

**SECTION 033000****CAST IN PLACE CONCRETE****PART 1 - GENERAL****1.1 GENERAL PROVISIONS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions of the Specifications and Addenda apply to work of this section.
- B. The Contractor shall cooperate with and coordinate all other trades in executing the work described in this section.
- C. The work covered by this section consists of furnishing all labor and materials, equipment, and tools, protection and performing all operations in connection with the installation of cast-in-place reinforced concrete.

**1.2 CODES AND STANDARDS**

- A. Conform to New York City Building Code, as amended, and all applicable rules of the Building Department; ACI 301 "Specifications for Structural Concrete Buildings"; ACI 318 "Building Code Requirements for Reinforced Concrete"; comply with applicable provisions except as otherwise indicated.

**1.3 QUALITY CONTROL**

- A. Concrete Testing Service: Contractor shall employ testing laboratory, approved by City of New York, to perform materials evaluation, testing and design of concrete mixes.
- B. Inspection: All concrete work shall be subject to inspection by or under the direct supervision of a Commissioner paid for by the City of New York. Such inspection shall include:
  - 1. Concrete Mixes:
    - a. Concrete mixes shall conform to the New York City Building Code Section 1905.
    - b. Form TR-3: Technical Report Concrete Design Mix: The contractor shall be responsible for, and shall bear all costs associated with, the filing and securing of approvals, if any, for Form TR-3: Technical Report Concrete Design Mix, including but not limited to engaging the services of a new York City licensed Concrete Testing Lab for the review and approval of concrete design mix, testing, signatures, and professional seals, etc., compliant with NYC Department of Buildings requirements, for each concrete design mix.
  - 2. Samples: Compression test samples shall be taken from the mixer in accordance with ASTM C172, cured in accordance with ASTM C31. A minimum of 4 test cylinders shall be taken for each 50 cubic yards or less of each class of concrete placed in any one day. One cylinder shall be tested at 7 days, 3 at 28 days.

Each cylinder shall be suitably identified by a mark and the area where the concrete is placed shall be recorded. All tests shall be made by a certified laboratory in accordance with Local Law 61-65 of the New York City Building Code. Test reports shall be filed within the (10) days of receipt from certified testing laboratory.

3. Concrete shall (except as stated above and as modified by Reference Standard RS 10-3 of the New York City Building Code) conform to ACI 318.89, Chapter 4 for quality and Chapter 5 for mixing and placing.

#### **1.4 SUBMITTALS**

- A. Manufacturer's Data: Submit manufacturer's product data with installation instructions for proprietary materials including reinforcement and forming accessories, admixtures, joint materials, hardeners, curing materials and others as requested by the Commissioner.
- B. Laboratory Reports: Submit two copies of laboratory test or evaluation reports for concrete materials and mix designs.

#### **1.5 MIX PROPORTIONS AND DESIGN:**

- A. Proportion mixes complying with mix design procedures specified in ACI 301.

### **PART 2 PRODUCTS**

#### **2.1 CONCRETE MATERIALS:**

- A. Portland Cement: ASTM C150, Type as required.
- B. Aggregates: ASTM C33.
- C. Water: Drinkable.
- D. Air-Entraining Admixture: ASTM C260.
- E. Water-Reducing Admixture: ASTM C494; type as required to suit project conditions. Only use admixtures which have been tested and accepted in mix designs, unless otherwise acceptable.
- F. Ready-Mix Concrete: ASTM C94.

#### **2.2 RELATED MATERIALS:**

- A. Membrane-Forming Curing Compound: ASTM C309 Type I
- B. Form Materials: Wood or steel to suit project conditions.

#### **2.3 REINFORCING MATERIALS:**

- A. Deformed Reinforcing Bars: ASTM A615, Grade 60, unless otherwise indicated.
- B. Welded Wire Fabric: ASTM A185.

### **PART 3 EXECUTION**

#### **3.1 FORMING AND PLACING CONCRETE:**

- A. Job-Site Mixing: Use drum type batch machine mixer, mixing not less than 1-1/2 minutes for one cubic yard or smaller capacity. Increase mixing time at least 15 seconds for each additional cubic yard or fraction thereof.

**B. Formwork:**

1. Construct so that concrete members and structures are of correct size, shape, alignment, elevation and position.
2. Provide openings in formwork to accommodate work of other trades. Accurately place and securely support items built into forms.
3. Clean and adjust forms prior to concrete placement. Apply form release agents or wet forms, as required. Retighten forms during concrete placement, if required, to eliminate mortar leaks.

**C. Reinforcement:**

1. Position, support and secure reinforcement against displacement. Locate and support with metal chairs, runners, bolsters, spacers and hangers, as required. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
2. Install welded wire fabric in as long lengths as practicable, lapping at least one mesh.

**D. Joints:** Provide construction, isolation, and control joints as indicated or required. Locate construction joints so as to not impair strength and appearance of structure. Place isolation and control joints in slabs on ground to stabilize differential settlement and random cracking.**E. Installation of Embedded Items:** Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by cast-in-place concrete. Use setting diagrams, templates and instructions provided by others for locating and setting.**F. Concrete Placement:**

1. Comply with ACI, placing concrete in a continuous operation within planned joints or sections. Do not begin placement until work of other trades affecting concrete is completed.
2. Consolidate placed concrete using mechanical vibrating equipment with hand rodding and tamping, so that concrete is worked around reinforcement and other embedded items and into forms.
3. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placement and curing.

**3.2 CONCRETE FINISHES:**

- A. Exposed to View Surfaces: Provide a smooth finish for exposed concrete surfaces. Remove fins and projections, patch defective areas with cement grout, and rub smooth.
- B. Slab Trowel Finish: Apply trowel finish to monolithic slab surfaces that are exposed to view or are to be covered with resilient flooring, paint or other thin film coating. Consolidate concrete surfaces by finish troweling, free of trowel marks, uniform in texture and appearance.

- C. Curing: Begin initial curing as soon as free water has disappeared from exposed surfaces. Where possible, keep continuously moist for not less than 72 hours. Continue curing by use of moisture-retaining cover or membrane-forming curing compound. Cure formed surfaces by moist curing until forms are removed. Provide protections as required to prevent damage to exposed concrete surfaces.

**END OF SECTION 033000**