

**SECTION 03 48 26**  
**PRECAST CONCRETE MEMORIAL WALL UNITS**

**PART 1 - GENERAL**

**1.1 GENERAL PROVISIONS**

Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 1 - GENERAL REQUIREMENTS, which are hereby made part of this Section of the Specifications.

**1.1 DESCRIPTION**

- A. This section covers the manufacture and installation of precast concrete memorial wall units, as shown on the plans and specified herein, including the steel reinforcement, steel embedment plates, required sleeves, and fasteners.

**1.2 RELATED WORK**

- A. Cast-in-place concrete work: Section 03 30 00, CAST-IN-PLACE CONCRETE.  
B. Joint Sealant - Section 07 92 00, JOINT SEALANTS.  
C. Memorial Wall Cap and Veneer - Section 04 43 00, Natural Stone Veneer.  
D. Decorative Gravel-Section 32 90 00, PLANTING.  
E. Installation of memorial markers: Section 04 73 10, MEMORIAL MARKERS-MARBLE.  
F. Flashing - Section 07 60 00 Flashing and Sheetmetal  
G. Sustainable - Section 01 81 11, Sustainable Design Requirements  
H. Mockup - Section 01 43 39, Mockup Requirements

**1.3 MANUFACTURER / INSTALLER QUALIFICATIONS**

- A. Precast concrete memorial wall units shall be product of manufacturer/installer who has a minimum of 3 years experience in fabrication and installation of precast concrete units similar in material and design to the extent indicated on the drawings and specified herein.

**1.4 ALLOWABLE TOLERANCES**

- A. Manufacturing and installation tolerances shall be as follows:
1. Variation of anchors and fasteners for memorial markers from dimensions specified -- 1/64-inch
  2. Variation in overall dimensions of precast element (height and width and depth inside and outside) -- 1/16-inch
  3. Variation in thickness of walls of precast units -- 1/16-inch
  4. Maximum vertical and horizontal differential between adjacent units in installed position -- 1/8-inch

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### **1.5 SUSTAINABILITY REQUIREMENTS**

- A. Materials in this section may contribute towards contract compliance with sustainability requirements. See Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS, for project requirements.
- B. Blended Cement: It is the intent of this specification to reduce CO2 emissions and other environmentally detrimental effects resulting from the production of portland cement by requiring that all concrete mixes, in aggregate, utilize blended cement mixes to displace portland cement typically included in conventional construction. Provide the following submittals:
  - 1. Copies of concrete design mixes for all installed concrete.
  - 2. Copies of typical regional baseline concrete design mixes for all compressive strengths used on the Project.
  - 3. Quantities in cubic yards of each installed concrete mix.
- C. Biobased Material: For products designated by the USDA's BioPreferred® program, provide products that meet or exceed USDA recommendations for biobased content, subject to the products compliance with performance requirements in this Section. For more information regarding the product categories covered by the BioPreferred® program, please visit <http://www.biopreferred.gov/>.

### **1.6 REGULATORY REQUIREMENTS FOR RECYCLED CONTENT**

- A. Products and Materials with Post-Consumer Content and Recovered Materials Content:
  - 1. Contractor is obligated by contract to satisfy Federal mandates for procurement of products and materials meeting recommendations for post-consumer content and recovered materials content; the list of designated product categories with recommendations has been compiled by the EPA - refer to <http://www.epa.gov/wastes/conserve/tools/cpg/products/>
  - 2. Materials or products specified by this section may be obligated to satisfy this Federal mandate and Comprehensive Procurement Guidelines program.
  - 3. The EPA website also provides tools such as a Product Supplier Directory search engine and product resource guides.
- B. Fulfillment of regulatory requirements does not relieve the Contractor of satisfying sustainability requirements stipulated by Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS, as it relates to recycled content;

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additional product and material selections with recycled content may be required, as determined by Contractor's Sustainability Action Plan.

