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## **Part 1 General**

### **1.1 RELATED SECTIONS**

- .1 Section 03 30 00 - Cast-in-Place Concrete.

### **1.2 MEASUREMENT PROCEDURES**

- .1 No measurement will be made under this section. Include costs in items of concrete work for which reinforcement is required.

### **1.3 REFERENCES**

- .1 Canadian Standards Association (CSA), all standards used shall be of latest edition
  - .1 CAN/CSA-A23.1-94 - Concrete Materials and Methods of Concrete Construction.
  - .2 CSA G30.3 - Cold Drawn Steel Wire for Concrete Reinforcement.
  - .3 CSA G30.5 - Welded Steel Wire Fabric for Concrete Reinforcement.
  - .4 CSA G30.14 - Deformed Steel Wire for Concrete Reinforcement.
  - .5 CAN/CSA-G30.18 - Billet-Steel Bars for Concrete Reinforcement.
  - .6 CAN/CSA-G164-M92 - Hot Dip Galvanizing of Irregularly Shaped Articles.

### **1.4 SUBMITTAL**

- .1 Submit shop drawings including placing of reinforcement in accordance with Section 01 33 00- Submittal Procedures. All shop drawings shall bear the signed stamp form P.Eng registered or licensed to practice in PEI.
- .2 Indicate on shop drawings, bar bending details, lists, quantities of reinforcement, sizes, spacings, locations of reinforcement and mechanical splices if approved by Departmental Representative, with identifying code marks to permit correct placement without reference to structural drawings. Indicate sizes, spacings and locations of chairs, spacers and hangers. Prepare reinforcement drawings in accordance with Reinforcing Steel Manual of Standard Practice - by Reinforcing Steel Institute of Canada.
- .3 Detail lap lengths and bar development lengths to CAN3-A23.3, unless otherwise. Provide type tension lap splices unless otherwise indicated.
- .4 Contractor shall check the Pre-cast units design that it meets the requirement and will be able to sustain the forces during lifting and transportation.

### **1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 21.

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## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Substitute different size bars only if permitted in writing by Department's Representative in writing
- .2 Reinforcing steel: billet steel, grade 400, deformed bars to CAN/CSA-G30.18, unless indicated otherwise.
- .3 Cold-drawn annealed steel wire ties: to CSA G30.3.
- .4 Chairs, bolsters, bar supports, spacers: to CAN/CSA-A23.1., all chairs and bar supports shall be hot dipped galvanized or plastic.

### **2.2 FABRICATION**

- .1 Fabricate reinforcing steel in accordance with CAN/CSA-A23.1, and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .2 Obtain Departmental Representative approval for locations of reinforcement splices other than those shown on placing drawings.
- .3 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

### **2.3 SOURCE QUALITY CONTROL**

- .1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to commencing reinforcing work.
- .2 Upon request inform Departmental Representative of proposed source of material to be supplied.

## **Part 3 Execution**

### **3.1 FIELD BENDING**

- .1 Do not field bend or field weld reinforcement.

### **3.2 PLACING REINFORCEMENT**

- .1 Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CAN/CSA-A23.1 and A 23.2.
- .2 Prior to placing concrete, obtain Departmental Representative approval of reinforcing material and placement.
- .3 Ensure cover to reinforcement is maintained during concrete pour.

**END OF SECTION**

**Part 1            General**

**1.1**

**RELATED SECTIONS**

- .1     Section 05 31 00 – Steel Decking
- .2     Section 03 20 00 - Concrete Reinforcing.
- .3     Section 05 50 00 - Metal Fabrications.

**1.2**

**MEASUREMENT PROCEDURES**

- .1     No deductions will be made for volume of concrete displaced by reinforcing steel, structural steel, or piles. Concrete deck and slab-on-grade at North end of work to be paid on a cubic metre place measure (m<sup>3</sup>) basis.
- .2     No deductions will be made for volume of concrete less than 0.1 m<sup>2</sup> in cross sectional area displaced by individual drainage openings.
- .3     Heating of water and aggregates and providing cold weather protection will not be measured but considered incidental to work.
- .4     Cooling of concrete and providing hot weather protection will not be measured but considered incidental to work.
- .5     Canadian Standards Association (CSA), all standards used shall be of latest edition
  - .1     CAN/CSA-A5- Portland Cement.
  - .2     CAN/CSA-A23.1- Concrete Materials and Methods of Concrete Construction.
  - .3     CAN/CSA-A23.2- Methods of Test for Concrete.
  - .4     CAN/CSA-A23.5- Supplementary Cementing Materials.

