
Part 1 General

1.1 RELATED SECTIONS

- .1 Section 03 30 00 - Cast-In-Place Concrete
- .2 Section 03 35 00 - Concrete Finishing

1.2 REFERENCES

- .1 American Concrete Institute (ACI)
 - .1 ACI Mn1-66(20), ACI Detailing Manual - 2020.
- .2 American National Standards Institute/American Concrete Institute (ANSI/ACI)
 - .1 ANSI/ACI 315-R-18, Guide to Presenting Reinforcing Steel Design Details
- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A1064/A1064m-18A, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed for Concrete.
- .2 Canadian Standards Association (CSA)
 - .1 Csa-A23.1:19/A23.2:19, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 Csa-A23.3:19, Design of Concrete Structures.
 - .3 Can/Csa-G30.18-09 (R2019), Carbon Steel Bars for Concrete Reinforcement.
 - .4 Can/Csa-G40.20-13/G40.21-13(R2018), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .3 Reinforcing Steel Institute of Canada
 - .1 Reinforcing Steel Manual of Standard Practice, RSCI, Latest Edition.

1.3 SUBMITTALS

- .1 Submittals in Accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare reinforcement drawings in accordance with RSCI Manual of Standard Practice and by the Reinforcing Steel Institute of Canada.
- .3 Submit shop drawings including placing of reinforcement and indicate:
 - .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.
- .5 Indicate sizes, spacings and locations of chairs, spacers and hangers.
- .4 Detail lap lengths and bar development lengths to CSA-A23.3, unless otherwise indicated.
 - .1 Provide tension lap splices unless otherwise indicated.
- .5 Each shop drawing submitted to bear the stamp and signature of A qualified professional engineer registered in the Province of Newfoundland and Labrador.

1.4 QUALITY CONTROL

- .1 Quality Control: in accordance with Section 01 45 00 - Quality Control.
- .2 Mill Test Report: upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, minimum 2 weeks prior to beginning reinforcing work.
- .3 Upon request, submit in writing to departmental representative proposed source of reinforcement material to be supplied.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Store and manage hazardous materials in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .2 Waste management and disposal:
 - .1 Separate waste materials for reuse and recycling.
 - .2 Place materials defined as hazardous or toxic in designated containers.

Part 2 Products

2.1 MATERIALS

- .1 Reinforcing Steel: billet steel, grade 400, deformed bars To CAN/CSA-G30.18-09 (R2019), unless indicated otherwise.

2.2 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2, ACI 315, and Reinforcing Steel Manual of Standard Practice by The Reinforcing Steel Institute of Canada, unless indicated otherwise.
- .2 Obtain Departmental Representative's approval for locations of reinforcement splices other than those shown on drawings.
- .3 Welding of reinforcement will not be permitted.

- .4 Ship bundles of bar reinforcement clearly identified in accordance with bar bending details and lists.

Part 3 Execution

3.1 ON-SITE STORAGE AND HANDLING

- .1 Reinforcing steel shall be handled and stored in such a manner to keep it free of dirt, mud and water.
- .2 Reinforcing steel shall be off-loaded from the truck directly onto purpose made storage racks and covered with tarp.
- .3 Clean reinforcing steel of excess rust and previously deposited concrete prior to placing concrete.

3.2 FIELD BENDING

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

3.3 PLACING REINFORCEMENT

- .1 Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CSA-A23.1/A23.2.
- .2 Ensure cover to reinforcement is maintained during concrete pour.
- .3 Prior to placing concrete, obtain Departmental Representative's approval, in writing, of reinforcing material and placement. Use of approved chairs to support reinforcement in slabs is mandatory.
- .4 Remove and replace reinforcement which is visibly damaged or cracked.
- .5 Do not cut reinforcement, either before or after concrete is placed, to permit incorporation of other work.
- .6 Do not relocate reinforcement without approval.
- .7 Clean reinforcement before placing concrete.
- .8 The Departmental Representative shall be notified when the reinforcing steel is in place and in sufficient time to permit an inspection of same prior to concrete placement. minimum 24-hour notification required.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 03 20 00 - Concrete Reinforcing.
- .2 Section 03 35 00 - Concrete Finishing

1.2 REFERENCES

- .1 American Society for Testing And Materials International (ASTM)
 - .1 AASHTO M 154m/M 154-12(2020), Standard Specification for Air-Entraining Admixtures for Concrete.
 - .2 ASTM C309-19, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - .3 ASTM C330/C330m-17a, Standard Specification for Lightweight Aggregates for Structural Concrete.
 - .4 ASTM C494/C494m-19, Standard Specification for Chemical Admixtures for Concrete.
 - .5 ASTM C881/C881m-20a, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
 - .6 ASTM C1017/C1017m-13e1, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA A23.1-14/A23.2:19, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CSA A283:19, Qualification Code for Concrete Testing Laboratories.
 - .3 Can/Csa-A3000-18, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 And A3005).
 - .1 Csa-A3001-18, Cementitious Materials for use in Concrete.

