

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1      Section 03 10 00 – Concrete forming and accessories
- .2      Section 03 20 00 – Concrete reinforcing
- .3      Section 03 37 26 – Underwater placed concrete
- .4      Section 03 41 00 – Precast structural concrete

**1.2                REFERENCES**

- .1      ASTM International
  - .1      ASTM A185/A185M-07, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
  - .2      ASTM D260-86(2001), Standard Specification for Boiled Linseed Oil.
  - .3      ASTM D1751-04, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non extruding and Resilient Bituminous Types).
- .2      Canadian General Standards Board (CGSB)
  - .1      CAN/CGSB-19.24-M90, Multicomponent, Chemical-Curing Sealing Compound.
- .3      CSA International
  - .1      CSA-A23.1/A23.2-2014, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2      CSA A3000-13, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
  - .3      CAN/CSA-G30.18-R2009, Billet-Steel Bars for Concrete Reinforcement.

**1.3                ADMINISTRATIVE REQUIREMENTS**

- .1      Pre-installation Meetings: in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart, convene pre-installation meeting one (1) week prior to beginning concrete works.
  - .1      Ensure Departmental Representative testing laboratories attend.
  - .2      Verify project requirements.

**1.4                AIMED ELEMENTS**

- .1      The main elements aimed by the present section are, without limiting itself to it, the following elements:
  - .1      Bases of mooring device
  - .2      Base of lamppost
  - .3      Gap between existing Berlin wall and news timbers cribwork
  - .4      Resurfacing existing concrete slab on Berlin wall (top)

- .5 Level adjustment on main south wharf

## **1.5 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
  - .1 Submit placing drawings prepared in accordance with plans to clearly show size, shape, location and necessary details of reinforcing.
  - .2 Submit drawings showing formwork and falsework design to: CSA A23.1/A23.2.
  - .3 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Quebec, Canada.
- .3 At least four (4) weeks prior to beginning Work, inform Departmental Representative of source of fly ash.
  - .1 Do not change source of fly ash without written approval of Departmental Representative.
- .4 At least four (4) weeks prior to beginning Work, submit to Departmental Representative samples of following materials proposed for use: curing compound, joint filler, waterstops.
- .5 At least four (4) weeks prior to beginning Work, submit to Departmental Representative data sheets of following materials to be used in concrete mix:
  - .1 Supplementary cementing materials
  - .2 Blended hydraulic cement
  - .3 Admixture
  - .4 Fine and coarse aggregate
  - .5 Fly ash
- .6 Provide concrete mix formula results and reports for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters are found.
- .7 Concrete hauling time: provide for review by Departmental Representative deviations exceeding maximum allowable time of 120 minutes for concrete to be delivered to site of Work and discharged after batching.

## **1.6 QUALITY ASSURANCE**

- .1 Provide to Departmental Representative, four 4 weeks minimum prior to starting concrete work, valid and recognized certificate from plant delivering concrete.
  - .1 Quality Control Plan: provide written report to Departmental Representative verifying compliance that concrete in place meets performance requirements.
  - .2 Sustainability Standards Certification:
    - .1 Construction Waste Management: provide copy of plan.
    - .2 Recycled Content:
      - .1 Provide listing of recycled content products used.

- .2 When Supplementary Cementing Materials (SCMs) are used, provide evidence to certify reduction in cement from Base Mix to Actual SCMs Mix, as percentage.

## **1.7 DELIVERY, STORAGE AND HANDLING**

- .1 Delivery and Acceptance Requirements:
  - .1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
    - .1 Do not modify maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2.
    - .2 Deviations to be submitted for review by the Departmental Representative.
  - .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.
  - .3 Packaging Waste Management: remove for reuse, recycling or elimination in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

## **Part 2 Products**

### **2.1 DESIGN CRITERIA**

- .1 Performance : to CSA A23.1/A23.2, and as described in MIXES of PART 2 - PRODUCTS.

### **2.2 PERFORMANCE CRITERIA**

- .1 Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established by Departmental Representative and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE.

### **2.3 MATERIALS**

- .1 Cement: to CSA A3001, Type GUb – SF ou GUb-F/SF.
- .2 Water: to CSA A23.1/A23.2
- .3 Reinforcing bars: to CAN/CSA-G30.18, Grade 400W.
- .4 Pieces of hardware and sundry equipment: to CSA-A23.1/A23.2.
- .5 Concrete forming: CAN/CSA-S269.3-FM92 and CAN/CSA-A23.4.
- .6 Anchors and supports: to CAN/CSA-G40.21, type 300W, galvanized.
- .7 Galvanizing: Hot-Dip Galvanized, 610 g/m<sup>2</sup>, to ASTM A-123
- .8 Air-entraining admixture : to ASTM C260.
- .9 Admixture
  - .1 Set accelerator are not authorized
  - .2 It's forbidden to use some chloride of calcium or materials which contain it.

