

PART 1 - GENERAL

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| 1.1 <u>Related Work</u>            | .1    Refer to other Specification Sections for related information.<br><br>.2    Refer to Section 01 33 00 for Shop Drawing/Submissions requirements.  |
| 1.2 <u>Reference Standards</u>     | .1    CSA A23.1/23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.<br><br>.2    CSA S269.1-1975 (R2003), Falsework for Construction Purposes and CSA S269, Concrete Formwork.   |
| 1.3 <u>Submissions</u>             | .1    Shop Drawings:<br>.1    Upon request, submit to Departmental Representative for review four (4) sets of formwork and falsework shop drawings, in accordance with Section 01 33 00, at least four (4) weeks prior to erection.<br>.2    All such drawings to be stamped and signed by a professional engineer registered in the Province of New Brunswick.<br>.3    Clearly indicate method and schedule of construction, materials, arrangement of joints, ties, shores, liners, and locations of temporary embedded parts.<br>.4    Comply with CSA S269.1 for falsework drawings.<br><br>.2    Product Data/Samples:<br>.1    Provide product data and samples for form ties.<br><br>.3    Provide submissions in accordance with Section 01 33 00. |
| 1.4 <u>Measurement for Payment</u> | .1    This item will not be measured separately but shall be considered incidental to the Work in accordance with Section 01 29 00 - Project Particulars and Measurement.   |

PART 2 - PRODUCTS

- 2.1 Materials
- .1 Formwork lumber: plywood and wood formwork materials to CSA A23.1.
  - .2 Falsework materials: to CSA S269.1.
  - .3 Form stripping agent: colourless mineral oil, free of kerosene, with viscosity between 70 and 110 s Saybolt Universal, 15 to 14 mm<sup>2</sup>/s at 40 degrees Celsius, flash-point minimum 150 degrees Celsius, open cup.
  - .4 Form ties: removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm diameter in concrete surface. When forms are removed, no metal will be less than 50 mm from the surface of the concrete.

PART 3 - EXECUTION

- 3.1 Erection
- .1 Verify lines and levels before proceeding with formwork and ensure dimensions agree with drawings.
  - .2 Construct forms to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA A23.1
  - .3 Line forms with material only as approved by Departmental Representative.
  - .4 Construct falsework in accordance with CSA S269.1.
  - .5 Align form joints and make watertight. Keep form joints to minimum.
  - .6 Use 25 mm chamfer strips on external corners.
  - .7 Clean formwork in accordance with CSA A23.1, before placing concrete.

- .8 Leave formwork in place for at least seven (7) days, exclusive for days when temperature falls below 5 degrees Celsius, unless otherwise directed by Departmental Representative.
- .9 Re-use of formwork and falsework subject to requirements of CSA A23.1.
- .10 All holes from form ties and rods to be plugged with mortar to requirements of CSA A23.1. When forms are removed, no metal will be less than 25 mm from the surface of the concrete.

3.2 Falsework

- .1 Design and construct formwork and falsework to resist severe exposed wave conditions.
- .2 Submit formwork and falsework design to Departmental Representative for review prior to construction.
- .3 Formwork and falsework design to be approved by a professional engineer registered in the Province of New Brunswick.

**END OF SECTION**

PART 1 - GENERAL

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| 1.1 <u>Related Work</u>        | .1 | Refer to other Specification Sections for related information.  |
|                                | .2 | Refer to Section 01 33 00 for Shop Drawing/ Submission requirements.  |
| 1.2 <u>Reference Standards</u> | .1 | CSA A23.1-14, Concrete Materials and Methods of Concrete Construction.  |
|                                | .2 | Reinforcing Steel Manual of Standard Practice (latest edition) by Reinforcing Steel Institute of Ontario.   |
|                                | .3 | CSA G30.18-09 (R2014), Billet-Steel Bars for Concrete Reinforcement.  |
|                                | .4 | ASTM A1064/A1064M-16A, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.  |
| 1.3 <u>Source Sampling</u>     | .1 | Upon request, provide Departmental Representative with certified copy of mill test of steel supplied showing physical and chemical analysis not less than two (2) weeks prior to commencement of work.  |
| 1.4 <u>Submissions</u>         | .1 | Shop Drawings:<br>.1    Clearly indicate bar sizes, spacing, location and quantities of reinforcement and mesh with identifying code marks to permit correct placement without reference to structural drawings; to Reinforcing Steel Manual of Standard Practice.<br>.2    Detail placement of reinforcing where special conditions occur.<br>.3    Design and detail lap lengths and bar development lengths to CSA standard A23.1, unless otherwise specified on drawings. |
|                                | .2 | Product Data/Samples:<br>.1    Provide product data for supports and spacers.   |

- .3 Test Results:
  - .1 Provide Mill Test Certificates cross referenced to the product supplied to the site.
- .4 Provide submissions in accordance with Section 01 33 00.

1.5 Storage

- .1 Store reinforcing steel on racks or sills that will permit easy access for identification and handling and prevent it from becoming coated with material which would adversely affect bond.
- .2 Do not store reinforcing steel in direct contact with the ground.

1.6 Measurement for Payment

- .1 This item will not be measured separately but shall be considered incidental to the Work in accordance with Section 01 29 00 - Project Particulars and Measurement.

PART 2 - PRODUCTS

2.1 Materials

- .1 Reinforcing steel: to CSA G30.18; billet steel grade 400 deformed bars.
- .2 Wire ties: to ASTM A1064 plain, cold drawn annealed steel wire.
- .3 Spacers: PVC, Fabricated to suit site dimensions.
- .4 Synthetic macro-fibre structural reinforcing to be composed of monofilament, self-fibrillating polypropylene/polyethylene blend fibres.

2.2 Reinforcing Steel Fabrication

- .1 Fabricate reinforcing to CSA standard A23.1
- .2 Fabrication tolerances for reinforcing steel to Reinforcing Steel Manual of standard Practice.
- .3 Obtain the Departmental Representative's acceptance for locations of reinforcement splices other than shown on steel placing drawings.

- .4 Ship bundles of bar reinforcement, clearly identified in accordance with bar list.
- .5 Do not weld reinforcing steel.

PART 3 - EXECUTION

- 3.1 Placing
  - .1 Accurately place reinforcing in positions indicated and hold firmly during placing, compacting and setting of concrete.
  - .2 Tie reinforcement where spacing in each direction is:
    - .1 Less than 300 mm: - tie at alternate intersections.
    - .2 300 mm or more: - tie at each intersection.
- 3.2 Field Bending
  - .1 Do not field bend reinforcement except where indicated or authorized by Departmental Representative.
  - .2 When authorized, bend reinforcement without heat, by applying slow and steady pressure.
  - .3 Replace bars which develop cracks or splits.
- 3.3 Cleaning
  - .1 Clean reinforcing before placing concrete.
- 3.4 Inspection
  - .1 Do not place concrete until Departmental Representative has inspected and accepted reinforcement work in place.
- 3.5 Surface Conditions
  - .1 Reinforcement, at time concrete is placed, to be free from mud, oil or other nonmetallic coatings that adversely affect bonding capacity.
  - .2 Reinforcement, with rust, mill scale, or combination of both to be considered as satisfactory, provided minimum dimensions, including height of deformations, and mass of hand wire brushed test specimen are not less than specified requirements in applicable CSA Standards.

END OF SECTION