

PART I – GENERAL**GENERAL REQUIREMENTS**

Comply with requirements with Division 1.

RELATED WORK

- Section 02200: Structure Excavation and Backfilling
- Section 03200: Concrete Reinforcing
- Section 03300: Cast-in-Place Concrete
- Section 03320: Interior Concrete Slabs on Grade
- Section 06100: Rough Carpentry

WORK INSTALLED BUT SUPPLIED BY OTHERS

- Inserts, anchor bolts, miscellaneous frames, flashing reglets, holes, sleeves and other items that are supplied under the work of other Sections.

WORK SUPPLIED BUT NOT INSTALLED

- Supply recessed tie plugs to Section 03300 for installation.

REFERENCE STANDARDS

- Do concrete formwork in conformance with CSA A23.1/A23.2-2019 and CSA S269.1-1975 (R2003) unless specified otherwise.

QUALITY ASSURANCE

- Design criteria: be responsible for the structural design of formwork and its construction, including shoring and bracing, to ensure its stability and to support safely and resist loads imposed by weight of forms and wet concrete, wind, fluid pressure of concrete, equipment and workers.
- Allowable tolerances: construct formwork to maintain tolerances in conformance with requirements of CSA A23.1/A23.2-2019.

UNIT PRICES

- Unit prices for concrete work requested as a part of the Bid, shall include materials, erection, bracing, shoring, stripping and removing of formwork.

PART II – PRODUCTS**MATERIALS**

1. Forms:
 1. Generally: to CSA A23.1/A23.2-2019;
 2. Falsework materials: to CSA S269.1-1975 (R2003)
 3. Form panels for concrete exposed to view: smooth and free of defects which would be reproduced as concrete blemishes; use one of following materials;
 - a. Plywood panels: Douglas Fir minimum 17.5 mm (11/16") thick, to CSA 0121, coated or faced one side, specifically produced for formwork use, edges sealed;
 - b. Plywood or lumber form with plastic liner, designed for formwork use;
 - c. Metal forms, designed for formwork use.
4. Chamfers: wood, 45°, cut from 25 mm x 25 mm (1"x1") nominal material or plastic type;
5. Tubular forms: seamless type where concrete is exposed: Sonotubes.

2. Form ties: snap-off type with plugs or approved equal to ensure that ties break off at approximately 20 mm (3/4") below face of concrete.
3. Form release agent: chemically active type containing compounds that react with free lime present in concrete to provide water insoluble soaps, preventing concrete from sticking to forms; non-staining, non-grain raising; suitable for type of formwork on which used; having no adverse affect on paint, adhesives or other treatments which are specified for application to concrete and containing no non-drying ingredients such as mineral oil.
4. Waterstops: extruded flexible PVC with centre bulb and corrugated wings.
5. Joint filler: bituminous type to ASTM 994; asphalt impregnated fiber; "Sealtight – Asphalt Expansion Joint Filler" by W.R. Meadows of Canada Limited or as approved by Consultant.
6. Dovetail anchor slots: 0.46 mm (26 ga) galvanized steel, glass fiber filled.

PART III – EXECUTION**EARTH FORMS**

- Where soil conditions are suitable, earth forms for wall footings may be used when approved by Consultant.

FORMWORK CONSTRUCTION

1. Design, construct and remove formwork, framing, supports and bracing to conform to requirements of CSA A23.1/A23.2-2019 and CSA S269.1-1975 (R2003) and to provide finished poured concrete surfaces within specified tolerances.
2. Do not eliminate or displace reinforcement to accommodate built-in work. Where inserts or openings cannot be located as indicated, obtain Consultant's review and approval of any modifications prior to placing concrete.
3. Do not place concrete in forms without Consultant's prior review.
4. Form construction joints expansion and waterstop joints where required, as indicated on drawings and as approved by Consultant. Locate and construct construction joints at architectural concrete surfaces as approved by Consultant.

5. Install waterstops where indicated; tie waterstops rigidly in place; install and field splice in accordance with manufacturer's recommendations to ensure effective water seal.
6. Build into formwork dovetail anchor slots for masonry anchors in locations as directed in Section 04200 and/or as required on Drawings.
7. Build into formwork inserts, anchor bolts, miscellaneous frames, flashing reglets, weather bars, holes, sleeves and items otherwise specified as supplied and located under the work of other Sections. Imbed no wood in concrete for purposes of anchorage.
8. Coat formwork with form release agent before reinforcement, anchors or other accessories are placed.
9. Before placing concrete, clean out forms to remove foreign matter, ice and snow in accordance with CSA A23.1/A23.2-2019.
10. Holes through concrete: install only at locations approved by Consultant.
11. Provide drainage and weep holes where indicated on Drawings.
12. Provide pre-moulded joint filler, in single piece for depth and thickness, where indicated. Secure filler to prevent displacement during placing of concrete. Unless otherwise detailed, provide 12.5 mm (1/2") thick joint filler to separate slabs on grade from vertical surfaces; extend joint filler from bottom of slab to within 12.5 mm (1/2") of finished slab surface.

REMOVAL OF FORMWORK AND RESHORING

1. Be responsible for the safety of structure, both before and after removal of forms, until concrete has reached its specified twenty-eight (28) day strength.
2. Strip side forms of vertical elements when 50% of specified concrete strength is reached. Strip soffit of suspended structural concrete when 67% of specified concrete strength is reached. Support concrete with adequate vertical struts until concrete has reached 28 days strength. Take particular care in cold weather.
3. Re-use formwork and falsework subject to requirements of CSA A23.1/A23.2-2019.
4. Immediately after the removal of forms all bolts, ties, nails and other metal not specifically required for construction purposes shall be removed or cut back to a depth of minimum 15 mm (5/8") from the surface of the concrete.
5. Fins, ridges and other imperfections shall be neatly chipped off and rubbed flush with adjacent surface areas at all concrete surfaces exposed and at all concrete surfaces scheduled to received finishes by Division 9.

6. No later than five to six (5 to 6) hours after removal of forms, provide a smooth rubbed finish on all formed concrete surfaces, exposed in finished wood, either unfinished or painted, except for underside of slabs. Thoroughly wet surfaces and rub with carborundum brick, or other acceptable abrasive, until uniform colour and texture are produced, and all ridges and projections are removed. No cement grout shall be used other than that produced from the concrete by the rubbing process.

FIELD QUALITY CONTROL

- a. The Owner may engage an inspection and testing company to inspect and report on compliance with the Specification for the fabrication and installation of work of this Section in accordance with Section 01410 and as directed by Consultant.
- b. Set special inserts for non- destructive strength testing of concrete where required by inspection and testing agency.

ADJUSTMENT

1. Replacement of defective work:
 - a. Movement and displacement of formwork during construction, variations in excess of specified tolerances, marked and disfigured surfaces that cannot be repaired by specified methods will be considered defective work.
 - b. Reconstruct defective formwork and replace concrete and reinforcement placed in defective formwork at no additional cost to the Owner.

END OF SECTION