofing to extent indicated below:
    - 1. Stone at Grade: Beds, joints, and back surfaces to at least 12 inches above finish-grade elevations.
    - 2. Stone Extending Below Grade: Beds, joints, back surfaces, and face surfaces below grade.
    - 3. Allow dampproofing to cure before setting dampproofed stone. Do not damage or remove dampproofing while handling and setting stone.

### 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.

## SPEC WRITER NOTES:

- 1. Confirm weep locations.

**3.9 WEEPS AND VENTS**

- A. Install weep holes in veneer at 600 mm (24 inches) on center horizontally above through-wall flashing, above shelf angles, and at bottom of walls.

**3.10 CONTROL/EXPANSION JOINTS**

- A. Size control joints in accordance with Section 07 92 00 for sealant performance, but in no case larger than adjacent mortar joints.
- B. 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.
- 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.

## SPEC WRITER NOTES:

- 1. ASTM D7089 relates to effectiveness of anti-graffiti coatings.

- E. Comply with 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.

- - - E N D - - -