

## **SECTION 03 30 10 CONCRETE PLACEMENT**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Concrete placement for slabs on grade, slabs on fill, structural building frame, and other concrete components.

#### **1.2 REFERENCES**

- A. ACI 301: Specifications for Structural Concrete for Buildings.
- B. ACI 305: Hot Weather Concreting.
- C. ACI 306: Cold Weather Concreting.
- D. ACI 309: Standard Practice for Consolidation of Concrete.
- E. ASTM C 881: Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
- F. ASTM C 1059: Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.

#### **1.3 SUBMITTALS**

- A. Batch Delivery Ticket: For each batch delivered to site, identify.
  - 1. Date and Project description.
  - 2. Producer and plant.
  - 3. Name of contractor.
  - 4. Serial number of ticket.
  - 5. Mix identification.
  - 6. Truck number and time dispatched.
  - 7. Volume of concrete.
  - 8. Type and amount of cement.
  - 9. Total water and water/cement ratio.
  - 10. Water added for receiver of concrete and receiver's initials.
  - 11. Admixture types.
  - 12. Separate weights of fine and coarse aggregate.
  - 13. Statement of whether batch is pre-mixed at plant or mixed in transit.
- B. Record of Placed Concrete: Identify record date, location of pour, quantity, air temperature, and CONTRACTOR's quality control test samples taken.
- C. Bonding Compound: Identify product name, type, and chemical analysis.

#### **1.4 QUALITY ASSURANCE**

- A. Provide ACI certified finishers.
- B. Remove and replace any placed concrete suffering hot or cold weather damage.
- C. For control testing follow Section 03 30 05 requirements.

#### **1.5 ACCEPTANCE**

A General:

1. Price adjustment, Section 01 29 00. CONTRACTOR may request ENGINEER determine appropriate Modifications or payment adjustments to correct Defective Work.
  2. Dispute resolution, Section 01 35 10 and Section 03 30 05.
- B. Concrete work that fails to meet any of the following requirements will be considered defective. Replace any Defective Work at no additional cost to the OWNER.
1. Placement:
    - a. Reinforcing steel size, quantity, strength, position, damage, or arrangement is not as specified or does not comply with code.
    - b. Formwork differs from required dimensions or location in such a manner as to reduce concrete's strength or load carrying capacity or physical esthetics.
    - c. Workmanship likely to result in deficient strength.
  2. Finishing:
    - a. Concrete exposed to view has defects that adversely affect appearance.
    - b. Slab tolerances of Section 03 35 00 are not met.
  3. Protection:
    - a. Method of curing is not as specified.
    - b. Inadequate protection of concrete during early stages of hardening and strength development from
      - 1) temperature extremes.
      - 2) rapid moisture loss.
    - c. Mechanical injury, construction fires, accidents, or premature removal of formwork likely to result in deficient strength development.

## **PART 2 PRODUCTS**

### **2.1 MATERIALS**

- A. Concrete, Section 03 30 04. Class as indicated.
  1. For roadway cuts, Section 33 05 25.
- B. Bonding compound, ASTM C 1059. Either polyvinyl acetate base or acrylic base latex.
  1. Use type I in areas not subject to high humidity or immersion in water with minimum bond strength of 400 psi.
  2. Use type II in areas subject to high humidity or immersion in water with minimum bond strength of 1250 psi.
- C. Vapor retarder, 10 mil thick clear polyethylene sheet. Type recommended for below grade application.
- D. Forms, Section 03 11 00.
- E. Reinforcement, Section 03 20 00.
- F. Coverings and curing compound, Section 03 39 00.
- G. Shrinkage compensating grout, Section 03 61 00.
- H. Epoxy adhesive, Section 03 61 00.

## PART 3 EXECUTION

### 3.1 PREPARATION

- A. Notify ENGINEER minimum 24 hours prior to commencement of concrete placement operations.
- B. Do not allow construction loads to exceed structural capacity.
- C. Clean previously placed concrete. Apply bonding compound per manufacturer's instructions.
- D. At locations where new concrete is dowelled to existing work, drill, remove dust, insert and pack steel dowels with shrink compensating grout.

