

# SECTION 03300

## CAST-IN-PLACE CONCRETE

### PART 1 - GENERAL

#### 1.01 SECTION INCLUDES

- A. Furnish all labor, material and equipment to place all concrete as shown on the Drawings and specified herein.
- B. Concrete items shall include but not be limited to:
  - 1. Cast-in-Place Manhole Bases
  - 2. Pipe Cradles and Encasement
  - 3. Concrete Pavement Restoration
  - 4. Plain Cement Concrete Curb/Curb Gutter Restoration
  - 5. Concrete Sidewalk Restoration
  - 6. Pump Station Bases and Appurtenances

#### 1.02 RELATED SECTIONS

- A. Section 01010 - Summary of Work
- B. Section 01300 - Submittals
- C. Section 01400 - Quality Control
- D. Section 01500 - Construction Facilities and Temporary Controls
- E. Section 01570 - Traffic Regulation
- F. Section 02225 - Excavating, Backfilling and Compacting for Utilities
- G. Section 02500 - Paving and Roadway Appurtenances Restoration
- H. Section 02605 - Manholes
- I. Section 11306 - Pump Stations
- J. Appendix A - Standard and Special Construction Detailed Drawings

#### 1.03 REFERENCES

- A. Pennsylvania Department of Transportation Publication 408, Latest Edition
- B. Pennsylvania Code, Title 67, Chapter 459, Occupancy of Highways by Utilities, Latest Edition
- C. Pennsylvania Department of Transportation Publication 72, Standards for Roadway Construction, Series RC-0 to 100, Latest Edition
- D. ASTM C-31 - Methods of Making and Curing Concrete Test Specimens in the Field
- E. ASTM A-615 - Specification for Deformed Billet Steel Bars for Concrete Reinforcement

#### 1.04 **JOB CONDITIONS**

- A. Contractor shall meet the job conditions of the Related Sections under which the concrete is being used.

#### 1.05 **SUBMITTALS**

- C. All submittals shall be in accordance with Section 01300 - Submittals.
- D. Submittals shall include, but not be limited to:
  - 1. Mix Designs (All Classes)
  - 2. Reinforcement Certifications
  - 3. Batch/Mixer Slips (For PennDOT Work)
  - 4. Delivery Tickets
  - 5. Test Cylinder Strength Reports

### **PART 2 - PRODUCTS**

#### 2.01 **CONCRETE**

- A. All concrete used in Authority approved Plans and Work shall meet the compressive strengths as heretofore listed for respective work.
- B. Concrete used within Pennsylvania Department of Transportation R/W shall meet the requirements of PDT Pub. 408, Section 704 - Cement Concrete.
- C. The Classes of concrete for various applications shall be as follows:
  - 1. **Class AA** - 3750 psi minimum compressive strength at twenty-eight (28) days:
    - a. Plain Cement Concrete Gutter/Curb Gutter
    - b. Concrete Pavement
  - 2. **Class A** - 3300 psi minimum compressive strength at twenty-eight (28) days:
    - a. Manhole Cast-in-Place Bases with Monolithic Flow Channels
    - b. Flow Channels in Pre-Cast Manhole Bases
    - c. Cast-in-Place Pump Station Bases and Appurtenances
    - d. Pipe Cradles (Within Pump Station Parameters)
    - e. Pipe Encasement (Within Pump Station Parameters)
    - f. Plain Cement Concrete Curb
    - g. Guide Rail Anchoring
  - 3. **Class B** - 2500 psi minimum compressive strength at twenty-eight (28) days:
    - a. Pipe Cradles Outside Pump Station Parameters
    - b. Pipe Encasement
    - c. Over Excavation (When Required)
    - d. Sinkhole Treatment

4. **Class H.E.S.** - 3750 psi minimum compressive strength at twenty-eight (28) days: 752 pounds per cubic yard minimum cement content.
  - a. Pavement
  - b. Miscellaneous
- D. If a higher strength concrete is required for a special application it will be specified on the Drawings or by the Authority.

