

**Part 1        General**

**1.1           RELATED SECTIONS**

- .1        Section 03 02 00 – Concrete Reinforcing
- .2        Section 03 30 00 – Cast in Place Concrete

**1.2           REFERENCES**

- .1        Canadian Standards Association (CSA International)
  - .1        CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2        CSA-O86-09, Engineering Design in Wood.
  - .3        CSA O121-08, Douglas Fir Plywood.
  - .4        CSA O151-09 Canadian Softwood Plywood.
  - .5        CSA O153-M1980(R2008), Poplar Plywood.
  - .6        CAN/CSA-O325.07, Construction Sheathing.
  - .7        CSA O437 Series-93(R2006), Standards for OSB and Waferboard.
  - .8        CSA S269.1-1975(R2003), Falsework for Construction Purposes.
  - .9        CAN/CSA-S269.3-M92(R2008), Concrete Formwork, National Standard of Canada
- .2        Underwriters' Laboratories of Canada (ULC)
  - .1        CAN/ULC-S701-05, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

**1.3           SUBMITTALS**

- .1        Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts. Comply with CSA S269.1, for falsework drawings Comply with CAN/CSA-S269.3 for formwork drawings.

**1.4           DELIVERY, STORAGE AND HANDLING**

- .1        Waste Management and Disposal:
  - .1        Separate waste materials for reuse and recycling
  - .2        Place materials defined as hazardous or toxic in designated containers.
  - .3        Divert wood materials from landfill to a reuse facility as approved by Departmental Representative.

- .4 Divert plastic materials from landfill to a recycling reuse facility as approved by Departmental Representative.
- .5 Divert unused form release material from landfill to an official hazardous material collections site as approved by the Departmental Representative.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Formwork materials:
  - .1 For concrete without special architectural features, use wood and wood product formwork materials to CSA-O121, CAN/CSA-O86, CSA O437 Series CSA-O153.
  - .2 For concrete with special architectural features, use formwork materials to CSA-A23.1/A23.2.
  - .3 Rigid insulation board: to CAN/ULC-S701.
- .2 Pan forms: as indicated.
- .3 Tubular column forms: round, spirally wound laminated fibre forms, internally treated with release material.
  - .1 Spiral pattern not to show in hardened concrete.
- .4 Form ties:
  - .1 For concrete not designated 'Architectural', use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm diameter in concrete surface.
  - .2 For Architectural concrete, use snap ties complete with plastic cones and light grey concrete plugs.
- .5 Form liner:
  - .1 Plywood: Douglas Fir to CSA O121, Canadian Softwood Plywood to CSA O151, Poplar to CSA O153.
  - .2 Waferboard: to CAN/CSA-O325.0.
- .6 Form release agent: non-toxic, low VOC.
- .7 Form stripping agent: colourless mineral oil, non-toxic, low VOC, free of kerosene, with viscosity between 15 to 24 mm<sup>2</sup>/s at 40 degrees C, flashpoint minimum 150 degrees C, open cup.
- .8 Falsework materials: to CSA-S269.1.

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**Part 3 Execution**

**3.1 FABRICATION AND ERECTION**

- .1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2 Fabricate and erect falsework in accordance with CSA S269.1.
- .3 Do not place shores and mud sills on frozen ground.
- .4 Provide site drainage.
- .5 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.
- .6 Align form joints and make watertight.
  - .1 Keep form joints to minimum.
- .7 Use 25 mm chamfer strips on external corners and/or 25 mm fillets at interior corners, joints, unless specified otherwise.
- .8 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .9 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.
  - .1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .10 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.

**3.2 REMOVAL AND RESHORING**

- .1 Leave formwork in place for following minimum periods of time after placing concrete.
  - .1 7 days for walls and sides of beams.
  - .2 14 days for columns.
  - .3 14 days for beam soffits, slabs, decks and other structural members, or 7 days when replaced immediately with adequate shoring to standard specified for falsework.
  - .4 4 days for footings and abutments.
- .2 Remove formwork when concrete has reached 75 % of its design strength or minimum period noted above, whichever comes later, and replace immediately with adequate reshoring.

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- .3 Provide necessary reshoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.
  - .4 Space reshoring in each principal direction at not more than 3000 mm apart.
  - .5 Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2.

#### **Part 4 Measurement and Basis for Payment**

##### **4.1 Measurement for Payment**

- .1 This item will not be measured for payment.

##### **4.2 Basis for Payment**

- .1 No separate or direct payment will be made for work under this Section, which will be considered incidental to work under this Contract. Costs will be deemed to be included in the unit and lump sum prices quoted in the Schedule of Quantities and Prices for concrete work.