

## SECTION 1140 - CONCRETE

### PART 1 - GENERAL

#### 1.1 SCOPE OF WORK:

Provide all labor, materials, equipment and services required for placing and finishing concrete as specified herein.

#### 1.2 GENERAL REQUIREMENT:

All concrete construction shall conform to all applicable requirements of the latest version of ACI 301, except as modified by the supplemental requirements specified herein, and shall be in accordance with ODOT 499.

### PART 2 - PRODUCTS

#### 2.1 CONCRETE:

##### A. Concrete shall be used as follows:

1. ODOT 499 Class C (ASTM Class A) Concrete for all concrete work except as noted below or elsewhere in these specifications.
  - a. 4,000 psi compressive strength at 28 days.
  - b. Type II cement plus dispersing agent and air.
  - c. Max. (water)/(cement and dispersing agent) ration = 0.45.
  - d. Min. cement content = 564 lbs. (6.0 bags)/cu. yd. concrete.
  - e. Nominal max. size coarse aggregate = No. 67 (3/4" max.) or No. 57 (1" max.). Walls with architectural treatment shall use No. 67 (3/4" max.).
  - f. Air content = 6% plus or minus 1% by volume.
  - g. Slump = 3" - 4" in accordance with ASTM C 143.
2. ODOT Class F (ASTM Class B) Concrete for fill concrete, thrust blocks, cradles, anchors, and encasement, and where indicated on the Drawings.
  - a. 3,000 psi compressive strength at 28 days.
  - b. Type I cement plus dispersing agent and air.
  - c. Max. (water)/(cement and dispersing agent) ration = 0.56.
  - d. Min. cement content = 470 lbs. (5.0 bags)/cu. yd. concrete.
  - e. Nominal max. size coarse aggregate = No. 67 (3/4" max.) or No. 57 (1" max) Walls with architectural treatment shall use No. 67 (3/4" max.).
  - f. Air content = 6% plus or minus 1% by volume.
  - g. Slump - 3" - 4" in accordance with ASTM C 143.

- B. Where concrete is to be placed over, around, or beside ductile iron piping, pipe and fittings shall first be wrapped with polyethylene to prevent direct contact between the pipe and concrete.

- C. Concrete cradle, anchors or encasement of water mains and fittings shall be placed where shown on the drawings, required by the specifications, or as directed by the ENGINEER. Concrete shall be Class F and shall be mixed sufficiently wet to permit it to flow under the pipe to form a continuous bed. In tamping concrete, care shall be taken not to disturb the grade or line of the pipe or injure the joints. Concrete placed outside the specified limits or without authorization from the ENGINEER will not be subject to payment.
- D. As shown on the plans, all water mains shall have restrained joints or concrete thrust or "kicker" blocks at all pipe intersections and changes of direction to resist forces acting on the pipeline. Concrete for thrust blocks shall be Class F.
- E. All testing shall be or have been performed by a recognized independent testing laboratory. All testing shall be in accordance with provisions of ACI 301. Testing services listed in ACI Sections 16.3, 16.4 and 16.5 shall be performed by a testing agency acceptable to the ENGINEER and OWNER. The testing services of ACI sections 16.3 and 16.4 will be performed at no cost to the OWNER. All testing services shall be paid for by the CONTRACTOR. Tests shall be made for every 50 cubic yards of concrete and/or each day concrete is placed. Testing is required for structural concrete and where specifically indicated on the Plans.
- F. Coarse aggregate for concrete shall be size No. 78, as specified in ASTM C33 unless a smaller size aggregate is required to conform to provisions of Section 3.6 of ACI 301. Coarse aggregate shall conform to all requirements of ASTM C33.
- G. Manufactured sand shall not be used as fine aggregate in concrete.
- H. The minimum yield strength of the reinforcement shall be 60,000 pounds per square inch. Bar reinforcement shall conform to the requirements of ASTM A 615. All bar reinforcement shall be deformed.
- I. Anchorage items shall be of standard manufacturer and of type required to engage with the anchors to be installed therein under other sections of the Specifications and shall be subject to approval by the ENGINEER.
  - 1. Concrete anchors shall be an approved expansion type conforming to Federal Specification FF-S-325, Groups I, II, III, or VIII and shall be installed in strict accordance with the manufacturer's recommendations.
  - 2. Epoxy bonding adhesive shall be used to bond fresh plastic concrete to sound, hardened concrete. CONTRACTOR shall furnish manufacturer's information on the proposed material.
- J. Concrete encasement shall be performed as shown on the Plans per the Standard Details.

### **PART 3 - BASIS OF PAYMENT**

Payment for concrete for cradles, anchors, blocking, encasement, etc. will be included in the bid prices for the various sizes and types of pipe, unless a separate bid item is included, in which case separate payment shall be made as indicated by that item.

END OF SECTION