

SECTION 03 45 50

PRECAST CONCRETE COLUMBARIUM UNITS

PART 1 – GENERAL

1.1 DESCRIPTION

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this section.
- B. This section covers the manufacturer and installation of precast concrete columbarium units, as shown on the Drawings and specified herein, including but not limited to: the steel reinforcement, steel embedment plates, required sleeves, preparation of setting surface, adhesive, columbarium fasteners, and niche cover anchor clip assemblies.
- C. This section covers acceptance and installation of the Contractor provided granite niche covers, one for each niche of the new columbarium units.
- D. This section covers precast units, cast-in-place concrete and stone piers (all exposed surfaces including the capstones).

1.2 RELATED WORK

- A. Furnishing and installing Wall Cap Stones: Section 047200, CAST STONE MASONRY.
- B. Manufactured Masonry Veneer: SECTION 04 70 00.
- C. Masonry Units: Section 042000, UNIT MASONRY.
- D. Joint Sealants: Section 079200, JOINT SEALANTS.

1.3 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Prior to commencement of work, Contractor shall submit documentation regarding the experience of his precast concrete supplier in the design and manufacture of Precast Concrete structures and custom units. Design, fabrication, delivery, and erection shall conform to ACI 318-02. Perform all welding in accordance with AWS D1.1.
- B. Precast concrete manufacturer's qualified Registered Professional Structural Engineer to certify that precast reinforced concrete conforms to specified requirements and is capable of structurally supporting imposed cast stone cap loads.
- C. Codes and regulations of the Federal, State, and County authorities shall apply.
- D. Fabricate to dimensions shown or approved. Replace or correct Columbarium Units which do not comply with the individual dimensions and tolerances.

E. Design Criteria:

1. The Columbarium Units shall be of the following type, style, and size:
 - a. Type: Precast concrete, reinforced.
 - b. Size: Interior and exterior dimensions as indicated on plans.
2. Columbarium top shall be capable of structurally supporting imposed service live load of no less than 50 psf, plus additional loads based on cast stone capstone thickness, dimensions, and heights, including material composition and element sectional properties, mortar and grout, reinforcement and load bearing locations. Verify and coordinate with cast stone capstone manufacturer prior to manufacturing columbarium niche units.
3. The Contractor shall submit in accordance with Section 013323 – Samples & Shop Drawings, for review and approval, electronic copy of design documentation showing structural design of the complete Columbarium. This documentation shall include dimensions, methods of construction, and calculations. All design calculations and drawings shall be signed and sealed by qualified Professional Structural Engineer, registered in the State of Delaware.

1.4 MANUFACTURER / INSTALLER QUALIFICATIONS

- A. Precast concrete columbarium units shall be product of manufacturer / installer who has a minimum of 3 years experience in fabrication and erection of the precast concrete columbarium units similar in material design and extent to that indicated on the drawings and specified herein.
- B. Precast manufacturer plant(s) used to be National Precast Concrete Association (NPCA) certified.

1.5 ALLOWABLE TOLERANCES

- A. In addition to tolerances of individual elements required by American Concrete Institution Publication 533.3R, erection tolerances shall be as follows:
 1. Variation of anchors and fasteners from dimensions specified..... 1/8 inch
 2. Variation in overall dimensions of precast element (height and width)..... 1/8 inch
 3. Maximum differential between adjacent units in erected position..... 1/4 inch
 4. Variation in thickness of precast panels and elements 1/8 inch
 5. Maximum vertical differential between adjacent columbarium units in installed position 1/8 inch
 6. Variation in overall dimensions of back to back precast elements (width) 1/4 inch

1.6 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
 1. Samples: exposed surface finishes including, but not limited to, the following:
 - a. Stainless Steel Rosette
 - b. Grouts.
 2. Shop Drawings: complete shop and erection drawings of all precast concrete columbarium units, showing all dimensions and details of construction, installation and relation to adjoining work, reinforcements, anchorage, attachments, inserts, location of all predrilled sleeves and other items

to be installed in the work of other trades, joint treatment, joint alignment coordinated with cap stone joints, cap stone load bearing locations, and other work required for a complete installation. Provide evidence that the Contractor to be installing the cast in place concrete foundations for the columbarium and pier units has been contacted prior to any work relating to the footings for the columbarium construction and that the construction of the concrete support work has been coordinated with the precast columbarium unit manufacturer and installer.

3. Manufacturer's Literature and Data:
 - a. Each type of Concrete Fastener, including adhesive and anchor devices
 - b. Instructions for final cleaning
 - c. Concrete stain/coating, including color charts of manufacturers standard color palette
4. Certificates: Manufacturers qualifications specifying precast concrete columbarium units meet the requirements of ACI 533.3R and as specified.

1.7 DELIVERY, STORAGE

- A. Ship precast concrete columbarium units to site with adequate protection to prevent chipping, breaking and other damage. Materials shall be marked giving proper identifications and location. Store materials in protected areas to prevent damage, injurious effects of weather and inclusion of foreign matter.

1.8 COORDINATION

- A. Coordinate the manufacture and erection of precast concrete columbarium units with related work of other sections of the Specifications. Provide templates for inserts and other devices for anchoring precast concrete columbarium 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 columbarium unit work. See Shop Drawing section for details regarding the coordination of work.