#### 1.7 SUBMITTALS

A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, furnish the following:

1. Samples: Submit sample of all fastening systems and mounting hardware including, but not limited to, the following:
  - a. Stainless Steel Angle (rosette plates of varying sizes depending on position of marble marker on memorial wall- see drawings).
  - b. Stainless Steel Bolt and Washers
  - c. Stainless Steel Spring Plate
  - d. Tamperproof Stainless Steel Bolt
  - e. Stainless Steel Rosette
  - f. Stainless Steel Expansion Anchors and Bolts
2. Shop Drawings: Complete shop and installation drawings of all precast concrete memorial wall units, showing all dimensions, sizes of units, and details of construction, installation and relation to adjoining work, joint locations and details, reinforcements, anchorage, attachments, inserts, location of all predrilled sleeves (see Fabrication, Paragraph 2.17) and other trades, joint treatment, and other work required for a complete installation.
3. Manufacturer's Literature and Data:
  - a. Each type of fastener or anchorage
  - b. Instructions for final cleaning
4. Certificates: Manufacturers qualifications specifying precast concrete memorial wall units meet the requirements of ACI 533.3R as specified and manufacturers qualification regarding performance previous acceptable work.
5. Mock-ups: Provide full scale mock-ups - see also 01 43 39 MOCKUP REQUIREMENTS:
  - a. Provide mock-ups for each of the following: Full height Memorial Marker Wall including the foundation stem wall/stone ledge, embedment plates, welds, full scale cast stone caps, connecting pins/bolts, stone Veneer end pier, retaining walls, marble markers, waterproofing and flower strips.

### **1.8 DELIVERY, STORAGE**

- A. Ship precast concrete memorial wall units to site with adequate protection to prevent chipping, breaking and other damage. Provide lifting devices that will allow the units to be set without the use of lifting straps that wrap around the unit. Materials shall be marked giving proper identification and location. Store materials in protected areas to prevent damage, injurious effects of weather and inclusion of foreign matter.

### **1.9 COORDINATION**

- A. Coordinate the manufacture and installation of precast concrete memorial wall units with related work of other sections of the Specifications. Provide templates for inserts and other devices for anchoring precast concrete memorial wall units to the work of other trades, in sufficient time to be built into adjoining construction. Perform cutting, fitting and other related work in connection with erection of precast concrete memorial wall unit work.

### **1.10 GUARANTEE**

- A. Guarantee precast concrete memorial wall unit work, including anchorage, joint treatment and related components to be free from all defects in materials and workmanship, including cracking and spalling and after erection, for a period of not less than three years.

### **1.11 APPLICABLE PUBLICATIONS**

- A. The publications listed below from a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. Federal Specifications (Fed.Spec.):
  - QQ-S-766C (5).....Steel Plates, Sheets, and Strip-Corrosion Resisting
  - QQ-W-423B.....Wire, Steel, Corrosive-Resisting
  - TT-S-00227E (3).....Sealing Compound Elastomeric Type, Multi-Component (For Caulking, Sealing, And Glazing In Building And Other Structures)
  - TT-S-00230C (2).....Sealing Compound: Elastomeric Type, Single Component (For Caulking, Sealing and Glazing In Building and Other Structures)
- C. American Concrete Institute (ACI) Publications:

ACI 533.3R-70.....Fabrication, Handling And Erection of Precast  
Concrete.

D. American Society for Testing Materials (ASTM) Standards:

A36/A36M-12.....Structural steel.

A83/A82M-07.....Steel Wire, Plain, for Concrete Reinforcement

A186/A185M-07.....Welded Steel Wire Fabric for Concrete  
Reinforcement.

A615/A615M-12.....Deformed and Plain Billet-Steel Bars for  
Concrete Reinforcement.

C33/C33M-13.....Concrete aggregates.

C 150/C150M-13.....Portland Cement.

