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**SECTION 03 30 00**  
**CAST-IN-PLACE CONCRETE****PART 1 - GENERAL****1.1 SECTION REQUIREMENTS**

- A. Submittals: Product Data concrete mix designs and submittals required by ACI 301.
- B. Ready-Mixed Concrete Producer Qualifications: ASTM C 94/C 94M.

**PART 2 - PRODUCTS****2.1 PERFORMANCE REQUIREMENTS**

- A. Comply with ACI 301, "Specification for Structural Concrete," and with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

**2.2 MATERIALS**

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- B. Plain Steel Wire: ASTM A 82/A 82M, as drawn.
- C. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, as drawn, flat sheet.
- D. Portland Cement: ASTM C 150, Type I or II.
- E. Fly Ash: ASTM C 618, Class C or F.
- F. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- G. Silica Fume: ASTM C 1240, amorphous silica.
- H. Aggregates: ASTM C 33, Class 3S coarse aggregate or better, graded, with at least 10 years' satisfactory service in similar applications.
  - 1. Maximum Coarse-Aggregate Size: 3/4 inch (19 mm) nominal.
- I. Air-Entraining Admixture: ASTM C 260.
- J. Synthetic Fiber: ASTM C 1116/C 1116M, Type III, polypropylene fibers, 1/2 to 1-1/2 inches (13 to 38 mm) long.
- K. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- L. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

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- M. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.

### 2.3 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301.
- B. Normal-Weight Concrete:
1. Minimum Compressive Strength: 3000 psi (20.7 MPa) 28 days.
  2. Maximum Water-Cementitious Materials Ratio: 0.50.
  3. Slump Limit: 4 inches (100 mm) for concrete with verified slump of 2 to 4 inches (50 to 100 mm) before adding high-range water-reducing admixture or plasticizing admixture plus or minus 1 inch (25 mm).
  4. Air Content: Maintain within range permitted by ACI 301. Do not allow air content of floor slabs to receive troweled finishes to exceed 3 percent.
  5. Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.
  6. For concrete exposed to deicing chemicals, limit use of fly ash to 25 percent replacement of portland cement by weight and granulated blast-furnace slag to 40 percent of portland cement by weight; silica fume to 10 percent of portland cement by weight.
- C. Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116.
1. When air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

## PART 3 - EXECUTION

### 3.1 CONCRETING

- A. Construct formwork according to ACI 301 and maintain tolerances and surface irregularities within ACI 347R limits of Class A, 1/8 inch (3.2 mm) for concrete exposed to view and Class B, 1/4 inch (6 mm) for other concrete surfaces.
- B. Place vapor retarder on prepared subgrade, with joints lapped 6 inches (150 mm) and sealed.
- C. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- D. Install construction, isolation, and contraction joints where indicated. Install full-depth joint-filler strips at isolation joints.
- E. Place concrete in a continuous operation and consolidate using mechanical vibrating equipment.
- F. Protect concrete from physical damage, premature drying, and reduced strength due to hot or cold weather during mixing, placing, and curing.
- G. Formed Surface Finish: Smooth-formed finish for concrete exposed to view, coated, or covered by waterproofing or other direct-applied material; rough-formed finish elsewhere.

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- H. Slab Finishes: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces. Provide the following finishes:
1. Scratch finish for surfaces to receive mortar setting beds.
  2. Float finish for surfaces to receive waterproofing, roofing, or other direct-applied material.
- I. Cure formed surfaces by moisture curing for at least seven days.
- J. Protect concrete from damage. Repair and patch defective areas.

### 3.2 STEEL REINFORCEMENT INSTALLATION

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded-wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

**END OF SECTION**