

**SECTION 03470
TILT-UP CONCRETE**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Requirements of Section 03300 "Cast-In-Place Concrete" applies to this Section.

1.02 SUMMARY

- A. This Section includes tilt-up concrete panels that are cast, finished, and erected at the site.
- B. Extent of tilt-up precast concrete construction is shown on drawings.

1.03 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specifications Sections, and in addition to requirements of Section "Cast-In-Place Concrete."
 - B. Samples approximately 12 inches square and 2 inches thick, representative of full range of colors and textures of panel finishes.
 - C. Shop Drawings indicating panel dimensions, openings, reinforcement and connection details, locations of items cast into panels, lifting devices, and other pertinent information. Submitted panel shop drawings shall be checked and signed by the general contractor and signed and sealed by a licensed specialty engineer.
 - D. Furnish information concerning method and sequence of erection.

1.04 QUALITY ASSURANCE

- A. General: The following are in addition to "Quality Assurance" provisions of Section "Cast-In-Place Concrete."
 - B. Erector Qualifications: At least 2 years of successful experience in erection of tilt-up wall panels similar in size and amount as required for this Project.
 - C. Job Mock-Up: After acceptance of material samples, construct full-size panel to include representative items encountered in work. Cast, finish, cure, and erect job mock-up panel in same manner as will be employed in Project. Job mock-up panel may be incorporated in structure when acceptable to Architect.

- D. Construction Loads: Design and fabricate tilt-up wall panels to withstand construction loads which may occur during lifting, bracing, and impact by adjoining panels.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Tilt-up precast concrete construction materials are specified in Section "Cast-In-Place Concrete."
- B. The following are in addition to requirements specified in Section "Cast-In-Place Concrete."
- C. Facing Concrete: Use selected cement and aggregates to match Architect's sample.
- D. Bond Breaker: Polymerized solution containing no oils, waxes, paraffin's, or other material which could affect bond of subsequent finishes or natural appearance of exposed concrete surfaces.
- E. Anchors and Inserts: Provide inserts, dowels, bolts, nuts, washers, and other items shown to be cast in panels or required for connecting panels to adjacent work, including inserts required for lifting.
 - 1. Structural Steel Shapes: ASTM A 36 or A992.
 - 2. Malleable Iron Castings: ASTM A 47, grade 32510.
 - 3. Carbon Steel Castings: ASTM A 27, grade 60-30.
 - 4. Stainless Steel Anchors: ASTM A 167, type 301, mill finish.
 - 5. Hot-Dip Galvanized iron and steel anchors, inserts, and connecting devices: ASTM A 153.
- F. Flashing Reglets: Open type having continuous groove not less than 1-1/8 inches deep by 3/16 inch wide at opening and sloped upwards to 45 degrees. Furnish with easily removed, temporary filler strip.
 - 1. Stainless Steel: ASTM A 167, type 302/304 soft temper, minimum 0.018 inch (28 gage) thick.
 - 2. Copper Strip: ASTM B 370, cold-rolled temper, minimum 0.0216 inch thick (16 oz. psf.).
 - 3. Hot-Dip Galvanized Sheet Steel: ASTM A 526, with ASTM A 525, G90 zinc coating, minimum 0.0217 inch thick (26 gage).
- G. Forms: Wood, metal, or other substantial material to maintain forms in good alignment and produce required finish. Provide external bracing to prevent form displacement during casting operations.
- H. Form Liners: As required to produce panel finish matching Architect's control sample.

2.02 CONCRETE MIX DESIGN

- A. Comply with requirements of Section "Cast-In-Place Concrete."
- B. Facing Concrete: Selected aggregates, cement, and additives to produce the following properties:
 - 1. Design compressive strength at 28 days: 4000 psi minimum.
 - 2. Total air content: 3 percent to 6 percent.