- .3 Super plasticizing, water reducer and retarder: to ASTM C494
- .10 Shim spacer: plastic
- .11 Sealer: boiled linseed oil to ASTM D260
- .12 Welded steel wire fabric: to ASTM A185.
- .13 Premoulded joint filler:
  - .1 Bituminous impregnated fibreboard: to ASTM D1751.
- .14 Joint sealer/filler: grey to CAN/CGSB-19.24, Type 1, Class B.

## **2.4 MIXES**

- .1 Concrete 1 – (resurfacing and concrete bases)
  - .1 Performance Method for specifying concrete: to meet Departmental Representative performance criteria to CSA A23.1/A23.2.
    - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as described in standard 3101, Tome VII, Concrete normal density, Concrete type V.
    - .2 Provide concrete mix to meet following plastic state requirements:
      - .1 Water / cement ratio: less than 0.45
      - .2 Water: 340-365 kg/m<sup>3</sup> of concrete (see tome VII)
      - .3 Aggregate size: 2.5-10 mm maximum.
      - .4 Air content: 5-8%
      - .5 L bar: 230 micrometers.
      - .6 Slump at time and point of discharge: 80mm ± 30mm
    - .3 Provide concrete mix to meet following hard state requirements:
      - .1 Durability and class of exposure: C-1
      - .2 Compressive strength at 28 days age: 35 MPa minimum.
      - .3 Intended application: Pedestrians, medium/light vehicle's traffic
      - .4 Finishability: lightly brushed non-slip finish.
      - .5 Permeability in the ions chlorinates: 1500 Coulombs
    - .4 Submit a management plan of the quality to assure the quality control of the concrete according to the specified performance requirements.
    - .5 Concrete supplier's certification
  - .2 Concrete 2 – (Gap between existing Berlin wall and news timbers cribwork)
    - .1 Lean concrete 20 MPa
      - .1 The Contractor have to provide a concrete mix for lean concrete supplying for the Departmental Representative approval.

## **Part 3 Execution**

### **3.1 PREPARATION**

- .1 Provide Departmental Representative 24 hour notice before each concrete pour.

- .2 Coordinate every sequence of concreting with the test laboratory indicated by the Departmental Representative for testing and sampling during concreting
- .3 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.
- .4 During concreting operations:
  - .1 Development of cold joints not allowed.
  - .2 Ensure concrete delivery and handling facilitates placing with minimum of rehandling, and without damage to existing structure or Work.
- .5 Protect previous Work from staining.
- .6 Clean and remove stains prior to application of concrete finishes.

### **3.2 INSTALLATION/APPLICATION**

- .1 Do cast-in-place concrete work in accordance with CSA A23.1/A23.2.
- .2 Sleeves and inserts:
  - .1 Cast in sleeves, ties, slots, anchors, reinforcement, frames, conduit, bolts, waterstops, joint fillers and other inserts required to be built-in.
  - .2 Sleeves and openings greater than 100 mm x 100 mm not indicated, must be reviewed by Departmental Representative.
- .3 The Contractor have to plan all the material and the equipment required for concreting during cold weather.

### **3.3 FINISHES**

- .1 Formed surfaces exposed to view: [sack rubbed finish] in accordance with CSA A23.1/A23.2.
- .2 Resurfacing, wharf concrete slab
  - .1 Finishing operations followed by final finishing comprising mechanical floating and wood trowelling to provide lightly brushed non-slip finish.
  - .2 Provide round edges and joint spacings using standard tools.
- .3 Walkway and curbs:
  - .1 Finishing operations followed by final finishing comprising mechanical floating and wood trowelling
  - .2 Provide round edges and joint spacings using standard tools.

### **3.4 CONTROL JOINTS**

- .1 Cut or form control joints in slabs on grade at locations indicated, to CSA A23.1/A23.2 and install specified joint sealer/filler.

### **3.5 EXPANSION AND ISOLATION JOINTS**

- .1 Install premolded joint filler in expansion and isolation joints full depth of slab flush with finished surface to CSA A23.1/A23.2.

### **3.6 CURING**

- .1 Use curing compounds compatible with applied finish on concrete surfaces free of bonding agents and to CSA A23.1/A23.2.

### **3.7 SEALING APPLICATION**

- .1 After curing is complete, apply two (2) even coats of linseed oil mixture to clean dry surfaces, each at 8 m<sup>2</sup>/L. Allow first coat to dry before applying second coat.

### **3.8 SITE TOLERANCES**

- .1 Concrete floor slab finishing tolerance to CSA A23.1/A23.2.

### **3.9 FIELD QUALITY CONTROL**

- .1 Concrete testing: to CSA A23.1/A23.2 by testing laboratory designated and paid for by Departmental Representative.

### **3.10 CLEANING**

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
- .2 Use trigger operated spray nozzles for water hoses.
- .3 Designate cleaning area for tools to limit water use and runoff.
- .4 Cleaning of concrete equipment to be done in accordance with Section 01 35 43 Environmental Procedures.
- .5 Waste Management: separate waste materials for reuse, recycling or elimination in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Divert unused concrete materials from landfill to local quarry or facility after receipt of written approval from Departmental Representative.
  - .2 Provide appropriate area on job site where concrete trucks can be safely washed.
  - .3 Do not dispose of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.

**END OF SECTION**