## **2.02 REINFORCEMENT STEEL**

- A. Reinforcement bars shall meet the requirements of ASTM A-615, Grade 60 for deformed bars.
- B. Steel welded wire fabric shall meet the requirements of ASTM A-185. Wire shall be rigidly welded at joints and points of intersection to form a fabric reinforcement. Wire size and spacing shall be as shown on the Drawings.

## **2.03 CURING COMPOUNDS**

- A. Liquid Membrane - Forming Curing Compound, Clear or White meeting the requirements of AASHTO M418.

# **PART 3 - EXECUTION**

## **3.01 GENERAL**

- A. Inspect all areas to ensure they are ready for concrete placement.
  1. Area to receive concrete is free of debris, loose earth, water, and ice.
  2. Forming is of the correct size and properly braced.
  3. Reinforcement is in place, properly spaced, and secure.
  4. Qualified work persons and equipment (testing equipment, test cylinders, consolidation and finishing tools) shall be on site and available for testing and finishing.

## **3.02 DELIVERY**

- A. When concrete is being delivered for work in PennDOT's Right-of-Way, the Contractor shall have the producer furnish a Batch Mixer Slip showing the following:
  1. Amount of Aggregate Water
  2. Amount of Batch Water
  3. Quantities of Fine and Coarse Aggregate and Cement
  4. Design Strength or Class
  5. Slip Preparation Time
- B. A copy of the batcher mixer slip shall be given to the PennDOT Inspector and Authority representative.
- C. A delivery ticket showing the time the truck left the plant and water in the load shall

accompany each load for all work with a copy to the Authority representative and/or PennDOT Inspector as applicable.

### **3.03 PLACING CONCRETE**

- A. No concrete shall be placed which has been mixed longer than ninety (90) minutes or has exceeded three hundred (300) truck drum revolutions.
- B. Concrete, when deposited, shall have a temperature ranging between a minimum of 50°F and a maximum of 90°F.
- C. Falling concrete shall be closely confined in a drop chute of the proper size when drop is over four (4) feet, and the final drop must be vertical to avoid segregation of aggregates. In no case shall concrete be deposited from a height that will cause separation of the aggregates.
- D. Concrete shall be mixed in such quantities as required for immediate use and shall be placed while fresh before loss of slump occurs. Retempering by adding water to restore slump lost during excessive mixing or due to too long a lapse of time since initial mixing will not be permitted.

### **3.04 PROTECTION OF NEW WORK**

- A. All freshly placed concrete shall be adequately protected from mechanical injury or by action of the elements until such time as the concrete is thoroughly set.

### **3.05 CURING**

- A. Curing shall be performed on all concrete surfaces not immediately backfilled when hard.
- B. Curing shall be started immediately upon completion of the finishing operation. Curing shall continue uninterrupted for a minimum period of seven (7) days unless a longer period is hereinafter specified. Rapid drying upon completion of the curing period shall be prevented. At no time during the curing period shall the temperature of the concrete be permitted to drop below 40°F.
  - 1. Curing may be by water curing, sheet or liquid membrane. Do not use liquid membrane where a later concrete or masonry joint may occur unless the material has been certified as a non-bond breaker.

### **3.06 TESTING**

- A. Four (4) test cylinders shall be molded each day for each fifty (50) cubic yard or fraction thereof. A slump and air test shall be made for each set of cylinders and whenever the concrete appears to vary in consistency.
- B. Mold and cure test cylinder in accordance with ASTM C-31 or PTM 611.
  - 1. Test one (1) cylinder at seven (7) days. If break does not meet specification, break two (2) at twenty-eight (28) days for acceptance.
  - 2. The remaining cylinder shall be kept for reference or additional testing if required.

### **3.07 DEFECTIVE CONCRETE**

- A. Defective concrete is defined as concrete in place, which does not conform to strength, shapes, alignments and/or elevations as shown on the Drawings.
- B. All defective concrete shall be removed and replaced in a manner meeting with the Authority's

satisfaction and at no additional cost.

**END OF SECTION**