1.9 WARRANTY

- A. Warranty precast concrete columbarium 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, completed work will be subject to terms of "Warranty" article in Division 1 Specification Sections except that warranty period is two years.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURER/DESIGN

- A. To establish an acceptable design as indicated herein, the Contractor is hereby notified that the columbarium unit design provided by Creter Vault Corp, Matthew Creter, mattcreter@cretervault.com, 908-782-7771, are established as an acceptable design quality conforming to these Specifications and Drawings. Utilize "Crete Vault Corp." or an approved equal.

2.2 COARSE AGGREGATE

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

2.3 PORTLAND CEMENT

- A. ASTM C150, Type I and Type II; Color as required.

2.4 STEEL WIRE REINFORCEMENT

- A. ASTM A82, cold drawn.

2.5 REINFORCING STEEL

- A. ASTM A615, deformed, Grade 60.

2.6 MISCELLANEOUS GALVANIZED STEEL ITEMS

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

2.7 GRANITE NICHE COVERS

- A. Granite niche covers shall be furnished by the Contractor 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 columbarium units, plus required spares shall be verified.

2.8 NICHE COVER ATTACHMENT

- A. United States Department of Military and Veterans Affairs, National Cemetery System, standard stainless steel rosette, mounting brackets, and bolts for complete attachment of the granite niche covers to the precast columbarium units.

2.9 BACK-UP MATERIAL

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

2.10 BOND BREAKERS IF USED

- A. Type and material recommended by sealant manufacturer.

2.11 SEALING COMPOUND IF USED

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

2.12 FABRICATION

- A. Precast concrete shall comply with ACI 533.3R, except as modified herein.
1. Concrete for precast columbarium units shall have minimum compressive strength of 4,000 psi at 28 days.
 2. Provide additional steel reinforcing as required for casting, handling and erection loads.
 3. Back-up Mix: Porosity, strength, weight, and gradation of coarse aggregate shall be as required to produce specified characteristics.
 4. Columbarium 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 plastic lined or metal forms that are true to line and plane. 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, notches, 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 niche covers, shall be cast into units. Drilling to precast concrete columbarium units, after fabrication, shall only be acceptable for bottom attachment to concrete base and for anchoring the capstones set on top of the units.
 - c. Identification: Provide permanent markings to identify pick-up points and orientation in structure, complying with markings indicated on final shop drawings. Imprint date of casting on each precast unit on a surface, which will not show in finished structure.
 5. 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.
 6. Finish: Exposed faces shall have smooth finish, unless otherwise noted. Back side of single columbarium units, with back exposed to view shall have surface finish as indicated on the drawings. Specified surface finish for the exposed back of the columbarium units shall be applied during the appropriate time of fabrication and curing. Seal coating of exposed back of units shall be applied as per manufacturer's recommendations.
 7. 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.

PART 3 – EXECUTION

3.1 HANDLING AND INSTALLATION

- A. All work performed under this section shall be in accordance with the Specifications, Drawings, and Manufacturer's instructions and recommendations. In the event of a conflict, the stricter requirement shall prevail.

- B. Before beginning installation, inspect work of other trades in-so-far as it affects the work of this Section. Commencing installation of precast concrete columbarium units will be construed as acceptance, as suitable, of such work of other trades. Concrete base for the columbarium units shall be inspected and modified as required, grinding off high spots, to become an acceptable base upon which to install the units. Columbarium 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 columbarium units against staining and other damage. Reinstall, realign and otherwise correct improper installed units.
 - 1. Accurately place and securely anchor precast concrete columbarium units to adjoining construction in accordance with manufacturer's specifications. Provide shop and erection drawings as per manufacturer recommendations and specifications.

3.2 SETTING

- A. Where shown, joints shall be filled with sealant/ Surfaces and other joints for precast concrete columbarium units shall be cleaned of all dust, dirt and other foreign matter. Exposed surfaces of units shall be protected by anti-graffiti coating at the manufacturer, or shall be protected until accepted by the VA following installation. Units that have been damaged on exposed surfaces by graffiti, when not coated in advance shall be rejected and removed from the site. Each precast element shall be set level and true to line with uniform joints.
- B. Erect precast concrete members to conform to PCI Design handbook tolerances, except as follows:
 - 1. Variation in joint width $\pm 1/4$ inch.
 - 2. Maximum difference between bottom surfaces of adjacent plank $1/4$ inch.
- C. Joints required to have sealants shall be kept free of dirt and other contaminants for their full depth. Precautions shall be taken to protect precast concrete work from being damaged and soiled during and after installation. Wedges, spacers or other appliances which are likely to cause staining shall be removed from joints.

3.3 SEALING OF JOINTS

- A. Where shown and where required to make work watertight, joints between precast concrete columbarium 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 as shown or 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.
 - 1. Workmanship shall be in accordance with Division 1 Specification Sections.

3.4 CLEANING

- A. After erection is complete, clean precast columbarium units using materials, equipment and methods recommended by manufacturer.

3.5 REPLACEMENT AND REPAIR

- A. Precast concrete columbarium units which 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 COTR. Repaired work shall be sound, permanent, 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.

3.6 INSTALLATION OF GRANITE NICHE COVERS

- A. Install niche covers plumb and level as shown so that exposed faces of niche covers lie in the same plane and that rows of niche covers align both horizontally and vertically. Tighten fasteners to achieve snug fit but do not over tighten to the point where they may crack or break niche covers.

END OF SECTION

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