

SECTION 13500
PRECAST CONCRETE COVER SYSTEM

PART 1 GENERAL

1.1 SYSTEM DESCRIPTION

A. Design Criteria:

1. Precast manufacturer shall be responsible for structural design of individual precast components, connections between components, and combining components to provide a complete cover system.
2. Design and reinforce units as required by ACI 318, PCI Design Handbook, as specified herein, and as shown on Drawings. Design and provide members capable of sustaining superimposed loads as noted below.
3. Design components to support applied loads, including following.
 - a. Live Load: 130 psf; concentrated load of one 10,000 pound axle plus 30 psf uniform; or two 5,000 pound wheel loads 4 ft apart plus 30 psf uniform load.
 - b. Wind Load: 20 psf.

1.2 SUBMITTALS

A. Shop Drawings:

1. Content:
 - a. Dimensions.
 - b. Details of inserts, anchors, connections, formed openings, fabrication detail, and design loads.
 - c. Lifting positions or devices.
 - d. Reinforcement.
2. Shop drawings shall bear stamp of Professional Engineer registered in State of Michigan.

B. Product Data:

1. Manufacturer's written instructions for handling, transporting, and erecting.

C. Test Results:

1. Reports of tests on concrete.

D. Miscellaneous SUBMITTALS:

1. Manufacturer's certificates of material or procedures are in compliance with Specifications.
2. When requested by ENGINEER, evidence of experience qualifications.

E. Submit in accordance with Section_____.

1.3 QUALITY ASSURANCE

A. Testing:

1. Conduct testing in accordance with PCI MML-I 16.

B. Regulatory Requirements:

1. Design, fabricate, and install precast sections to meet requirements of ACI 318, PCI MNL-116, and PCI Design Handbook

C. Shop Inspection:

1. Shop inspection may be required by OWNER at OWNER'S expense. CONTRACTOR shall give minimum of seven days notice to ENGINEER prior beginning of any fabrication work and shipment of completed components so Inspection may be provided.
2. CONTRACTOR shall allow ENGINEER free access to necessary parts of Work. ENGINEER shall have authority to reject materials or Work not meeting requirements of Specifications.
3. Inspection at shop intended as means of facilitating Work and avoiding errors, but will in no way relieve CONTRACTOR from responsibility for furnishing proper materials and workmanship under these specifications.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Follow manufacturer s written instructions for handling and transporting.
- B. Lift members at designated points only, and use lifting inserts if provided.
- C. Use lifting slings or spreader bars to keep angle between lifted member and cable greater than 45 degrees.
- D. Do not place members in position causing over stress, warp or twist
- E. Handle members to protect from dirt and damage.
- F. Place stored members so identification marks discernible.

G. Separate stacked members by battens across full width of each bearing point

H. Stack members so lifting devices accessible and undamaged.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Firms specializing in providing precast concrete products and service normally associated with industry for at least 3 yrs.

B. Manufacturers may be required to submit written evidence showing experience, qualifications, and adequacy of plant capability, facilities, and ability to perform Work in accordance with these Specifications.

C. Approved Manufacturers:

1. HTI, Inc., Suttons Bay, MI.

2.2 MATERIALS

A. Portland Cement: ASTM C150, Type I, II, or III.

B. Admixtures:

1. Air-Entraining: ASTM C260.
2. Water Reduction and Set Retardation: ASTM C494,-Type A.
3. Super Plasticizer: ASTM C494, Type A.

C. Aggregates ASTM C33 modified as follows:

1. Fine Aggregate: 2NS Sand
2. Coarse Aggregate: Peastone

D. Water: Potable or free from foreign materials in amounts harmful to concrete.

E. Reinforcing Steel:

1. Deformed SteelBars: ASTMA615,Grade 60.
2. Wire Fabric: Welded steel, ASTM A185.
3. Fabricated Steel Bar or Rod Mats: ASTM A184.

F. Anchors and Inserts:

1. Material: Steel, ASTM A360 or A307.
2. Finish:
 - a. Hot-dipped galvanized: ASTM A153.

G. Nonshrink grout in accordance with Section _____.

H. Grout:

1. Cement Grout: One part Portland cement, 3 parts sand, sufficient water for placement and hydration.

I. Curing Materials:

1. Liquid membrane forming compound, ASTM C309 or sheet materials, ASTM C 171.

2.3 MIX DESIGN

A. Mix design shall be in accordance with manufacturer's recommendations.

B. Concrete Properties:

1. Air-Entrainment:
 - a. 5 to 8%
2. 28-day Compressive Strength: 5,000 psi min.
3. Do not use calcium-chloride or other salts.

