

**Part 1        General**

**1.1        REFERENCES**

- .1 American Concrete Institute (ACI)
  - .1 SP-66-04, ACI Detailing Manual 2004.
- .2 ASTM International
  - .1 ASTM A82/A82M-07, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
  - .2 ASTM A185/A185M-07, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
  - .3 ASTM A775/A775M-07b(2014), Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
- .3 CSA International
  - .1 CSA-A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
  - .2 CAN/CSA-A23.3-14, Design of Concrete Structures.
  - .3 CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.
  - .4 CSA-G40.20/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .5 CSA W186-M1990(R2012), Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .4 Reinforcing Steel Institute of Canada (RSIC)
  - .1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.

**1.2        ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice.
- .3 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada.
    - .1 Indicate placing of reinforcement and:
      - .1 Bar bending details.
      - .2 Lists.
      - .3 Quantities of reinforcement.
  - .2 Detail lap lengths and bar development lengths to CAN/CSA-A23.3.

### **1.3 QUALITY ASSURANCE**

- .1 Submit in accordance with Section 01 45 00 - Quality Control and as described in PART 2 - SOURCE QUALITY CONTROL.
  - .1 Mill Test Report: upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, minimum 4 weeks prior to beginning reinforcing work.
  - .2 Upon request, submit in writing to Departmental Representative proposed source of reinforcement material to be supplied.

### **1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and 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 off ground, indoors, in dry location, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.
- .1 Develop Construction Waste Management Plan related to Work of this Section.

## **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 400.
- .3 Reinforcing steel: weldable low alloy steel deformed bars to CSA-G30.18.
- .4 Welded steel wire fabric: to ASTM A185/A185M.
  - .1 Provide in flat sheets only.
- .5 Epoxy Coating of non-prestressed reinforcement: to ASTM A775/A775M.
- .6 Plain round bars: to CSA-G40.20/G40.21.

### **2.2 FABRICATION**

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2.
  - .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.

- .1 Ship epoxy coated bars in accordance with ASTM A775A/A775M.

## **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 beginning 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 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 that develop cracks or splits.

### **3.2 PLACING REINFORCEMENT**

- .1 Place reinforcing steel 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 epoxy and paint coated portions of bars with covering during transportation and handling.

### **3.3 FIELD TOUCH-UP**

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

### **3.4 CLEANING**

- .1 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 recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 03 20 00 - Concrete Reinforcing.

**1.2 REFERENCES**

- .1 ASTM International
  - .1 ASTM A1064/A1064M-13, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain, and Deformed, for Concrete.
  - .2 ASTM D1751-04(2013)e1, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non extruding and Resilient Bituminous Types).
- .2 CSA International
  - .1 CSA-A23.1/A23.2-09(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-G30.18-09, Carbon 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 week prior to beginning concrete works.
  - .1 Ensure key personnel, site supervisor, and Departmental Representative attend.
  - .2 Verify project requirements.

**1.4 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 false work design to: CSA A23.1/A23.2.
- .3 At least 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 4 weeks prior to beginning Work, submit to Departmental Representative samples of following materials proposed for use: curing compound.
- .5 Provide inspection results for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters are found.
- .6 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.

## **1.5 QUALITY ASSURANCE**

- .1 Provide to Departmental Representative, 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.

## **1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Delivery and Acceptance Requirements:
  - .1 Concrete hauling time: deliver to site of Work and discharge 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 by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

## **Part 2 Products**

### **2.1 DESIGN CRITERIA**

- .1 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 GU.
- .2 Supplementary cementing materials: to CSA A3001.
- .3 Water: to CSA A23.1/A23.2.
- .4 Reinforcing bars: to CAN/CSA-G30.18, Grade 400.
- .5 Welded steel wire fabric: to ASTM A1064as.
- .6 Other concrete materials: to CSA A23.1/A23.2.

## **2.4 MIXES**

- .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 PART 3 - VERIFICATION.
  - .2 Provide concrete mix to meet following plastic state requirements:
    - .1 Workability: free of surface blemishes.
    - .2 Set time: 8 hours maximum.
  - .3 Provide concrete mix to meet following hard state requirements:
    - .1 Durability and class of exposure: N.
    - .2 Compressive strength at 56 age: 30 MPa minimum.
    - .3 Intended application: indoor floor slab.
    - .4 Aggregate size 13.2 mm maximum.
  - .4 Concrete supplier's certification.
  - .5 Provide quality management plan to ensure verification of concrete quality to specified performance.

## **Part 3 Execution**

### **3.1 PREPARATION**

- .1 Provide Departmental Representative 24 hour notice before each concrete pour.
- .2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.
- .3 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.
- .4 Protect previous Work from staining.
- .5 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.

