

The Executed Agreement including General Conditions and Supplementary Conditions, Division 01, applicable drawings and amendments are part of and are to be read in conjunction with this Section

PART 1 - GENERAL

1.1 RELATED WORK

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| .1 | Concrete Reinforcement | Section 03 20 00 |
| .2 | Cast-In-Place Concrete | Section 03 30 00 |

1.2 REFERENCES

- .1 CSA-A23.1, Concrete Materials and Methods of Concrete Construction.
- .2 CSA-A23.2, Methods of Test and Standard Practices for Concrete.
- .3 CSA-A23.3, Design of Concrete Structures
- .4 CSA-O86, Consolidation - Engineering Design in Wood.
- .5 CSA O121, Douglas Fir Plywood.
- .6 CSA O151, Canadian Softwood Plywood.
- .7 CSA O153, Poplar Plywood.
- .8 CSA O437, CSA Standards for OSB and Waferboard.
- .9 CSA S269.1, Falsework for Construction Purposes.
- .10 CSA S269.2, Access Scaffolding for Construction Purposes
- .11 CSA-S269.3, Concrete Formwork.

1.3 FORMWORK DESIGN

- .1 All formwork must be designed by a Professional Engineer Licensed in the Province of Construction. Upon request of the Consultant the Professional Engineer must supply written confirmation that all formwork has been designed to support all appropriate loads and in accordance with applicable standards.
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PART 2 - PRODUCTS

2.1 MATERIALS

- .1 For concrete without special architectural features, use wood and wood product formwork materials to CSA-O121, CSA-O86, CSA O437 Series and CSA-O153.
- .2 For concrete with special architectural features, use formwork materials to CSA-A23.1.
- .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 1 inch diameter in concrete surface.
 - .2 For Architectural concrete, use snap ties complete with plastic cones and light grey concrete plugs
- .4 Form release agent:
 - .1 Chemically active, non-staining, release agents containing compounds that react with free lime in concrete resulting in water insoluble soaps. Non-toxic, biodegradable, low VOC.
- .5 Form stripping agent:
 - .1 Colourless, non-staining, mineral oil, non-toxic, biodegradable, low VOC, free of kerosene, with viscosity between 70 and 110 s Saybolt Universal at 40 degrees C, and having a minimum flashpoint of 150 degrees C. Form release agents must be compatible with waterproofing systems where applicable.
- .6 Falsework materials: to CSA-S269.1.

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 Obtain Consultant's approval for use of earth forms and for framing openings not indicated on drawings.
 - .3 Hand trim sides and bottoms 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.
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- .6 Fabricate and erect formwork in accordance with CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1.
- .7 Align form joints and make watertight. Keep form joints to minimum.
- .8 Locate horizontal form joints in exposed columns and walls eight feet above finished floor elevation.
- .9 Use 1 inch chamfer strips on exterior corners and 1 inch fillets at interior corners unless specified otherwise.
- .10 Form all chases, slots, openings, drips, recesses, expansion and control joints. Also form pockets in concrete walls for cladding anchorage as required.
- .11 Build in anchors, inserts, sleeves, miscellaneous frames, flashing reglets, weather bars, holes, and other inserts required to accommodate work of other sections. This includes all embedded items as required to support cladding elements and structural steel framing support. Assure that all anchors and inserts will not protrude beyond surfaces designated to receive applied finishes.
- .12 Clean formwork in accordance with CSA-A23.1, before placing concrete.
- .13 Construct forms for surfaces to receive membrane type waterproofing with taped joints and edges of plywood backed to prevent separation
- .14 Waterstops:
 - .1 Build waterstops into forms. Support against displacement by pouring of concrete. Locate waterstops at construction joints in pits and trenches below floor levels, and as indicated on Drawings.
 - .2 Use preformed waterstop corners and intersections where they are available to suit conditions.
 - .3 Join waterstops to preformed corners and intersections, and between lengths with butted and welded connections in accordance with manufacturer's recommendations.

3.2 REMOVAL AND RESHORING

- .1 Leave formwork in place for following minimum periods of time after placing concrete:
 - .1 3 days for walls and sides of beams and columns.
 - .2 2 days for footings and abutments.
- .2 Be responsible for the safety of the structure, both before and after removal of the forms, until concrete has reached its specified 28 day strength.
- .3 Strip formwork only when no damage will result from the stripping.

- .4 Take care in removing plywood forms. Do not jerk them loose or use metal pinch bars, but use wood wedges and gradually force the panels loose. Leave plywood forms in place as long as possible and until other adjacent formwork is stripped to permit maximum shrinkage away from concrete and to protect surfaces. Take particular care to prevent damage to external corners of concrete.
- .5 Provide all necessary re-shoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.
- .6 Re-use formwork and falsework subject to requirements of CSA-A23.1.
- .7 Movement and displacement of formwork during construction, variations in excess of specified tolerances, and marked and disfigured surfaces that cannot be repaired by methods acceptable to structural consultant will be considered defective Work performed by the Section.
- .8 Reconstruct defective formwork and replace concrete and reinforcement placed in defective formwork at no additional cost to the Owner.

3.3 QUALITY OF FORMWORK

- .1 Particular attention must be paid to the quality of all concrete exposed to view upon completion of the project including retaining walls. In exposed surfaces, form ties must be minimal, regular and neat and be plugged properly upon removal of formwork.
- .2 For the above-mentioned elements the following special precautions must be taken:
 - .1 All plywood form panels should be new at the start of this project.
 - .2 Concrete shall be smooth form finish as described in CSA A23.1
 - .3 Take special care in vibrating concrete in these elements.
 - .4 All joints in formwork, both horizontally and vertically must be aligned.
- .3 Any concrete falling short of these requirements shall be removed and replaced at the formwork contractors expense.

END OF SECTION