### 3.2 EXAMINATION

- A. Verify items to be cast into concrete are accurately placed and held securely.
- B. Verify slump, air content range, mix identify, and batch time on delivery ticket matches mix design.
- C. Verify slab steel mats are supported by steel chairs, precast concrete blocks, or other slab bolsters. Do not pour if absent.

### 3.3 DELIVERY

- A. Slump and Air Content: Keep slump and air content within the allowable range.
- B. Placement Time:

#### **Air Time Temperature After Initial Batching**

Less than 90 deg. F. 1-1/2 hours Greater than 90 deg. F. 1-hour (without retarder)  
Greater than 90 deg. F. 1-1/2 hours (with retarder)  
To increase time past 1-1/2 hours, a hydration stabilizer that is acceptable to Supplier may be used.

- C. Tempering:
  - 1. Water may be added if all following conditions are met.
    - a. The mix design water/cement ratio is not exceeded.
    - b. The delivery ticket allows for addition of water based upon water/cement ratio.
    - c. The amount of water added is accurately measured to within 1 gallon of the design addition.
    - d. Water addition is followed by 3 minutes of mixing at mixing speed prior to discharge.
    - e. Supplier and CONTRACTOR mutually agree on who is authorized to add water.
  - 2. **Do not add water after 1 cubic yard of concrete has discharged from the delivery vehicle.**
- D. Super-plasticizer: Comply with manufacturer's requirements. If none, then as follows.
  - 1. If added at site, add agent using injection equipment capable of rapidly and uniformly distributing the admixture to the concrete. Prior to discharge, mix for a minimum of 5 minutes at a drum rate not less than 12 rpm or more than 15 rpm.
  - 2. If added at plant; do not deliver to site unless batch delivery ticket displays water/cement ratio prior to super-plasticizer addition.

### 3.4 CONCRETE PLACEMENT

#### A. Place concrete, ACI 301.

1. Hot Weather Placement: ACI 305. If the rate of evaporation approaches 0.2 lb./ft<sup>2</sup>/hr. precautions against plastic shrinkage cracking are necessary. (i.e. dampening subgrade and forms; placing concrete at the lowest possible temperature; erecting windbreaks and sunshades; fog sprays; use of evaporation retardants; or rescheduling time of placement).
2. Cold Weather Placement: ACI 306. Non-chloride accelerating admixture may be used in concrete work placed at ambient temperatures below 50 deg. F. Use of admixtures will not relax cold weather placement, curing, or protection requirements.

#### B. Concrete Temperature: Keep mixed concrete temperature at time of placement between 60 deg. F. and 90 deg. F.

#### C. Do not disturb reinforcement, inserts, embedded parts, and formed joints.

#### D. Do not break or interrupt successive pours such that cold joints occur.

#### E. Honeycomb or embedded debris in concrete is not acceptable.

### 3.5 JOINTS AND JOINT SEALING

#### A. Steel edging and jointing tools are acceptable. Preferred are magnesium, aluminum or wood.

#### B. Pavement joint sealing, Section 32 13 73.

### 3.6 CONSOLIDATION

#### A. Keep spare vibrator available during concrete placement operations, ACI 309.

### 3.7 FINISHING

#### A. Section 03 35 00 and as follows.

### 3.8 CURING

#### A. Section 03 39 00. Use a membrane forming compound unless specified otherwise.

### 3.9 PROTECTION AND REPAIR

#### A. Protection: Section 01 66 00.

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

#### B. Repair:

1. Modify or replace concrete not conforming to required levels, lines, details, and elevations.
2. Structural analysis and additional testing may be required at no additional cost to OWNER when the strength of a structure is considered potentially deficient.
3. To patch imperfections refer to Section 03 35 00 requirements.
4. Remove graffiti and mechanical injury.

END OF SECTION