

SECTION 03480

PRECAST CONCRETE SPECIALTIES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section describes the requirements for furnishing and installing precast concrete caps at light court parapets, 1st, 2nd and 3rd floors and Penthouse.
- B. Related Sections:
 - 1. Water repellent coatings are specified in Section 07190.
 - 2. Sheet metal flashing and trim is specified in Section 07620.
 - 3. Joint sealants are specified in Section 07920.

1.02 DESIGN REQUIREMENTS

- A. Design precast concrete items in accordance with ACI 318 and the 2001 CBC.
- B. Exposed Surface Finish: Light sandblast, free of pockets, sand streaks, and honeycomb, displaying uniform texture and color.
- C. Cast units greater than 12-inches wide face down in form to ensure uniform finish.

1.03 SUBMITTALS

- A. Shop Drawings: Show complete information for fabrication and installation of precast concrete units including connections to structural frame, and embedded steel connections. Indicate member dimensions and cross-section; location, size, and type of reinforcement, including special reinforcement and lifting devices necessary for handling and erection. Indicate welded connections by AWS standard symbols. Show location and details of anchorage devices that are to be embedded in other construction. Include dimensioned plans and elevations at 1/4" = 1'-0" and a schedule of each precast item with its location. Show adjacent construction and all joints. Shop drawings and corresponding structural calculations shall be prepared and stamped by a California-licensed structural engineer.
- B. Samples: Furnish 18-inch square sample representative of each required finish color and texture. Continue to submit samples until they are approved by the Architect.

1.04 QUALITY ASSURANCE

- A. Manufacturer/Installer: Documented experience in fabricating precast concrete items of comparable size and complexity.
- B. Comply with requirements of Precast Concrete Institute (PCI) MNL 117 for manufacturing, testing, and dimensional tolerances for fabrication and erection.
- C. Design concrete mixes in compliance with American Concrete Institute (ACI) 318.
- D. Welders, welding operators, and tackers shall be qualified in accordance with American Welding Society (AWS) D1.1 and California Building Code (CBC) Standard No. 27-6 Structural Welding. Requalify welders who have not performed welding for 3 or more years.
- E. Shop and field welding shall be in accordance with AWS D1.1 and CBC Standard 27-6.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle units to prevent chipping and other damage.
- B. Handle units in positions consistent with their shape and design; lift and support only from support points indicated on the shop drawings.
- C. Block and laterally brace during transport and while store on-site. Provide lateral bracing sufficient to prevent bowing and warping. Blocking and bracing shall be clean, non-staining, and shall not prevent uniform curing of exposed surfaces.

- D. Protect edges of items to prevent staining, chipping or spalling of concrete. Damaged units will be rejected.
- E. Store units in a clean, dry location, off the ground and suitably protected.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Cement: ASTM C150, Type I. White cement may be required for selected colors. Use only one brand of cement throughout.
- B. Aggregate:
 - 1. Coarse Aggregate: ASTM C33, Size 67 (3/4-inch to No. 4).
 - 2. Fine Aggregate: ASTM C33, manufactured from same material as coarse aggregate.
- C. Water: Clean, potable, free from injurious amounts of oils, alkalis, organic materials and other deleterious substances.
- D. Concrete Colorant: L.M. Scofield "Chromix", Conrad Sovig Co., Inc. or approved equal. Color to be off white. Sample to be approved by Architect.
- E. Reinforcement: Fabricator's standard.
- F. Inserts and Miscellaneous Installation Hardware: AISI stainless steel, Type 304.
- G. Molds and Forms: Provide as required to produce finishes.
 - 1. Use molds and forms which are rigid and constructed of materials that will result in products whose various finishes are each uniform with surfaces and corners true, and arises and angles straight and uniform. Exposed joints in forms will not be acceptable
 - 2. Molds shall be accurate and shall maintain face dimensions of plus 0", minus 3/32".
- H. Grout: Nonmetallic, premixed, non-shrink, non-corrosive, non-staining product containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents. Match color to precast units.
- I. Epoxy Dowel Adhesive: Sika "Sikadur 31 Hi-Mod Gel", L&M Construction Chemicals or approved equal.
- J. Dowels and Pins: Stainless steel threaded rods.

2.03 MIXES

- A. Design mixes appropriate to type and strength of concrete that will produce concrete of specified strengths and finishes. Mix designs shall indicate water-cement ratio, water content, admixture content, cement content, aggregate content, aggregate gradations, slump, air content and strength. More than one mix design may be required to produce various units specified. Designate mixes A, B, C, etc. as may be required.
- B. Design mixes to meet the following requirements:
 - 1. Compressive strength at 28-days: 5,000-psi minimum.
 - 2. Sacks of cement per cubic yard of concrete: 6.5 minimum.
 - 3. Air entrainment: 3-percent minimum, 6-percent maximum.
 - 4. Slump: 3-inches maximum.
 - 5. No other admixtures are allowed without Architect's approval.

2.04 STEEL CONNECTION MATERIALS

- A. Steel Plates, Shapes and Bars: ASTM A36.
- B. Fasteners: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select type, grade and class required.