1.3 DESIGN REQUIREMENT

- .1 Alternative 1 - Performance: In accordance with CSA-A23.1/A23.2, and as described in mixes of Part 2 - Products.

1.4 SUBMITTALS

- .1 Submittals in accordance with section 01 33 00 - Submittal Procedures.
- .2 Submit proposed quality control procedures for Departmental Representative's review.

1.5 CONSTRUCTION QUALITY CONTROL

- .1 Inspection and testing of concrete and concrete materials will be carried out in accordance with CSA-A23.1.

1.6 QUALITY ASSURANCE

- .1 Quality assurance: in accordance with Section 01 45 00 - Quality Control.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Concrete hauling time: maximum allowable time for concrete to be delivered to site of work and discharged not to exceed 120 minutes after batching.
 - .1 Modifications to maximum time limit must be agreed to by Departmental Representative Laboratory Representative and concrete producer as described in CSA A23.1/A23.2.
 - .2 Deviations to be submitted for review by Departmental Representative.
- .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

Part 2 Products

2.1 MATERIALS

- .1 Cement: to CANCSA-A3001, type GU, or type GUB.
- .2 Supplementary cementing materials: to CAN/CSA-A3001.
- .3 Water: to CSA-A23.1.
- .4 Aggregates:
 - .1 To CAN/CSA-A23.1/A23.2 and ASTM C330. Coarse aggregates to be normal density.
 - .2 Maximum aggregate size shall not be greater than 38 mm.
- .5 Admixtures:
 - .1 Air entraining admixture: to ASTM C260. air entrainment shall be used in all concrete except the floors and footings.
 - .2 Chemical admixture: to ASTM C494 and ASTM C1017. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .6 Shrinkage compensating grout: premixed compound consisting of non-metallic aggregate, Portland Cement, water reducing and plasticizing agents To CSA A23.1/A23.2.
 - .1 Acceptable products:

- .1 M-Bed Standard by Sika Canada Inc.
 - .2 Masterflow 713 Grout by Master Builders Technologies Ltd.
 - .3 Ns Grout by Euclid Canada Inc.
 - .4 Alternate materials: approved by addendum in accordance with instructions to tenderers.
- .7 Acrylic adhesive for dowel and anchor rod anchorage: to ASTM C881, type Iv, grade 3, class A, B and C.
- .1 Acceptable products:
 - .1 Sika Anchorfix4 Anchoring Resin as supplied by Action Fasteners.
 - .2 Epcon Acrylic 7 by Itw Ramset/Red Head.
 - .3 Hit Hy200 Adhesive System by Hilti.
 - .4 Acrylic-Tie-Anchoring System by Simpson Strong-Tie.
 - .5 Alternate materials: approved by addendum in accordance with instructions to tenderers.
 - .8 Curing compound:
 - .1 To CSA-A23.1/A23.2 white and ASTM C309,
 - .2 To be white pigmented. Subject to compatibility with specified finishes, removal may be required.
 - .3 Acceptable products:
 - .1 Kurez Vox by Euclid Chemical Company.
 - .2 Sealtight 1220 white pigmented curing compound by W.R. Meadows.
 - .3 Florseal by Sika Canada Inc.
 - .4 Alternate materials: approved by addendum in accordance with instructions to tenderers.
 - .4 Use curing compounds compatible with applied finish on concrete surfaces. provide written certification that compounds used are compatible.

2.2 MIXES

- .1 The Contractor shall be responsible for the concrete mix designs.
- .2 It shall be the responsibility of the Contractor to ensure that the mixture proportions shall be properly batched, mixed, placed and cured such that the concrete conforms to the specifications.

Part 3 Execution

3.1 PREPARATION

- .1 Obtain Departmental Representative's approval before placing concrete.
 - .1 Provide 24 hours notice prior to placing of concrete.

- .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 re-handling, and without damage to existing structure or work.
- .4 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .5 Protect previous work from staining.
- .6 Clean and remove stains prior to application for concrete finishes.
- .7 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .8 Reinforcing steel, embedded parts, and inserts to be secured in position prior to placing concrete.
- .9 In locations where fresh concrete is placed on previously placed concrete and construction joints:
 - .1 Clean and prepare existing surfaces at interface of all new concrete work in accordance with CSA A23.1, Clause 19.2.
 - .2 Remove all foreign materials, loose concrete, form release agent, oil, grease and laitance, dust, and dirt on base concrete surface. partially expose aggregate. surface to be roughened to provide an amplitude of at least 5 mm.

