

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section 03 10 00 – Concrete forming and accessories
- .2        Section 03 30 00.01 – Cast-in-place concrete

**1.2                REFERENCES**

- .1        Definitions:
  - .1        Tremie concrete: concrete placed underwater through tube called tremie pipe.
  - .2        Tremie pipe: pipe has hopper at upper end and may be open ended or may have foot valve, plug or travelling plug to control flow of concrete. Pipe has diameter of 200 mm minimum, constructed from sections with flange couplings fitted with gaskets.
    - .1        Concrete is placed in hopper and sufficient head of concrete is maintained in tremie pipe to provide desired rate of flow.
  - .3        Pumped concrete method: method of placing concrete underwater uses concrete pump with discharge line used in similar manner to tremie pipe.
  - .4        Bottom-dump bucket method: method of placing concrete underwater requires use of bucket designed to discharge from bottom after it has contacted foundation or surface of previously placed concrete.
  - .5        Bagged concrete method: method of placing underwater concrete consists of diver placing bags partially filled with dry concrete mix.
- .2        Reference Standards:
  - .1        American Concrete Institute (ACI)
    - .1        ACI 304R-00, Guide for Measuring, Mixing, Transporting and Placing Concrete.
  - .2        CSA International
    - .1        CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

**1.3                ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Product Data:
  - .1        Submit manufacturer's instructions, printed product literature and data sheets for concrete and include product characteristics, performance criteria, physical size, finish and limitations.

**1.4                DELIVERY, STORAGE AND HANDLING**

- .1        Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Concrete materials: to Section 03 30 00.0 - Cast-in-Place Concrete (short form)

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for concrete placement installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

**3.2 INSTALLATION**

- .1 Do concrete work in accordance with Section 03 30 00.01 - Cast-in-Place Concrete short form and to CSA A23.1/A23.2. Testing for concrete to CSA A23.1/A23.2.
- .2 Where concrete placement extends above water surface, protect concrete from direct contact with air at temperature below 5 degrees C for 3 days.
- .3 Place concrete in one continuous operation to full depth required.
  - .1 Supply complete equipment for every phase of operation.
  - .2 Provide sufficient supply of concrete to complete pour without interruption.
- .4 Tremie method:
  - .1 Provide water-tight tremie pipe sized to allow free flow of concrete. Diameter of tremie pipe to be minimum 200 mm and minimum eight times maximum size of coarse aggregate.
  - .2 Provide hopper at top of tremie pipe and means to raise and lower tremie pipe.
  - .3 Provide plug or foot valve at bottom of tremie pipe to permit filling pipe with concrete initially.
  - .4 Provide minimum of one tremie pipe for every 30 m<sup>2</sup> of plan area and to maximum spacing of 6 m centre to centre. Do not move tremie pipes laterally through concrete.
  - .5 Start placement with tremie pipe full of concrete. Keep bottom of pipe buried minimum 900 mm in freshly placed concrete.
  - .6 If seal is lost, allowing water to enter pipe, withdraw pipe immediately. Refill pipe, and continue placing as specified.
  - .7 Do not place concrete in flowing water when current exceeds 3 m/min.
- .5 Pumped concrete method:

- .1 Follow procedures as for tremie method in placing concrete using discharge line from concrete pump as tremie pipe.
- .2 Pump discharge line diameter: 125 mm minimum.
- .6 Bottom-dump bucket method:
  - .1 Bottom-dump bucket method is not allowed

### **3.3 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse, recycling or elimination in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**END OF SECTION**