E. American Welding Society (AWS) Publications:

AWS D1.1/D1.1M-10.....Structural Welding Code

AWS D1.4/D1.4M-11.....Welding Reinforcing Steel

**PART 2 - PRODUCTS**

**2.1 COARSE AGGREGATE**

A. Hard durable aggregate carefully graded from coarse to fine in  
proportions required to match approved samples.

**2.2 AGGREGATE FOR BACK-UP MIX (FINE AND COARSE AGGREGATE LIGHTWEIGHT):**

A. ASTM C33. Limit gradation as required to produce specified appearance  
and quality of concrete.

**2.3 PORTLAND CEMENT**

A. ASTM C150, Type I and Type III; Color as required to match existing.

**2.4 WATER**

A. Water shall be clean, fresh and potable.

**2.5 STRUCTURAL STEEL**

A. ASTM A36.

**2.6 STEEL FABRIC REINFORCEMENT**

A. ASTM A185, galvanized.

**2.7 STEEL WIRE REINFORCEMENT**

A. ASTM A82, cold drawn.

**2.8 REINFORCING STEEL**

A. ASTM A615, deformed, Grade 60.

**2.9 MISCELLANEOUS STAINLESS STEEL ITEMS**

A. Bolts, nuts, washers, anchors, inserts, and the like for handling,  
erection, or use by other trades.

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**2.10 BACK-UP MATERIAL**

- A. Closed cell neoprene, butyl, polyurethane, vinyl or polyethylene foam rod, diameter approximately 1- 1/3 times the Joint width.

**2.11 BOND BREAKERS**

- A. Type and material recommended by sealant manufacturer.

**2.12 SEALING COMPOUND**

- A. Fed. Spec. TT-S-00230 C, Type 11, Class A, or ASTM C 920-87, Type S, Grade NS, Class 25.

**2.13 ROSETTES**

- A. To be produced from sheet goods like or similar to #316 stainless steel as manufactured by Sinner Brothers, 3452 Hancock Street, San Diego, CA 92110 or an approved equal.

Thickness to be 0.100 inch. Die stamp, producing an eight-petal flower pattern. Luster finish. 1" in diameter with slight convex; center hole of 0.218", concentric to outer edge, with shoulder recess of 0.400" in diameter and 0.035" in depth. Rosettes shall match existing in place at the site in color, finish and design. Provide all hardware necessary for installation of the marble memorial wall markers.

**2.14 NATURAL STONE CAPS**

- A. Natural Stone Caps shall meet the requirements of Section 04 43 00 NATURAL STONE VENEER for the type of stone identified in the drawings.

**2.15 DECORATIVE GRAVEL**

- A. See Section 32 90 00, PLANTING

**2.16 CONCRETE FOOTINGS**

- A. See Section 03 30 00, CAST-IN-PLACE-CONCRETE

**2.17 FABRICATION**

- A. Memorial wall units shall be of size and form as indicated on the plans.
- B. Concrete for precast memorial wall units shall have minimum compressive strength of 5,000 psi at 28 days.
- C. Provide additional steel reinforcing as required for casting, handling and erection loads.
- D. Back-up Mix: Porosity, strength, weight and gradation of coarse aggregate shall be as required to produce specified characteristics.
- E. Memorial wall units shall be cast in steel forms designed to suit shape and finish required and to withstand high frequency vibration. Concrete shall be deposited in oiled forms. Form oil shall be non-staining type.

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Vibrations, where required, shall be continuous during process of casting to attain through compaction, complete embedment of reinforcement and to assure concrete of uniform and maximum density without segregation of mix and full thickness of precast element is attained.

- a. Anchors, lifting devices, provisions for cutouts and openings, dovetail slots, reglets, inserts and similar items required for the work of other trades shall be accurately positioned in forms before casting elements.
  - b. All fastener location holes, including those for anchoring of units and attachment of memorial markers, shall be field drilled for anchor bolts.
- F. Cement, aggregate, and water shall be obtained from single sources for facing mix of precast concrete work in order to assure regularity of appearance and uniformity of color.
- G. Architectural Finish: Exposed faces shall have smooth finish, rubbed with a fine abrasive or stone hone to create a cast stone like finish, uniformly smooth. Use ample water during rubbing to prevent working up a lather of mortar or changing texture of concrete. There shall be no air bubble marks or other such imperfections visible on the surface.
- H. Finish: Exposed faces shall have smooth finish, unless otherwise noted. The face of the units shall be processed by the manufacturer, following removal from the forms to insure that the discoloration, variation in color and texture, and blemishes on the faces are removed before shipping to the site.
1. Finish for all exposed faces and edges of the memorial wall shall be coated with color coat suitable for cured concrete, such as 'MASTERPROTECT HB 300 SB' manufactured by Sonneborn- BASF or and approved equivalent. Color and texture to be approved by Resident Engineer prior to application of coating. Manufacturer's literature and color charts to be submitted as a part of the submittal process.
- I. Curing: Precast concrete shall be cured as required to develop specified structural characteristics and shall be stored in a manner that will permit all surfaces to cure equally and minimize warping, without staining the exposed faces.