3.2 CONSTRUCTION

- .1 Do cast-in-place concrete work in accordance with CSA-A23.1/A23.2.
- .2 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .3 Cure concrete slab surfaces by moist cure for minimum 7 consecutive days after placing.
- .4 Embedded components:
 - .1 No conduits, pipes or other embedded components shall be placed in concrete base except where indicated or approved by Departmental Representative.
 - .2 Where approved by Departmental Representative, set embedded components as indicated or specified elsewhere.
 - .3 Do not eliminate or displace reinforcement to accommodate hardware. if embedded components cannot be located as specified, obtain approval of modifications from Departmental Representative before placing of concrete.
 - .4 Check locations and sizes of embedded components shown on the drawings.
- .5 Finishing and curing:
 - .1 Finish concrete in accordance with CSA-A23.1/A23.2.

- .2 Formed surfaces:
 - .1 Interior concrete curb and wall surfaces to be left exposed in finished work - smooth rubbed finish.
- .3 Slab and floor finishes: as per CSA-A23.1.
 - .1 Concrete intended as finished surface: except as specified herein, finish to produce a smooth, steel troweled surface free from ridges, trowel marks or undulations to a tolerance defined in table 22.
 - .2 Float surface with wood or metal floats and power finishing machine and bring surface to true grade.
 - .3 Steel trowel to smooth and even surface.
 - .4 All concrete slab surfaces to be moist cured for minimum 7 days.
- .4 Use procedures as reviewed by Departmental Representative or those noted in CSA-A23.1/A23.2 to remove excess bleed water. ensure surface is not damaged.
- .5 Use curing compounds compatible with applied finish on concrete surfaces.
applied finish on concrete: provide written declaration that compounds used are compatible.

3.3 HOUSEKEEPING PADS

- .1 Provide reinforced concrete housekeeping pads/bases for floor mounted mechanical and electrical equipment as indicated on plans or in specifications of related trades. size pads with reference to equipment shop drawings. pads shall extend beyond the outer surface of the equipment by 100 mm and as otherwise directed by related trades.
- .2 Unless otherwise indicated, construct to standard housekeeping pad details on drawings.
- .3 Submit all pad locations to Departmental Representative for review.

3.4 FIELD QUALITY CONTROL - CONCRETE

- .1 Inspection and testing of concrete and concrete materials to be carried out in accordance with CAN/CSA-A23.1.
- .2 All construction not meeting the required standard of quality and workmanship shall be rejected unless, in the opinion of the Departmental Representative, suitable repair work can be performed within the work schedule. cost of replacement or repair shall be borne entirely by the Contractor. all remedial work must be carried out to the satisfactory of the Departmental Representative.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

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

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-25.20 - 95, Surface Sealer for Floors.
- .2 Canadian Standards Association (CSA)
 - .1 CSA A23.1:19/A23.2:19, Concrete Materials and Methods Of Concrete Construction / Test Methods and Standard Practices for Concrete.

1.3 PRODUCT DATA

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Include application instructions for concrete floor treatments.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials.
- .2 Place materials defined as hazardous or toxic waste in designated containers.
- .3 Ensure emptied containers are sealed and stored safely for disposal away for children.
- .4 Use chemical hardeners that are non-toxic, biodegradable and have zero or low VOC's.
- .5 Dispose of surplus chemical and finishing materials in accordance with Federal, Provincial and Municipal Regulations.
- .6 Dispose of waste from stripping of floors in a manner that will not have unfavourable effects on the environment.

1.5 ENVIRONMENTAL REQUIREMENTS

- .1 Temporary lighting:
 - .1 Minimum 1200W light source, placed 2.5 m above floor surface, for each 40 square metres of floor being treated.
- .2 Electrical power:
 - .1 Provide sufficient electrical power to operate equipment normally used during construction.

- .3 Work area:
 - .1 Make the work area watertight and protected against rain and detrimental weather conditions.
- .4 Temperature:
 - .1 Maintain ambient temperature of not less than 10°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 Moisture:
 - .1 Ensure concrete substrate is within moisture limits prescribed by flooring manufacturer.
- .6 Safety:
 - .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.
- .7 Ventilation:
 - .1 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.

Part 2 Products

2.1 EPOXY FINISH

- .1 The building shall have a finished concrete floor to CSA A23.1 and will have two (2) coats of epoxy floor coating.
- .2 Acceptable product: Stonkote GS4 as manufactured by Stonehard Limited, or approved equal. floor finish colour to be determined by Departmental Representative.
- .3 pipe sleeves to be sealed with Stoneflew CJ4 by Stonehard Limited, or approved equal, unless otherwise directed by Departmental Representative.

2.2 MIXES

- .1 Mixing, ratios and application in accordance with manufacturer's instructions.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify that slab, substrate, or site conditions surfaces are ready to receive work and elevations are as indicated on shop drawings instructed by manufacturer.

3.2 PREPARATION OF SLAB

- .1 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radius edges unless otherwise indicated.
- .2 Use strong solvent 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 3.3 Application

- .1 After floor treatment is dry, seal control joints and joints at junction with vertical surfaces with sealant.
- .2 Apply floor treatment in accordance with manufacturer's written instructions.
- .3 Clean overspray. clean sealant from adjacent surfaces.

3.4 PROTECTION

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

END OF SECTION