

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cast-in-place concrete sidewalks, footings, and curbs.
- B. Slabs on grade.
- C. Control, expansion and contraction joint devices associated with concrete work, including joint sealants.

1.2 RELATED SECTIONS

- A. Section 03100 - Concrete Formwork: Formwork and accessories.

1.3 REFERENCES

- A. ACI 211.1 - Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
- B. ACI 211.2 - Selecting Proportions for Structural Lightweight Concrete.
- C. ACI 301 - Structural Concrete for Buildings.
- D. ACI 302 - Guide for Concrete Floor and Slab Construction.
- E. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.
- F. ACI 305R - Hot Weather Concreting.
- G. ACI 306R - Cold Weather Concreting.

- H. ACI 308 - Standard Practice for Curing Concrete.
- I. ASTM C33 - Concrete Aggregates.
- J. ASTM C94 - Ready-Mixed Concrete.
- K. ASTM C150 - Portland Cement.
- L. ASTM C260 - Air Entraining Admixtures for Concrete.

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- M. ASTM C494 - Chemical Admixtures for Concrete.
 - N. ASTM C618 - Fly Ash and Raw or Calcinated Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.
 - O. ASTM C948 - Test Method for Dry and Wet Bulk Density, Water Absorption and Apparent Porosity of Thin Sections of Glass-Fiber-Reinforced Concrete.
 - P. ASTM D994 - Preformed Expansion Joint Filler for Concrete (Bituminous Type).
 - Q. ASTM D1190 - Concrete Joint Sealer, Hot-Poured Elastic Type.
 - R. ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
 - S. ASTM D1752 - Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
- 1.5 SUBMITTALS FOR INFORMATION
- A. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent Work.
- 1.6 SUBMITTALS AT PROJECT CLOSEOUT
- A. Accurately record actual locations of embedded utilities and components, which are concealed from view.
- 1.7 QUALITY ASSURANCE
- A. Perform Work in accordance with ACI 301.
 - B. Maintain one copy of each document on site.
 - C. Acquire cement and aggregate from same source for all work.
 - D. Conform to ACI 305R when concreting during hot weather.
 - E. Conform to ACI 306R when concreting during cold weather.

PART 2 PRODUCTS

A.

2.1 CONCRETE MATERIALS

- A. Cement: ASTM C150, Type I – Normal Portland type.
- B. Fine and Coarse Aggregates: ASTM C33.
- C. Water: Clean and not detrimental to concrete.

2.2 ADMIXTURES

- B. Air Entrainment: ASTM C260
- C. Chemical: ASTM C494 Type A - Water Reducing Type D - Water Reducing and Retarding Water Reducing and Type F - Water Reducing, High Range.

2.3 ACCESSORIES

- A. Bonding Agent: Polymer resin emulsion Polyvinyl Acetate Latex emulsion, Two component modified epoxy resin Non-solvent, two component polysulfide epoxy mineral filled polysulfide polymer epoxy. Versamid cured epoxy.
- B. Vapor Retarder: 6 mil. thick.
- C. Non-Shrink Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2,400 psi in 48 hours and 7,000 psi in 28 days;

2.4 JOINT DEVICES AND FILLER MATERIALS

- A. Joint Filler Type A ASTM D1751 Asphalt impregnated fiberboard or felt 3/8 inch thick; tongue and groove profile.
- B. Construction Joint Devices: Integral extruded plastic 3/8 inch thick, formed to tongue and groove profile with removable top strip. Exposing sealant trough, knockout holes spaced at 6 inches, ribbed with tongue to fit top screed edge.
- C. Expansion and Contraction Joint Devices: ASTM B221 alloy, extruded aluminum; resilient elastomeric vinyl neoprene filler strip with a Shore. A hardness of 35 to prevent plus or minus 25 percent joint movement with full recovery; extruded aluminum vinyl cover plate, of longest manufactured length at

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each location, flush, recessed mounted; color to match concrete finish as approved by designer.

D. Sealant: ASTM D1190; Hot applied rubber compound.

A. 2.5 CONCRETE MIX

A. Mix concrete in accordance with ACI 304. Deliver concrete in accordance with ASTM C94.

B. Select proportions for normal weight concrete in accordance with ACI 301 Method 1.

C. Provide concrete to the following criteria:

<u>Unit</u>	<u>Measurement</u>
Compressive Strength (7 day)	3000 psi
Compressive Strength (28 day)	4000 psi
Aggregate Size (maximum)	¾ inch
Aggregate Size (minimum)	¼ inch
Slump- Plus of minus 1 inch	3 inches

D. Use accelerating admixtures in cold weather only when approved by the Project Manager. Use of admixtures will not relax cold weather placement requirements.

E. Use calcium chloride only when approved by the Project Manager.

F. Use set retarding admixtures during hot weather only when approved by the Project Manager.

G. Add air entraining agent to normal weight concrete mix for work exposed to exterior.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify site conditions are acceptable to proceed with work. Starting work means conditions are acceptable.

B. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

3.2 PREPARATION

- A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
- B. In locations where new concrete is dowelled to existing work, drill holes in existing concrete; insert steel dowels and pack solid with non-shrink grout.
- C. Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories.

3.3 PLACING CONCRETE

- A. Place concrete in accordance with ACI 301.
- B. Notify the Project Manager a minimum 24 hours prior to commencement of operations.
- C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints, are not disturbed during concrete placement.
- D. Extend joint filler from bottom of slab to within 1/2 inch of finished slab surface.
- E. Install joint devices in accordance with manufacturer's instructions.
- F. Install joint covers in one piece length, when adjacent construction activity is complete.
- G. Apply sealants in joint devices.
- H. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- I. Place concrete continuously between predetermined expansion, control, and construction joints.
- J. Do not interrupt successive placement; do not permit cold joints to occur
- K. Saw cut joints within 24 hours after placing. Use 3/16 inch thick blade, cut into ¼ depth of slab thickness.

3.4 CONCRETE FINISHING

- A. Provide formed concrete surfaces to be left exposed with smooth rubbed finish.

3.5 CURING AND PROTECTION

- A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.6 FIELD QUALITY CONTROL

- A. Provide free access to Work and cooperate with appointed firm.
- B. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of Work.
- C. Tests of cement and aggregates may be performed to ensure conformance with specified requirements.
- D. Three concrete test cylinders will be taken for every 75 or less yds of each class of concrete placed.
- E. One additional test cylinder will be taken during cold weather concreting, cured on job site under same conditions as concrete it represents.
- F. One slump test will be taken for each set of test cylinders taken.

3.7 PATCHING

- A. Allow the Project Manager to inspect concrete surfaces immediately upon removal of forms.
- B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify the Project Manager upon discovery.
- C. Patch imperfections as directed.

3.8 DEFECTIVE CONCRETE

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replacement of defective concrete will be determined by the Project Manager.
- C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of the Project Manager for each individual area.

END OF SECTION