2.03 FABRICATION TOLERANCES

- A. Casting Tolerances: Over-all height and width measured at face adjacent to mold when cast:
 - 1. Panels 10 ft. or under: plus or minus 1/8 inch.
 - 2. Panels 10 ft. to 20 ft.: plus 1/8 inch, minus 3/16 inch.
 - 3. Panels 20 ft. to 30 ft.: plus 1/8 inch, minus 1/4 inch.
 - 4. Each additional 10 ft.: plus or minus 1/16 inch per 10 ft.
 - 5. Panel thickness: plus 1/4 inch, minus 1/8 inch.
 - 6. Openings (cast within one member): plus or minus 1/4 inch.
 - 7. Out of square (diagonal): 1/8 inch per 6 ft. or 1/4 inch total.
- B. Location Tolerances: Cast-in items:
 - 1. Inserts, pipe sleeves, bolts, etc.: plus or minus 3/8 inch.
 - 2. Flashing reglets, at edge of panel: plus or minus 1/4 inch.
 - 3. Reglets for glazing gasket: plus or minus 1/8 inch.
 - 4. Groove width for glazing gaskets: plus or minus 1/16 inch.
 - 5. Electrical outlets, hose bibs, etc.: plus or minus 1/2 inch.
 - 6. Reveals across panels: plus or minus 1/8 inch.

PART 3 EXECUTION

3.01 PREPARATION

- A. General: Coordinate installation of inserts and anchorages required to be set into concrete slabs prior to casting panels.
- B. Curing Base Casting Slabs: Cure concrete surfaces upon which wall panels are to be cast in same manner specified under Section "Cast-In-Place Concrete," except do not use paper or other curing sheet. At completion of 48-hour fog spray curing, use varnish base type of "curing compound" certified to have qualities of a "bond breaker" (parting compound), applied in accordance with manufacturer's instructions.

3.02 CASTING PANELS

- A. Forms: Place forms to minimize damage to casting slab surfaces. Erect and

brace forms to receive reinforcing steel anchors, inserts, and other items to be cast into wall panels.

1. Place form liners accurately to provide finished surface texture to match Architect's sample.
- B. Reinforcing and Inserts: Set and tie reinforcing steel as specified in Section "Cast-In-Place Concrete." Locate and secure anchorages and inserts and other cast-in items.
1. Extend reinforcing as required for later connections to other concrete structures.
 2. After placing reinforcing steel for panels, check casting slab surfaces for continuity of bond breaker film. Touch up or re-coat worn or damaged areas, taking particular care to prevent application of coating on reinforcing steel and inserts.
- C. Casting: Cast panels individually on building floor slab, or temporary casting platform as required by project conditions. Comply with applicable requirements of Section "Cast-In-Place Concrete."
- D. Consolidate concrete thoroughly to produce maximum density throughout entire panel thickness without voids. Take care not to displace reinforcement or inserts, or to score forms, liners, or casting slab.
- E. Finish: Match Architect's sample for color and texture. Cracks, voids, protrusions, spalls, or non-uniform color or texture will not be acceptable.
- F. Curing: As specified in Section "Cast-In-Place Concrete." Curing may be completed with panels in vertical position when sufficient strength has been attained for lifting without damage.

3.03 ERECTION AND INSTALLATION

- A. General: Use erection equipment with care to prevent damage to floor slabs. Repair damage as directed.
- B. Erection: Do not erect panels until at least 75 percent of specified 28-day compressive strength has been verified.
- C. Raise and lift panels from casting slab and erect plumb in accurate location and alignment. Anchor in place as shown. Use wedges where required to correctly position panels. Provide concrete mortar, grout, or dry pack to fill joints between panels and foundation system.
- D. After placing, provide temporary braces and supports to securely hold panels in position. Maintain braces and supports in place, undisturbed, until closures, columns, or other supporting structures have been installed and are capable of receiving panels.

- E. Weld panels to supports where indicated on drawings. Comply with requirements of AWS D1.1 for welded steel connections and D1.4 for welded reinforcing bars.
- F. Installation Tolerances: 1/4 inch maximum offset in alignment with adjacent panel facings at any point.

3.04 PATCHING

- A. Patch holes in panel surfaces created by lifting and bracing devices. Comply with concrete surface repair requirements of Section "Cast-In-Place Concrete."
- B. Repair of other defective or damaged surfaces will be permitted only upon acceptance by Architect. Remove and replace panels that are not acceptable for surface repairs.

3.05 FIELD QUALITY CONTROL

- A. Comply with requirements of Section "Cast-In-Place Concrete."

END OF SECTION 03470