**1.3**

**SAMPLES**

- .1     Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2     At least 4 weeks prior to commencing work, inform Departmental Representative of proposed source of aggregates and provide access for sampling.

**1.4**

**CERTIFICATES**

- .1     Submit certificates in accordance with Section 01 33 00 - Submittal Procedures.
- .2     Minimum 4 weeks prior to starting concrete work submit to Departmental Representative manufacturer's test data and certification by qualified independent inspection and testing laboratory that following materials will meet specified requirements:
  - .1     Portland cement.
  - .2     Blended hydraulic cement.
  - .3     Supplementary cementing materials.
  - .4     Grout.
  - .5     Admixtures.

- .1 Portland cement to CAN/CSA-A5, normal .
- .2 Supplementary cementing materials: to CAN/CSA-A23.5.
- .3 Water: to CAN/CSA-A23.1.
- .4 Aggregates: to CAN/CSA-A23.1. Coarse aggregates to be normal density.
- .5 Air entraining admixture: to ASTM C260.
- .6 Chemical admixtures: to ASTM C494. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .7 Concrete retarders: to ASTM C494 water based, low VOC, solvent free. Do not allow moisture of any kind to come in contact with the retarder film.
- .8 Post-Tensioning ducts: to CAN/CSA-A23.1.
- .9 Curing compound: to CAN/CSA-A23.1 white and to ASTM C309, Type 1-chlorinated rubber.
- .10 Premoulded joint fillers:
  - .1 Bituminous impregnated fiber board: to ASTM D1751.
  - .2 Sponge rubber: to ASTM D1752, Type I, flexible firm grade.

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**2.2**

**MIXES**

- .1 Proportion normal density concrete in accordance with CAN/CSA-A23.1 and A 23.2
  - .1 Normal Cement.
  - .2 Minimum compressive strength at 28 days: 35 MPa.
  - .3 Minimum cement content: 385 kg/m<sup>3</sup> of concrete.
  - .4 Class of exposure: C1 for exterior and salt condition.
  - .5 Nominal size of coarse aggregate: 5-20 mm.
  - .6 Slump at time and point of discharge: 50 to 100 mm.
  - .7 Air content: 5 to 8 %.
  - .8 Maximum water cement ratio 0.35.

**Part 3**

**Execution**

**3.1**

**PREPARATION**

- .1 Obtain Departmental Representative approval before placing concrete. Provide 24 hours notice prior to placing of concrete.
- .2 Pumping of concrete is permitted only after approval of equipment and mix.
- .3 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .4 Prior to placing of concrete obtain Departmental Representative approval of proposed method for protection of concrete during placing and curing in adverse weather.
- .5 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .6 In locations where new concrete is dowelled to existing work, drill holes in existing concrete. Place steel dowels of deformed steel reinforcing bars and pack solidly with shrinkage compensating grout to anchor and hold dowels in positions as indicated.
- .7 Do not place load upon new concrete until authorized by Departmental Representative.

**3.2**

**CONSTRUCTION**

- .1 Do cast-in-place concrete work in accordance with CAN/CSA-A23.1.
- .2 Finishing.
  - .1 Finish concrete in accordance with CAN/CSA-A23.1.
  - .2 Float surfaces with wood or metal floats or power finishing machines and bring surfaces to true grade or dimensions..
  - .3 Use curing compounds compatible with applied finish on concrete surfaces.  
Applied finish on concrete: Provide written declaration that compounds used are compatible.
  - .4 Apply two (2) coats of sealing compounds for all concrete work.
  - .5 Concrete deck shall have broom finish.
  - .6 All concrete work shall be properly vibrated .

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**3.3**

**SITE TOLERANCE**

- .1 Concrete tolerance in accordance with CAN/CSA-A23.1 and A 23.2

**3.4**

**FIELD QUALITY CONTROL**

- .1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by Departmental Representative in accordance with CAN/CSA-A23.1 and Section 01 45 00.
- .2 Departmental Representative may take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
- .3 Non-destructive Methods for Testing Concrete shall be in accordance with CAN/CSA-A23.2.

**END OF SECTION**