

Part 1 General

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| <u>1.1 REFERENCES</u> | .1 | American Society for Testing and Materials International (ASTM) |
| | .1 | ASTM A1064/A1064M-15 Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete. |
| | .2 | ASTM C494/C494M-15a, Standard Specification for Chemical Admixtures for Concrete. |
| | .2 | Canadian Standards Association (CSA) |
| | .1 | CSA A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete. |
| | .2 | CSA A3000-13, Cementitious Materials Compendium. |
| | .3 | CSA G30.18-09 (R2014), Carbon Steel Bars for Concrete Reinforcement. |
| | .3 | Reinforcing Steel Manual of Standard Practice, RSIC, Fourth Edition, 2004. |
| <u>1.2 CONSTRUCTION QUALITY CONTROL</u> | .1 | Submit proposed quality control procedures to Departmental Representative for review. |
| | .2 | Inspection and testing of concrete and concrete materials will be carried out in accordance with CSA-A23.1. |
| | .3 | Inspection or testing by Departmental Representative will not augment or replace Contractor's quality control nor relieve him of his contractual responsibilities. |
| <u>1.3 CERTIFICATES</u> | .4 | Provide certification indicating the concrete supplier is certified in accordance with the Atlantic Provinces Ready Mix Concrete Association Program or equivalent. |
| | .1 | Only concrete supplied from such certified plants shall be acceptable to the client. |
| | .2 | Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CSA-A23.1. |
| | .3 | Provide mix design in compliance with CSA-A23.1 to provide concrete of quality, yield and strength as specified under 2.2 Mixes. Mix designs to be prepared by and stamped by an engineer licensed to practice in the Province of New Brunswick. |
| <u>1.4 DEFINITIONS</u> | .1 | Non-shrinking Fill (CLSM): very weak mixture of cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated. |

Part 2 Products

2.1 MATERIALS

- .1 Portland Cement and Supplementary Cementing Materials, (SCM's): to CSA-A3000.
- .2 Water: to CSA-A23.1.
- .3 Aggregates: to CSA-A23.1. Coarse aggregates to be normal density.
- .4 Air Entraining Admixture: to ASTM C260.
- .5 Chemical Admixtures: to ASTM C494/C494M.
- .6 Acrylic adhesive for dowel and anchor rod anchorage: to ASTM C881, Type IV, Grade 3, Class A, B, and C.
 - .1 Acceptable Products:
 - .1 Epcon Acrylic 7 by ITW Ramset/Red Head.
 - .2 HIT HY200 Injection Adhesive System by HILTI.
 - .3 Acrylic-Tie Anchoring System by Simpson Strong-tie.
 - .4 Alternate Materials: Approved by addendum in accordance with Instructions to Tenderers.
- .7 Premoulded Joint Fillers (Isolation Joints):
 - .1 Isolation Joint Filler: Closed Cell foam expansion joint material. To be chemical resistant, ultraviolet stable, non-absorbent, low density.
 - .2 Acceptable product: Deck-O-Foam by W.R. Meadows Ltd., or approved alternate.
- .8 Joint Sealant: Two component, traffic-grade, polyurethane elastomeric sealant.
- .9 Reinforcing steel: billet steel, grade 400, deformed bars to CAN/CSA-G30.18, unless indicated otherwise.
- .10 Cold drawn annealed steel wire ties: to ASTM A82.
- .11 Chairs, bolsters, bar supports, spacers: to CSA-A23.1. Non-metallic where within 40 mm of exposed concrete surfaces.

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 specification.

- .3 Proportion normal density concrete in accordance with A23.1, Alternate 1, to give following quality for concrete:
 - .1 Concrete for slab infill repair:
 - .1 Cement type GU.
 - .2 Minimum compressive strength at 28 days: 30 MPa.
 - .3 Class of exposure: N.
 - .4 Maximum water /cement ratio: 0.45.
 - .5 Nominal maximum size of coarse aggregate: 20 mm.
 - .6 Slump at time and point of discharge: 80 mm \pm 30 mm.
 - .2 Non-shrinking fill: Controlled Low Strength Material proportioned and mixed to meet following criteria:
 - .1 Cement type GU.
 - .2 Maximum compressive strength at 28 days: 0.4 to 1.0 MPa.
 - .3 Concrete aggregates: to CSA-A23.1/A23.2.
 - .4 Slump at time and point of discharge: 160 to 200 mm.
 - .5 In place density: 1440 to 1920 kg/m³.
 - .6 Incorporate Controlled Low Strength Material performance additive to the mix to reduce mix water requirements, shrinkage, improve flexibility, eliminate segregation and settlement, and control strength development. Dosage to be in the range of 120 ml/m³ of CLSM. Obtain mix design information from CLSM additive producer and incorporate in mix design.

**2.3 FABRICATION OF
REINFORCING STEEL**

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1, ANSI/ACI 315, and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada, unless indicated otherwise.

Part 3 Execution

**3.1 PLACING
REINFORCEMENT**

- .1 Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CSA-A23.1.
- .2 Install, support and space reinforcement in alignment to position and clearances indicated and secure to supports.
- .3 Ensure cover to reinforcement is maintained during concrete pour.
- .4 Clean reinforcement before placing concrete.

- .5 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement. Use of approved chairs to support reinforcement is mandatory.

3.2 PREPARATION

- .1 Obtain Departmental Representative's approval before placing concrete. Provide 24 hour notice prior to placing of concrete.
- .2 Pumping of concrete is permitted only after approval of equipment and mix.
- .3 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing.
- .4 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .5 Do not place load upon new concrete until authorized by Departmental Representative.

3.3 CONSTRUCTION

- .1 Do cast-in-place concrete work in accordance with CSA-A23.1.
- .2 Reinforcing steel shall be secured in position prior to placing concrete.
- .3 Finishing.
 - .1 Unless otherwise directed by Departmental Representative, finish exposed surface of concrete in accordance with CSA-A23.1-Smooth steel trowel surface. Match finish of adjacent in-situ concrete.

3.4 TRENCH INFILL

- .1 Backfill new trenches and excavations below floor slab to lines and grades indicated using non-shrinking fill consisting of a cementitious Controlled Low Strength Material, (CLSM).

3.5 CONCRETE SLAB INFILLS

- .1 Prepare existing base concrete as detailed and as required to provide for installation of new work.
- .2 Install dowels where new concrete abuts existing as detailed on plans.
- .3 Clean and prepare existing surfaces at interface of all new concrete work in accordance with CSA A23.1.
- .4 Floor Repair:
 - .1 Remove existing concrete slab where indicated.
 - .2 Saw cut perimeter of areas of slab removal.
 - .3 Upon installation of new services and

backfill, prepare existing concrete slab edges, install dowels, and install new concrete.

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| <u>3.6 SITE TOLERANCE</u> | .1 | Concrete tolerances to be in accordance with CSA-A23.1 and as otherwise indicated on drawings. |
| <u>3.7 FIELD QUALITY CONTROL</u> | .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. |
| | .2 | Owner will pay for costs of tests. |