

PART 1 - GENERAL

- 1.1 DESCRIPTION .1 This section specifies requirements for supply, placing, and protecting concrete in an underwater application.
- 1.2 RELATED SECTIONS .1 Section 03 30 00 - Cast-in-Place Concrete.
.2 Section 31 63 19 - Bored and Socketed Piles .
.3 Section 31 63.19.13 - Rock Sockets for Piles.
- 1.3 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.

- 1.4 SUBMITTAL .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit manufacturer's instructions, printed product literature and data sheets for concrete and include product characteristics, performance criteria, physical size, finish and limitations.
- 1.5 MEASUREMENT FOR PAYMENT .1 No separate payment will be made for underwater placed concrete and is considered to be included in the cost for items where underwater concrete is required.

PART 2 - PRODUCTS

- 2.1 CONCRETE AND MIX .1 Concrete to Section 03 30 00 (Cast-in-Place Concrete), with the exception of:.
- .1 Slump at point and time of discharge: 150 to 230mm .
- .2 Air dry density: 2150 to 2500kg/m3.
- .3 Admixtures: as approved in writing by Departmental Representative. Use admixtures to correct deficiencies in mix or to improve placement of concrete.
- .4 Anti-washout agent to approval of Departmental Representative.

PART 3 - EXECUTION

- 3.1 GENERAL .1 Do concrete work in accordance with Section 03 30 00 - Cast-in-Place Concrete and Section 03 20 00 - Concrete Reinforcing 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 7 days.
- .3 Place concrete in one continuous operation to full depth required.

3.2 CONSTRUCTION

- .1 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 m² 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 If tremie operation is interrupted so that horizontal construction joint has to be made, cut surface laitance by jetting, within 24 to 36 hours and remove loose material by pumping or air lifting before placing next lift.
- .2 Pumped concrete method:
 - .1 Follow procedures as for tremie method in placing concrete using discharge line

Wharf Reconstruction (Phase II)

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from concrete pump as tremie pipe.
.2 Pump discharge line diameter: 125 mm
minimum.