

## **1 General**

### **1.1 RELATED REQUIREMENTS**

- .1 Section 03 20 00 - Concrete Reinforcing.
- .2 Section 03 30 00 - Cast-in-Place Concrete.
- .3 Section 03 35 00 - Concrete Finishing.
- .4 Section 07 92 00 - Joint Sealants.

### **1.2 REFERENCES**

- .1 Canadian Standards Association (CSA)
  - .1 CAN/CSA-A23.1-09, Concrete Materials and Methods of Concrete Construction.
  - .2 CAN/CSA-O86-09, Engineering Design in Wood (Limit States Design).
  - .3 CSA O121-08, Douglas Fir Plywood.
  - .4 CSA O151-09, Canadian Softwood Plywood.
  - .5 CSA O153-M1980 (R2008), Poplar Plywood.
  - .6 CAN3-O188.0-M78, Standard Test Methods for Mat-Formed Wood Particleboards and Waferboard.
  - .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.
- .2 Council of Forest Industries of British Columbia (COFI)
  - .1 COFI Exterior Plywood for Concrete Formwork.

### **1.3 SHOP DRAWINGS**

- .1 Submit shop drawings for formwork and falsework 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.
- .3 Indicate sequence of erection and removal of formwork/falsework as directed by Departmental Representative.
- .4 Each shop drawing submission shall bear stamp and signature of qualified professional engineer registered or licensed in the Province of Newfoundland & Labrador, Canada.

### **1.4 QUALITY CONTROL**

- .1 Pre-Pour Meeting
  - .1 Attend a quality control meeting including all relevant sub-trades to review the quality of the formwork, reinforcement installation, exposed concrete finishes, under floor services, pour sequence and related issues.

### **1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Collect and separate for disposal waste material generated by this Section.
  - .2 Place in appropriate on-site bins in accordance with Waste Management Plan.
  - .3 A clean worksite is mandatory at all times. Failure to maintain the site in a clean, safe condition shall result in the Departmental Representative initiating a clean-up and related costs being deducted from progress claims.
  - .4 Place materials defined as hazardous or toxic waste in designated containers.
  - .5 Ensure emptied containers are sealed and stored safely for disposal.
  - .6 Use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low VOC's.
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## 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.
  - .2 For concrete with special architectural features, use formwork materials to CAN/CSA-A23.1.
- .2 Tubular column forms: round, spirally wound laminated fiber forms, smooth, non patterned PVC internally treated with release material. Spiral pattern to show in hardened concrete.
- .3 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 dia. in concrete surface.
  - .2 For Architectural concrete, use snap ties complete with plastic cones and light grey concrete plugs.
- .4 Form release agent: non-toxic.
- .5 Form release agent: chemically active release agents containing compounds that react with free lime present in concrete to provide water insoluble soaps, preventing concrete from sticking to forms.
- .6 Falsework materials: to CSA-S269.1.
- .7 Sealant: to Section 07 92 00 - Joint Sealing.

## 3 Execution

### 3.1 FABRICATION AND ERECTION

- .1 Verify lines, levels and centers before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2 Obtain Departmental Representative approval for framing openings not indicated on drawings.
- .3 Hand trim sides and bottoms of excavation and remove loose earth from earth forms before placing concrete.
- .4 Fabricate and erect falsework in accordance with CSA S269.1.
- .5 Refer to architectural drawings for concrete members requiring architectural exposed finishes.
- .6 Do not place shores and mud sills on frozen ground.
- .7 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 CAN/CSA-A23.1.
- .8 Align form joints and make watertight. Keep form joints to minimum.
- .9 Locate horizontal form joints for exposed columns 2400 mm above finished floor elevation.
- .10 Use 25 mm chamfer strips on external corners and/or 25 mm fillets at interior corners, joints, unless specified otherwise.
- .11 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .12 Construct forms for architectural concrete, and place ties as indicated and/or as directed. Joint pattern not necessarily based on using standard size panels or maximum permissible spacing of ties.
- .13 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections. Assure that all anchors and inserts will not protrude beyond surfaces

designated to receive applied finishes, including painting.

- .14 Clean formwork in accordance with CAN/CSA-A23.1, before placing concrete.

### **3.2 REMOVAL**

- .1 Leave formwork in place for following minimum periods of time after placing concrete.
  - .1 72 hours for walls and sides of beams.
  - .2 72 hours for columns.
  - .3 28 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 72 hours for footings and abutments.
- .2 Re-use formwork and falsework subject to requirements of CAN/CSA-A23.1.

**END OF SECTION**

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