**2.18 MARBLE MEMORIAL WALL MARKERS (GOVERNMENT FURNISHED / CONTRACTOR  
INSTALLED)**

- A. Marble memorial wall markers shall be furnished by the Government and delivered to the site on pallets and shall be of size, type, finish and quantities required for this project. Contractor and Government representatives shall inspect the niche covers upon delivery to the site. The general quantity and condition shall be observed and an adequate count to cover all the installed memorial wall units, plus required surplus of niche covers shall be verified, once the memorial wall markers are accepted at the site, they shall become the Contractors responsibility until installed by the contractor and the installation is accepted by the VA.

**PART 3 - EXECUTION**

**3.1 CONCRETE FOOTINGS**

- A. Place concrete footings per lines and grades indicated on the drawings and in accordance with Section 03 30 53, CAST-IN-PLACE CONCRETE.

**3.2 HANDLING AND INSTALLATION**

- A. Before beginning installation, inspect work of other trades insofar as it affects the work of this Section. Commencing installation of precast concrete memorial wall units will be construed as acceptance, as suitable, of such work of other trades. Memorial wall units shall be handled in a nearly vertical plane at all times and stacked vertically on wood supports of adequate strength, until erected. Cover and protect precast concrete memorial wall units against staining and other damage. Reinstall, realign and otherwise correct improperly installed units.
1. Accurately place and securely anchor precast concrete memorial wall units to adjoining construction in accordance with approved shop and installation drawings.

**3.3 SETTING**

- A. Concrete footings (pads) for the memorial wall shall be constructed to meet all structural requirements to meet local soil and climate conditions and the weight and dimensions of the memorial wall.
- B. Joints shall be filled with sealant. Surfaces and other joints for precast concrete memorial wall units shall be cleaned of all dust, dirt and other foreign matter. Each precast element shall be set level and true to line with uniform joints. Joints required to have sealant shall be kept free of dirt and other contaminants for their full depth.

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Precautions shall be taken to protect precast concrete work from being damaged and soiled during and after installation. Wedges, spacers or other appliances that are likely to cause staining shall be removed from joints. Where two units are butted together, alignment shall be precise so that a smooth continuous line is produced.

- C. Place decorative gravel to the line and grade as indicated on the drawings. See Section 32 90 00, PLANTING.

### **3.4 SEALING OF JOINTS**

- A. Where shown and where required to make the work watertight, joints between precast concrete memorial wall units and between other precast elements and adjoining masonry, concrete and other materials shall be filled with back-up material for depth extending as required to form joint of depth recommended by sealant manufacturer. Provide bond breakers, at base of sealant where space for back-up does not exist and to prevent sealant from bonding to material at base of joint.
- B. Workmanship shall be in accordance with Section 07 92 00, JOINT SEALANTS.

### **3.5 CLEANING**

- A. After installation is complete, clean precast memorial wall units using materials, equipment and methods recommended by manufacturer.

### **3.6 REPLACEMENT AND REPAIR**

- A. Precast concrete memorial wall units that are damaged, cracked, stained, improperly fabricated or otherwise defective shall be removed and be replaced. Precast units having minor defects, not affecting serviceability or appearance may be repaired when approved by the Resident Engineer. Repaired work shall be sound, permanent, and flush with adjacent surfaces and of color and texture matching similar adjoining surfaces and shall show no line of demarcation between original and patched surfaces. Replacement and repairs shall be done at no additional cost to the Government.

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