2.05 FABRICATION

- A. Conform to applicable requirements of ACI and PCI.
- B. Manufacture items to ensure uniformity of dimensions and finishes.
- C. Provide special corner shapes as indicated.
- D. Place concrete to prevent cold joints within units. Do not use supports for reinforcing steel from the exposed face. Provide 3/4-inch minimum cover for all reinforcing.
- E. Locate embedded items accurately.
- F. Block out openings for embedded items, including guardrail and handrail posts.
- G. Perform all welds to comply with AWS provisions.
- H. Cure precast concrete to comply with ACI 533-3R.
- I. Deposit and vibrate concrete to ensure proper consolidation, elimination of unintentional cold joints, and to minimize entrapped air on exposed surfaces.
- J. Fabricate precast items straight, smooth, and true to size and shape, with 1/8-inch radius on exposed edges and corners precise and square unless otherwise indicated. Items that are warped, cracked, broken, spalled, stained or otherwise defective will not be acceptable.
- K. Clearly mark each unit, on a surface to be concealed, identifying it for panel location and for date of casting.
- L. Tolerances:
 - 1. Overall dimension under 10-feet (height or width): plus or minus 1/8-inch.
 - 2. Overall dimension under 20-feet (height or width): plus 1/8-inch, minus 3/16-inch.
 - 3. Overall dimension under 30-feet (height or width): plus 1/8-inch, minus 1/4-inch.
 - 4. Thickness: Plus or minus 1/8-inch.
 - 5. Insert location: Plus or minus 1/8-inch.
 - 6. Bowing or warpage: 1/700 of precast unit dimension.

2.06 SOURCE QUALITY CONTROL

- A. A Testing Laboratory employed by the Owner will:
 - 1. Sample and test concrete ingredients.
 - 2. Review the Contractor's proposed mix design.
 - 3. Inspect plant and equipment for measuring, mixing and transporting concrete.
 - 4. Inspect batching and mixing operations.
 - 5. Inspect concrete mixes, performing aggregate and cement analyses.
 - 6. Review mill test reports for steel and inspect reinforcement and embedded items.
 - 7. Perform visual inspection of welds.
 - 8. Perform slump tests.
 - 9. Make cylinders for laboratory testing of compressive strength and perform tests in accordance with ASTM C39.

- B. If there is evidence that strength of unit does not meet specification requirements, upon direction of the Architect, the Owner's Testing Laboratory will make core samples drilled from hardened concrete at locations designated by the Architect or perform non-destructive tests to determine compressive strength.
 - 1. A Testing Laboratory employed by the Owner will determine compressive strength of drilled cores in accordance with ASTM C42 by:
 - a. Taking at least three representative cores from precast units of suspect strength.
 - b. Testing cores in saturated-surface-dry condition in accordance with ACI 318 if concrete will be wet during use of completed structure.
 - c. Testing cores in air-dry condition in accordance with ACI 318 if concrete will be dry at all times during use of completed structure.
 - 2. Strength of concrete for each series of cores will be considered satisfactory if their average compressive strength is at least 85-percent of 28-day compressive strength.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine supporting construction and verify that location and elevation of bearings is correct, dimensions are correct, and other conditions to adversely affect erection of precast concrete are absent.
- B. Do not begin erection until unsatisfactory conditions have been corrected. Installation of units constitutes acceptance of conditions.

3.02 INSTALLATION

- A. Preparation: Review installation procedures, sequencing and coordination required with related or adjacent work.
- B. Install all units level, plumb, in line and true within the non-cumulative and individual tolerances permitted by PCI MNL-117. Secure each unit neatly and securely as indicated.
- C. Conform to applicable requirements of referenced standards. Erect items without damage to shape or finish.
- D. Provide for erection procedures, temporary bracing and induced loads during erection; maintain temporary bracing in place until final connection is made or support is provided.
- E. Securely fasten items in place at locations indicated. Method of attachment shall be proposed by manufacturer and installer and indicated on shop drawings. Seal all penetrations through wall membrane.
- F. Grout horizontal joints using grout. Brace units until grout has reached sufficient strength to support units and until steel connections can be made.
- G. Shim units with non-shrink grout as required to comply with specified tolerances.
- H. Maintain units clean and free of grout or other construction materials during and after installation.

3.03 CLEANING AND ADJUSTING

- A. Clean marks, debris and dirt from exposed surfaces.
- B. Clean using fiber brushes, soap and water. Rinse with clean water.
- C. Patching:
 - 1. Minor patching may be accepted providing structural adequacy and appearance of finished units is not impaired.
 - 2. Patches in exposed areas which are noticeable at a distance of 3'-0" or more will be rejected and entire item shall be replaced at no additional cost to the Owner.
- D. Replace badly damaged units. The Architect will be sole judge of degree of damage or mismatch of finish that will require replacement.
- E. Protect precast units throughout construction and repair damage as specified.
- F. Upon completion of work, remove materials, tools, rubbish and debris resulting from the work.

END OF SECTION