

SECTION 03300

CONCRETE

PART 1 GENERAL

1.01 SCOPE OF WORK

Concrete foundation walls, sanitary structures, pipe encasements, thrust blocking and slabs on grade.

1.02 REFERENCES

- A. ACI 301 – Specification for Structural Concrete
- B. ACI 318 – Building Code Requirements for Structural Concrete and Commentary
- C. ACI 350R – Environmental Engineering Concrete Structure
- D. ASTM C33 – Specification for Concrete Aggregates
- E. ASTM C94 - Specification for Ready-Mixed Concrete
- F. ASTM C150 - Specification for Portland Cement
- G. ASTM C260 - Specification for Air-Entraining Admixtures for Concrete
- H. ASTM C494 - Specification for Chemical Admixtures for Concrete
- I. Georgia Department of Transportation Standard Specifications (Section 500)
- J. ACI 306.1 – Standard Specification for Cold Weather Concreting

1.03 QUALITY ASSURANCE

- A. Perform work in accordance with ACI 301 and 318.
- B. Obtain materials from same source throughout the WORK.
- C. Tests: As listed in "Methods of Sampling and Testing", Section 18, ASTM C94. Qualifications of laboratory, responsibilities of all parties involved, and designation of the party to employ, and to pay for, specified services are covered in the Supplementary General Provisions.

1. Concrete:
 - a) Mix and Control: The verifications and control of concrete mixes shall be the work of an independent testing laboratory. Cost of testing shall be paid by DEVELOPER/CONTRACTOR.
 - b) Laboratory Services shall test aggregates for specifications compliance.
2. Contractor shall submit design mixes and testing as required by ACI 301.

1.04 TESTS

- A. Testing and analysis of concrete will be performed in accordance to ACI 301.
- B. Submit proposed mix design of each class of concrete to ENGINEER for review prior to commencement of work.
- C. Four concrete test cylinders will be taken for every 75 or less cu yds of each class of concrete placed each day.
- D. One slump and entrained air test will be taken for each set of test cylinders taken.

PART 2 PRODUCTS

2.01 CONCRETE MATERIALS

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

2.02 ADMIXTURES

- A. Air Entrainment: ASTM C260.
- B. Chemical Admixture: ASTM C494, of any type must be approved prior to use.

2.03 CONCRETE MIX

- A. Mix concrete in accordance with ASTM C94.
- B. Provide concrete for all applications of the following characteristics:
 1. Class B - Normal Weight 4,000 psi @ 28 days

2. Class C - Normal Weight 3,000 psi @ 28 days
 3. Class D - Normal Weight 2,500 psi @ 28 days
- C. Use accelerating admixtures in cold weather only when approved. Use of admixtures will not relax cold weather placement requirements.
- D. Use set-retarding admixtures during hot weather only when approved.
- E. Concrete mix for concrete work subject to freeze-thaw cycling will have entrained air in accordance with ACI 301.

PART 3 EXECUTION

3.01 INSPECTION

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

3.02 PREPARATION

Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Bonding agent shall be approved prior to use. Apply bonding agent in accordance with manufacturer's instructions.

3.03 PLACING CONCRETE

- A. Notify the TOWN a minimum of 24 hours prior to commencement of concreting operations.
- B. Place concrete in accordance with ACI 301.
- C. Hot Weather Placement: When hot weather placement is required, Contractor shall submit plans for approval by Owner and Engineer.
- D. Cold Weather Placement: ACI 306.1.
- E. Ensure reinforcement, inserts, embedded parts, formed joints and opening are not disturbed during concrete placement.
- F. Maintain concrete cover around reinforcing as per ACI 318.
- G. Place concrete continuously between predetermined construction joints. Construction joints not in construction plans shall be approved.
- H. All construction joints shall be constructed in accordance with construction documents.

I. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify CONTRACTOR/DEVELOPER and TOWN upon discovery.

J. Placing during non-daylight hours

1. Concrete shall be placed during daylight hours unless otherwise approved by the Engineer. Placing of concrete in a portion of work shall not be started unless that portion of the work can be completed during daylight. Daylight is defined as the period one hour before sunrise to one hour after sunset.
2. If it is desired by the CONTRACTOR to place concrete during non-daylight hours, the CONTRACTOR shall provide an adequate lighting system approved by the ENGINEER. Approval of the placing of concrete during non-daylight hours shall in no way lessen the responsibility of the CONTRACTOR as related to the WORK.

3.04 FINISHING

- A. Concrete surfaces shall have rough edges tooled-off; irregularities shall be filled pointed-up and spot finished.
- B. Dress all exposed concrete corners with a $\frac{3}{4}$ " x $\frac{3}{4}$ " chamfer.

3.05 FIELD QUALITY CONTROL

- A. Concrete Control: The verification and control of all concrete shall be performed by an independent testing laboratory. Cost of testing shall be paid by CONTRACTOR/DEVELOPER. All concrete testing shall be performed by ACI certified technicians in accordance with ASTM C94.
- B. Laboratory Services shall be as follows:
 1. Make, cure, store and break test cylinders conforming to requirements of ASTM C31 "Standard Method of Making and Curing Concrete Test Specimens in the Field"; ASTM C39 "Standard Method of Test for Compressive Strength of Cylindrical Specimens"; ASTM C143 "Standard Method of Test for Slump of Portland Cement Concrete"; ASTM C172 Test cylinders and slump tests shall be made at job site and under no circumstances shall they be taken at a central mixing plant.
 2. Reports on all tests conducted by laboratory shall be rendered promptly and distributed as follows:
 - a) TOWN - two (2) copies
 - b) DEVELOPER/CONTRACTOR - As requested

3. Reports of control cylinders for job placed concrete shall conform to the requirements of ASTM C94.

C. Contractors Function in Concrete Testing

1. Contractor/Developer shall comply with ACI 301. Contractor/Developer shall provide assistance as necessary for cylinder sampling.
2. Keep a daily log, recording quantities of each class of concrete used, the area of location of each quantity of concrete relating to its controlling cylinder and the slump of this concrete, and general weather conditions. The CONTRACTOR/DEVELOPER shall furnish this information to the laboratory for inclusion in the test reports. The CONTRACTOR/DEVELOPER shall obtain delivery tickets showing the class and strength of concrete, the size of coarse aggregate and the slump order. The CONTRACTOR/DEVELOPER shall identify these tickets relative to the area of placement of the concrete and shall retain them on file. He shall produce the tickets, should TOWN so request.

D. Detailed Requirements

1. Of the test cylinders taken, one shall be broken at 7 days, two shall be broken at 28 days and one held in reserve.
2. Acceptance of concrete shall be in accordance with ACI 301.

3.06 PATCHING

- A. Patch imperfections.

3.07 DEFECTIVE CONCRETE

- A. Modify or replace concrete not conforming to required levels and lines, details, and elevations.
- B. Repair or replace concrete not properly placed or of the specified type.

3.08 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.

END OF SECTION