

SECTION 03450
ARCHITECTURAL PRECAST CONCRETE

PART 1 - GENERAL

1.1 SUMMARY:

A. Section Includes:

1. Architectural precast concrete.
2. Embedment plates, sleeves and hangers in precast panels for all mechanical equipment.
3. Conduit, rough-in boxes, panels, plates, sleeves and hangers in precast concrete for all electrical equipment.
4. Precast bollards.

B. Related Sections:

1. Section 03100 - Concrete Formwork
2. Section 03200 - Concrete Reinforcement
3. Section 03300 - Cast-in-Place Concrete
4. Section 05500 - Metal Fabrications
5. Section 07180 - Water Repellents

1.2 REFERENCES:

A. Prestressed Concrete Members:

1. When not otherwise specified, comply with "Building Code Requirements for Reinforced Concrete", ACI 318.
2. PCI Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products, MNL-117.

1.3 SYSTEM DESCRIPTION:

A. Design Criteria:

1. Design of precast units shall be under the direct supervision of a Professional Engineer registered in the State of Colorado and shall bear his seal and signature.
2. Design and fabrication of all precast members shall be in accordance with ACI 318 "Building Code Requirements for Reinforced Concrete" and the Uniform Building Code.
3. Where not detailed in the Contract Documents, it shall be the responsibility of the precast manufacturer that all precast units are designed to support their own

weight, resist any gravity and lateral loads and distribute those loads into the supporting structure.

4. Where not detailed in the Contract Documents responsibility for the determination of adequate and proper anchorage of precast units shall rest with the precast manufacturer and shall be fully detailed on the shop drawings.

1.4 SUBMITTALS:

A. Shop Drawings:

1. Include connection anchorage and insert details.
2. Size and location of reinforcing steel.
3. Member identification marks, and plan layout location.

B. Samples:

1. Submit samples of all specified finishes for approval.
2. Samples shall include sealer coat.

C. Test Reports:

1. Records of concrete cylinder breaks for concrete used in the precast concrete products.
2. Mill tests of reinforcing steel used.
3. Air entrainment analysis.

D. Design Calculations:

1. Submit design calculations for each type, shape and span of precast unit and connection.
2. Design shall include camber and deflection calculations.

LEED MRc5: Regional Materials

Provide a statement from the manufacturer stating that materials provided were manufactured and harvested within a 500 mile radius of the project. Include location.

1.5 QUALITY ASSURANCE:

A. Qualifications:

- a) **Manufacturer:** The design consultant and the university will together establish the specific manufacturer qualifications for each individual project.

- b. The basis of inspection shall be the Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products, MNL-117.

2. Erector:

- a. Regularly engaged for at least 5 years in the erection of precast concrete similar to the requirements of this project.

3. Engineer Qualifications:

- a. Successful experience designing precast members for projects of similar size and complexity as this project.
- b. Experience designing precast concrete walls, beams, columns, and moment frames.
- c. A minimum of 5 years continuous experience performing precast concrete engineering.
- d. Current registration as a Colorado Professional Engineer.

4. Welder:

- a. In accordance with AWS D1.1.

1. Prior to beginning work, erect an architectural precast concrete sample panel at a location on the site agreed upon by the Architect.
2. Protect panel to prevent damage during duration of work.
3. Make such modifications as necessary to achieve a panel satisfactory to the Architect.
4. Approved panel shall serve as a standard for all remaining work.
5. Remove panel only after completion of architectural precast concrete work.
6. Mock-up panel shall consist of the following as applicable:
 - a. Wall panel including finishes and colors required.
 - b. Typical horizontal and vertical joint treatment. Include one joint to receive sealant.
 - c. Grouted, packed joint including color and tooling technique.
 - d. Cast-in samples:
 - 1) Decorative bands, rustications.
 - 2) Typical cut-outs and fenestrations.
 - 3) Surface texturing.

U
C
B

S
T
A
N
D
A
R
D
S

B. Mock-up:

7. Temporary wood or metal frame and bracing to support sample for duration of precast concrete work.

C. Testing:

1. In general compliance with testing provisions in MNL-117, Manual of Quality Control for Plants and Production of Precast and Prestressed Concrete Products.

PART 2 - PRODUCTS

2.1 FABRICATION:

A. Tolerances:

1. Length: 1/8" per 10 feet of length.
2. Cross-Sectional Dimensions:
 - a. Less than 12", plus or minus 1/8"
 - b. 12" to 24", plus or minus 1/4"
 - c. Over 24", plus or minus 3/8"
3. Position of Anchors and Inserts: Plus or minus 1" of centerline locations indicated.
4. End Squareness: Not more than 1/8" in 6 feet, measured on a diagonal, 1/4" maximum overall.
5. Blockouts: 1/2" of centerline location indicated.
6. Bowing: Length of bow/360 or 3/4" maximum.
7. Bowing Differential, Adjacent Members: 1/4".
8. Warpage: 1/16" per foot, one corner from nearest corner.

B. Finishes for Architectural Precast Concrete:

1. Finish: Light acid etch.
2. Color: To match existing precast concrete on a campus building as directed by the Campus Architect.

C. Patching:

1. Minor patching in the plant will be acceptable provided the structural adequacy of the product is not impaired.
2. All patching shall be done by the manufacturer.
3. All patching must be visibly acceptable to the Architect and Owner.

2.2 PRECAST BOLLARDS

- A. The standard bollard to be used on UCCS projects shall be Dura Art Stone, PBH1 concrete bollard or equivalent as approved by the Facilities Services Department and the Campus Architect.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL:

- A. Erection Tolerances: Erect precast with joints in positions indicated and within the following limits:

1. Face Width of Joints: $\pm 3/16$ ".
2. Joint Taper: $1/40$ " per foot length, with maximum length of tapering in one direction of 10'.
3. Variations from Plumb: $1/4$ " in any 20' run or story height; $1/2$ " total in any 40' or longer run.
4. Variations from Level or Elevation: $1/4$ " in any 20' run; $1/2$ " in any 40' run; total $\pm 1/2$ " at any location.
5. Variation from Theoretical Position in Plan: $\pm 1/4$ " maximum at any location.
6. Offsets in Alignment of Adjacent Members at Any Joint: $3/16$ " in any 10' run; $3/8$ " maximum.

- B. In addition to above, in-place precast units may be rejected for any one of the following:

1. Exceeding the specified installation tolerances.
2. Exposed reinforcing steel.
3. Damaged during construction operations.
4. Exposed-to-view surfaces which develop surface finish deficiencies.
5. Other defects as listed in PCI MNL-117.

END OF SECTION 03450