

SECTION 03 41 00
STRUCTURAL PRECAST CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Columns and bearing saddles
- B. Beams, spandrels, girders, purlins
- C. Floor of single, double, quad tees; channel slabs or inverted tee beam
- D. Grout packing.
- E. Connection and supporting devices
- F. Lintels and bond beams.
- G. Piles

1.2 REFERENCES

- A. ACI 301 - Structural Concrete for Buildings
- B. ACI 318 - Building Code Requirements for Structural Concrete
- C. ASCE-7 – Minimum Design Loads for Building & Other Structures
- D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel
- E. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- F. ASTM A185/A185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
- G. ASTM A416/A416M – Standard Specification for Steel Strand, Uncoated Seven-Wire (Stress-Relieved) for Pre-stressed Concrete
- H. ASTM A497/A497M - Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete.
- I. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
- J. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel, Sheet, Strip, Plate and Flat Bar
- K. ASTM C150/C150M - Standard Specification for Portland Cement
- L. AWS D1.1/D1.1M - Structural Welding Code Bundled Set B
- M. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel
- N. PCI MNL-116 - Manual for Quality Control for Plants and Production of Pre-cast Concrete Products
- O. PCI MNL-120 – PCI Design Handbook – Precast and Prestressed Concrete
- P. PCI MNL-123 - Design & Typical Details of Connections for Precast & Prestressed Concrete
- Q. PCI MNL-124 - Design for Fire Resistance of Precast Concrete
- R. FBC - Florida Building Code
- S. UL - Underwriter's Laboratories

1.3 DESIGN REQUIREMENTS

- A. Size the components to withstand design loads.
- B. Maximum Allowable Deflection: In accordance with FBC and ACI 318
- C. Design members exposed to the weather to provide for movement of components without damage, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to seasonal or cyclic day/night temperature ranges.

The School District of Palm Beach County

Project Name

SDPBC Project No.

- D. Design system to accommodate construction tolerances, deflection of other building structural members and clearances of intended openings.
- E. Calculate structural properties of framing members in accordance with FBC, and ACI 318.
- F. Design and construction shall comply with FBC, ASCE 7-Wind Loads.
- G. Superimposed design dead loads on roofs shall be the actual dead loads of the system, roofing, MEP allowance, plus 5-psf for re-roofing.

1.4 SUBMITTALS FOR REVIEW

- A. Section 01 33 00 - Submittals Procedures
- B. Shop Drawings: Indicate layout, unit locations, fabrication details, unit identification marks, reinforcement, connection details, support items, dimensions, openings and relationship to adjacent materials, and sealed by a Professional Structural Engineer licensed in the State of Florida. Indicate design loads, deflections, cambers, bearing requirements and special conditions.
- C. Product Data: Indicate standard component configurations, design loads, deflections, cambers and bearing requirements.

1.5 SUBMITTALS FOR INFORMATION

- A. Section 01 33 00 - Submittals Procedures
- B. Design Data: Submit design data reports indicating calculations for loadings and stresses of fabricated, designed framing.
- C. Provide a visual record of surrounding structures outside of school property at construction projects requiring driven piles.

1.6 QUALITY ASSURANCE

- A. Perform work in accordance with the requirements of PCI MNL-116, PCI MNL-123, and PCI MNL-120.
- B. Fabricator: Company specializing in manufacturing the work of this section with minimum five years documented experience.
- C. Erector: Company specializing in erecting the work of this section with three years documented experience and approved by manufacturer.
- D. Design pre-cast concrete members under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of Florida.
- E. Welder: Person qualified within previous 12 months in accordance with AWS D1.1 and AWS D1.4.

1.7 REGULATORY REQUIREMENTS

- A. Conform to ACI 318 and applicable code for design load and construction requirements applicable to work of this section.
- B. Conform to UL Assembly to achieve hour fire rating for floor or roof assembly.

1.8 PRE-INSTALLATION MEETING

- A. Convene a pre-installation conference two weeks prior to commencing work of this section, under provisions of Section 01 31 00.
- B. Instruct others when field cutting of required openings are 10: and smaller.

1.9 DELIVERY, STORAGE AND PROTECTION

- A. Section 01 60 00 - Material Equipment and approved equals
- B. Handle pre-cast members in position consistent with their shape, design, and Engineer's requirements.
 - 1. Lift and support only from support points.

- C. Lifting or Handling Devices: Capable of supporting member in positions anticipated during manufacture, storage, transportation, and erection.
- D. Protect members to prevent staining, chipping or spalling of concrete.
- E. Mark each member with date of production and final position in structure.