### **3.3 FINISHES**

- .1 Formed surfaces exposed to view: sack rubbed finish in accordance with CSA A23.1/A23.2.
- .2 Interior floor slabs to be left exposed requiring smooth surface: initial finishing operations followed by final finishing comprising mechanical floating and steel trowelling as specified in CSA A23.1/A23.2 to produce hard, smooth, dense trowelled surface free from blemishes.
- .3 New finishes to match existing.
- .4 Masonry wall finishes:
  - .1 Clean the wall surface and wash with a degreaser or detergent. Then vacuum to clear any dust or dirt that remains.
  - .2 Repair any holes or cracks caused by demolition to scribe 1/4 inch MIN.
  - .3 Apply Sealent of SIKAFLEX 15 LM or equivalent approved by Departmental Representative.
  - .4 Spray mortar surface at intervals and keep moist for maximum 3 days after installation.
  - .5 Install loose steel lintels over openings where required.
  - .6 Brace door jambs to maintain plumb. Fill spaces between jambs and masonry with mortar.

### **3.4 CURING**

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

### **3.5 SEALING APPLICATION**

- .1 After curing is complete, apply two 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.

### **3.6 SITE TOLERANCES**

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

### **3.7 FIELD QUALITY CONTROL**

- .1 Concrete testing: to CSA A23.1/A23.2 by testing laboratory designated and paid for by Departmental Representative. Accelerated test methods will apply.

### **3.8 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 recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Divert unused concrete materials from landfill to local facility after receipt of written approval from Departmental Representative.
  - .2 Provide appropriate area on job site where concrete trucks can be safely washed.
  - .3 Divert admixtures and additive materials from landfill to approved official hazardous material collections site after receipt of written approval from Departmental Representative.
  - .4 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**

**Part 1 General**

**1.1 REFERENCES**

- .1 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-25.20-95, Surface Sealer for Floors.
- .2 CSA International
  - .1 CAN/CSA-A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction//Methods of Test for Concrete.
- .3 South Coast Air Quality Management District (SCAQMD), California State
  - .1 SCAQMD Rule 1168-A2005(June 2006), Adhesives and Sealants Applications.

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Provide manufacturer's printed product literature and data sheets for concrete finishes and include product characteristics, performance criteria, physical size, finish and limitations.
    - .1 Provide two copies of WHMIS MSDS. WHMIS MSDS acceptable to Labour Canada and Health and Welfare Canada for concrete floor treatment materials. Indicate VOC content in g/L.
    - .2 Include application instructions for concrete floor treatments.

**1.3 ENVIRONMENTAL REQUIREMENTS**

- .1 Temporary lighting:
  - .1 Minimum 1200 W light source, placed 2.5 m above floor surface, for each 40 sq m of floor being treated.
- .2 Electrical power:
  - .1 Provide sufficient electrical power to operate equipment normally used during construction.
- .3 Work area:
  - .1 Make work area water tight protected against rain and detrimental weather conditions.
- .4 Temperature:
  - .1 Maintain ambient temperature of not less than 10 degrees C from 7 days before installation to at least 48 hours after completion of work and maintain relative humidity not higher than 40% during same period.
- .5 Safety:

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.
- .6 Ventilation:
  - .1 Departmental Representative will arrange for ventilation system to be operated during installation of concrete floor treatment materials. Ventilate area of work as directed by Departmental Representative by use of approved portable supply and exhaust fans.
  - .2 Provide continuous ventilation during and after coating application.
- 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.
  - .2 Delivery and Acceptance Requirements:
    - .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
  - .3 Packaging Waste Management: remove for reuse by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- Part 2 Products**
  - 2.1 PERFORMANCE REQUIREMENTS**
    - .1 Product quality and quality of work in accordance with Section 01 61 00 - Common Product Requirements.
    - .2 Submit written declaration that components used are compatible and will not adversely affect finished flooring products and their installation adhesives.
  - 2.2 CHEMICAL HARDENERS**
    - .1 Type: Sodium silicate.
    - .2 Water: potable.
  - 2.3 SEALING COMPOUNDS**
    - .1 Surface sealer: to CAN/CGSB-25.20.
    - .2 Surface sealer: acrylic carnuba wax.
    - .3 Surface sealers are not manufactured or formulated with aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium and their compounds.

## **2.4 CURING COMPOUNDS**

- .1 Select water-based, organic-solvent free curing compounds.

## **2.5 CONCRETE STAINS**

- .1 Select water-based concrete stains.

## **2.6 MIXES**

- .1 Mixing ratios in accordance with manufacturer's written instructions.

# **Part 3 Execution**

## **3.1 EXAMINATION**

- .1 Verify that slab surfaces are ready to receive work and elevations are as recommended by manufacturer's written instructions.

## **3.2 PREPARATION OF EXISTING SLAB**

- .1 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radiused edges unless otherwise indicated.
- .2 Use strong solvent or mechanical stripping to remove chlorinated rubber or existing surface coatings.
- .3 Use protective clothing, eye protection, and respiratory equipment during stripping of chlorinated rubber or existing surface coatings.

## **3.3 APPLICATION**

- .1 Apply concrete finishing floor hardener in accordance with manufacturer's written instructions.
- .2 After floor treatment is dry, seal control joints and joints at junction with vertical surfaces with sealant.
- .3 Apply floor treatment in accordance with Sealer manufacturer's written instructions.
- .4 Clean over spray. Clean sealant from adjacent surfaces.

## **3.4 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 recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**3.5            PROTECTION**

- .1        Protect finished installation in accordance with manufacturer's instructions.

**END OF SECTION**