2.4 FABRICATION

A. Formwork:

1. Construct forms to maintain units within specified tolerances with radius or chamfer at corners.
2. Securely attach anchorage devices to Formwork in locations not affecting position of main reinforcement or placing of concrete.
3. Form treatments or curing compounds shall not contain ingredients which might stain through or otherwise injure concrete or reduce bond with subsequent coatings, finishes, grout or caulking.

B. Reinforcement:

1. Provide reinforcement necessary to resist stresses from applied loads, handling, and erecting.
2. Place and anchor reinforcement in position.
3. Locate lifting devices to not harm appearance of unit in finished position.

C. Concrete Placement:

1. Batch, mix, and handle concrete in accordance with ACI and PCI

recommended practices.

2. Place concrete in continuous operation to prevent formation of seams.
3. Consolidate placed concrete by vibration without dislocation or damage to reinforcement and built-in items.

D. Cure units in accordance with PCI MNL-116.

E. Finishes:

1. Unexposed Areas: As cast.
2. Exposed Faces of Units:
 - a. Cast against concrete or steel casting beds maintained in accordance with industry practice.
 - b. Surface holes, chips, and spalls shall not exceed 1/4-in.
 - c. Casting bed offsets and finish shall not exceed 1/8-in.
3. Spotty coloring not accepted.

F. Fabrication tolerances shall conform to requirements of MNL-116 and ACI 117, the more stringent requirements shall apply.

2.5 HOLES, ANCHORS, AND FRAMING

A. Embedded Items: Provide pipes, sleeves, inserts, weld plates, anchor plates, and other embedded items shown on Drawings and as required and cast into members during manufacture. Place dissimilar metals to avoid physical contact between them.

B. Furnish inserts, plates, fastening devices, and anchors to be set in supporting structure.

C. Holes:

1. Over 8-in. dia/sq shall be formed during manufacture of units, or field cut or cored by manufacturer.
2. 8-in. and under may be field cut or cored by contractor. Location shall be coordinated with precast manufacturer before cutting or coring.

D. Large Openings: Design and provide steel headers.

1. Reinforce units adjacent to units with openings larger than 12 in. to support additional dead and live load.

2.6 SOURCE QUALITY CONTROL

A. In general compliance with applicable provisions of PCI MNL-116.

1. Concrete Compression Tests:

- a. ASTM C39.
- b. Make one compression test for each day's production of each type of unit.

- c. Specimens:
 - i. Provide 4 test specimens for each compression test
 - ii. Obtain concrete for specimens from actual production batch
 - iii. Concrete cylinders, ASTM C31.
- 2. Failure of any member to come with intolerance specified in PCI MNL-116 end herein shall be cause for rejection.

PART 3 EXECUTION

3.1 INSPECTION

- A. Inspect bearing surfaces of structure to ensure they are smooth, level, and free of debris.
- B. Verify required inserts and anchors for connection to precast sections installed.

3.2 ERECTION

- A. Erect precast sections in accordance with manufacturer's written instructions.
- B. Do not bear units on cast-in-place concrete until strength of concrete is minimum 80% of design strength as determined by cylinder tests.
- C. Align, place, and level UNITS in final position on accepted bearing surfaces.
- D. Place no warped, cracked or broken units.
- E. Ends of units may be saw cut if required for proper clearance. Breaking of units with hammer to produce fit not accepted.
- F. Perform welding according to AWS D1.1 and D1.4.
- G. Cutting of holes or shall be approved by manufacturer and ENGINEER. Do not cut tension rods without manufacturer's consent.
- H. Remove lifting devices and grout surfaces flush with concrete.
- I. Refinish damaged surfaces to match adjacent areas.
- J. Anchor units to supporting structure. Anchors may be drilled and grouted into supporting structure.
- K. Allowable Erection Tolerances:
 - 1. Alignment between Units: 1/8 in./10 ft.
 - 2. Elevation between Adjacent Roof Members: Maximum difference 3/4 in. at any

point.

3. Gaps between Adjacent Roof Members: Maximum 1/4 in.

3.3 GROUTING AND POINTING

- A. Grout joints between roof units from top of unit, and finish on underside before hardening by raking joints 1/2 in. deep, fill with sealant, and smooth. Sealant shall be Tremco Dymeric 511 or equal.
- B. Trowel top of grout joints smooth, slope transitions due to differential levels not steeper than 1:12.
- C. Grout base of columns with nonshrink grout.

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