

**PART 1**      **GENERAL**

**1.1**            **RELATED REQUIREMENTS**

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

**1.2**            **PRICE AND PAYMENT PROCEDURES**

- .1      Measurement and Payment:
  - .1      No measurement will be made under this Section.
  - .1      Include reinforcement costs in items of concrete work in Section 03 30 00 – Cast-In-Place Concrete.

**1.3**            **REFERENCES**

- .1      CSA International
  - .1      CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
  - .2      CAN/CSA-A23.3-04(R2010), Design of Concrete Structures.
  - .3      CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.
  - .4      CSA-G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .5      CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .6      CSA W186-M1990(R2007), Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .2      Reinforcing Steel Institute of Canada (RSIC)
  - .1      RSIC-2004, Reinforcing Steel Manual of Standard Practice.

**1.4**            **ACTION AND INFORMATIONAL SUBMITTALS**

- .1      Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2      Shop Drawings:
  - .1      Submit drawings stamped and signed by professional engineer registered or licensed in Newfoundland & Labrador, Canada.
    - .1      Indicate placing of reinforcement and:
      - .1      Bar bending details.
      - .2      Lists.
      - .3      Quantities of reinforcement.
      - .4      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.

**1.5**            **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.

- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.

## **PART 2**      **PRODUCTS**

### **2.1**      **MATERIALS**

- .1 Substitute different size bars only if permitted in writing by Departmental Representative.
- .2 Reinforcing steel: billet steel, grade 350, deformed bars to CSA-G30.18, unless indicated otherwise.
- .3 Reinforcing steel: weldable low alloy steel deformed bars to CSA-G30.18.
- .4 Cold-drawn annealed steel wire ties: to ASTM A 82/A 82M.
- .5 Deformed steel wire for concrete reinforcement: to ASTM A 82/A 82M.
- .6 Welded deformed steel wire fabric: to ASTM A 82/A 82M.
  - .1 Provide in flat sheets only.
- .7 Epoxy Coating of non-prestressed reinforcement: to ASTM A 775/A 775M.
- .8 Galvanizing of non-prestressed reinforcement: to CAN/CSA-G164, minimum zinc coating 610 g/m<sup>2</sup>.
  - .1 Protect galvanized reinforcing steel with chromate treatment to prevent reaction with Portland cement paste.
  - .2 If chromate treatment is carried out immediately after galvanizing, soak steel in aqueous solution containing minimum 0.2% by weight sodium dichromate or 0.2% chromic acid.
    - .1 Temperature of solution equal to or greater than 32 degrees and galvanized steels immersed for minimum 20 seconds.
  - .3 If galvanized steels are at ambient temperature, add sulphuric acid as bonding agent at concentration of 0.5% to 1%.
    - .1 In this case, no restriction applies to temperature of solution.
  - .4 Chromate solution sold for this purpose may replace solution described above, provided it is of equivalent effectiveness.
- .9 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.
- .10 Mechanical splices: subject to approval of Departmental Representative.
- .11 Plain round bars: to CSA-G40.20/G40.21.

### **2.2**      **FABRICATION**

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
  - .1 SP-66 unless indicated otherwise.
- .2 Obtain Departmental Representative's written approval for locations of reinforcement splices other than those shown on placing drawings.

- .3 Upon approval of Departmental Representative, weld reinforcement in accordance with CSA W186.
- .4 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.
- .2 Upon request inform Departmental Representative of proposed source of material to be supplied.

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- .1 Galvanizing to include chromate treatment.
  - .1 Duration of treatment to be 1 hour per 25 mm of bar diameter.
- .2 Conduct bending tests to verify galvanized bar fragility in accordance with ASTM A 143/A 143M.

### **3.2 FIELD BENDING**

- .1 Do not field bend or field weld reinforcement except where indicated or authorized by Departmental Representative.
- .2 When field bending is authorized, bend without heat, applying slow and steady pressure.
- .3 Replace bars, which develop cracks or splits.

### **3.3 PLACING REINFORCEMENT**

- .1 Place reinforcing steel as indicated on placing drawings and in accordance with CSA-A23.1/A23.2.
- .2 Use plain round bars as slip dowels in concrete.
  - .1 Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint.
  - .2 When paint is dry, apply thick even film of mineral lubricating grease.
- .3 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.

- .4 Ensure cover to reinforcement is maintained during concrete pour.
- .5 Protect coated portions of bars with covering during transportation and handling.

**3.4 FIELD TOUCH-UP**

- .1 Touch up damaged and cut ends of epoxy coated or galvanized reinforcing steel with compatible finish to provide continuous coating.

**3.5 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - 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 00 - Cleaning.

**END OF SECTION**