1.10 PROJECT CONDITIONS

- A. Section 01 31 00 - Coordination and Meetings
- B. Coordinate the work of framing components not pre-tensioned but associated with the work of this section.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Cement: White or Gray Portland, conforming to ASTM C150/C150M Type I or III.
- B. Aggregate, Sand, Water, and Admixtures, Pre-cast Fabricator determined as appropriate to design requirements and PCI MNL-116.

2.2 REINFORCEMENT

- A. Tensioning Steel Tendons: ASTM A416/A416M Grade 250K or 270K, of sufficient strength commensurate with member design
- B. Reinforcing Steel: ASTM A615/A615M Grade 60 deformed steel bars.
- C. Welded Steel Wire Fabric: ASTM A185/A185M Plain Type, ASTM A497/A497M Welded Deformed Type, and ASTM A497/A497 Deformed Type in flat sheets galvanized.
- D. Coating: Galvanize reinforcement to resist corrosion.

2.3 ACCESSORIES

- A. Connecting and Supporting Devices:
 - 1. ASTM A36/A36M carbon steel plates, angles, items cast into concrete inserts, hot-dip galvanized in accordance with ASTM A153/A153M.
 - 2. Do not paint surfaces in contact with concrete or surfaces requiring field welding.
- B. Grout: Non-shrink, non-metallic, non-ferrous minimum yield strength of 10,000 psi at 28 days.
- C. Bearing Pads: High-density plastic, smooth both sides, Vulcanized elastomeric compound molded to size, Neoprene.
- D. Bolts, Nuts and Washers: High strength steel type recommended for structural steel joints.
- E. Prime Paint: Zinc rich alkyd type.

2.4 FABRICATION

- A. Fabrication procedure to conform to PCI MNL-116
- B. Maintain plant records and quality control program during production of pre-cast members and make records available upon request.
- C. Ensure reinforcing steel, anchors, inserts, plates, angles and other cast-in items are embedded in the locations as shown on shop drawings.
- D. Tension reinforcement tendons as required to achieve design load criteria.
- E. Provide required openings with a dimension larger than 10-inches and embed accessories provided by other sections, at indicated locations.
- F. Exposed Ends at Stressing Tendons: Fill recess with non-shrink epoxy grout, trowel flush.

2.5 FINISHES

- A. Ensure exposed-to-view finish surfaces of pre-cast concrete members are uniform in color and appearance.
- B. Cure members under identical conditions to develop required concrete quality, and minimize appearance blemishes such as non-uniformity, staining, or surface cracking.

The School District of Palm Beach County

Project Name

SDPBC Project No.

- C. Rubbed Finish: Surface holes or bubbles over 1/4 inch filled with matching cementitious paste, fins or protrusions removed and surface ground smooth, surface then rubbed with neat cementitious paste to smooth and even color and texture.

2.6 FABRICATION TOLERANCES

- A. Conform to PCI MNL-116.

2.7 SOURCE QUALITY CONTROL AND TESTS

- A. Section 01 40 00 - Quality Control: Provide mix design for concrete.
- B. Test samples in accordance with applicable ASTM standard.

PART 3 EXECUTION

3.1 APPLICATION

- A. Verify that site conditions are ready to receive work and field measurements are as shown on shop drawings.

3.2 PREPARATION

- A. Prepare support equipment for the erection procedure, temporary bracing, and induced loads during erection.

3.3 ERECTION

- A. Erect members without damage to structural capacity, shape, or finish.
 - 1. Replace or repair damaged members.
- B. Align and maintain uniform horizontal and vertical joints, as erection progresses.
- C. Protect members from staining by maintaining temporary bracing until final placement of all supports.
- D. Provide temporary lateral support to prevent bowing, twisting, or warping of members.
- E. Adjust differential camber between precast members to tolerance before final attachment.
- F. Install bearing pads.
- G. Level differential elevation of adjoining horizontal members with grout to maximum slope of 1:12
- H. Set vertical units dry, without grout, attaining joint dimension with lead or plastic spacers.
- I. Grout underside of column and beam bearing plates and joints between members at roof and floor locations.
- J. Secure units in place and perform welding in accordance with AWS D1.1.

3.4 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Control: Tolerances
- B. Erect all members' level and plumb within allowable tolerances.
- C. Conform to PCI MNL-116.
- D. When members cannot be adjusted to conform to design or tolerance criteria, cease work and advise Architect/Engineer.
 - 1. Execute modifications as directed.

3.5 PROTECTION

- A. Protect members from damage caused by field welding or erection operations.
- B. Provide non-combustible shields during welding operations.

3.6 CLEANING

- A. Clean weld marks, dirt or blemishes from surface of exposed members.

END OF SECTION