

PART 1 - GENERAL

1.1 RELATED WORK

- .1 Section 03 20 00 - Concrete Reinforcement.
- .2 Section 03 30 00 - Cast-in-Place Concrete.
- .3 Section 02 52 80 - Concrete Walks & Curbs.

1.2 REFERENCE STANDARDS

- .1 Do concrete formwork in accordance with CAN/CSA-A23.1:19 and CSA Standard S269.3-M92 (R2013), except where specified otherwise.
- .2 Do falsework in accordance with CSA S269.1-1975(R2003) and CAN/CSA O86:19, except where specified otherwise.

1.3 SHOP DRAWINGS

- .1 Submit Falsework shop drawings in accordance with Section 01 33 00. Falsework drawings are to be stamped by a professional engineer licensed in the Province of Ontario.
- .2 Indicate method and schedule of construction, materials, arrangement of joints, ties, shores, liners, and locations of temporary embedded parts. Comply with CSA S269.1-16 for falsework drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Formwork lumber: plywood and wood formwork materials to CAN/CSA-O86 and CSA-O153.
- .2 Falsework materials: to CSA S269.1.
- .3 Form ties: removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm dia in the concrete surface.
- .4 Form release agent: chemically active release agents containing compounds that react with free lime present in the concrete to provide water-insoluble soaps, preventing concrete from sticking to forms.

PART 3 - EXECUTION

3.1 ERECTION

- .1 Verify lines, levels, and column centers before proceeding with formwork and ensure dimensions agree with drawings.
- .2 Construct falsework in accordance with CSA S269.1.

- .3 Construct forms to produce finished concrete conforming to shape, dimensions, locations, and levels indicated within tolerances required by CAN/CSA-A23.1.
- .4 Obtain Departmental representative's permission before framing openings not indicated in concrete slabs, walls, piers, and footings.
- .5 Align form joints and make watertight. Keep form joints to minimum. Locate horizontal form joints for exposed walls to the approval of Departmental Representative.
- .6 Form chases, slots, openings, drips, recesses expansion and control joints as indicated.
- .7 Clean formwork in accordance with CAN/CSA-A23.1, before placing concrete.
- .8 Leave formwork in place for following minimum periods of time after placing concrete.
 - .1 Twenty-eight days for beam soffits, slabs, and other structural members, or until concrete has reached 75% of the specified strength, determined by tests of concrete cylinders cured on-site under the same conditions.

After form removal, cover and protect concrete for the remainder of the initial curing period. Use insulated tarps for cold weather operation.
- .9 Reuse of formwork and falsework subject to requirements of CAN/CSA-A23.1.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

- .1 Section 03 10 00 - Concrete Formwork and Falsework.
- .2 Section 03 30 00 - Cast-In-Place Concrete.

1.2 REFERENCE STANDARDS

- .1 CAN/CSA-A23.1-19 / A23.2-19, Concrete Materials and Methods of Concrete Construction / Methods of Test and Standard Practices for Concrete.
- .2 CAN3-A23.3-14, Design of Concrete Structures for Buildings.
- .3 CSA G30.3-M1983 (R1998), Cold Drawn Steel Wire for Concrete Reinforcement.
- .4 CSA G30.5-M1983 (R1998), Welded Steel, Wire Fabric for Concrete Reinforcement.

1.3 SHOP DRAWINGS

- .1 Submit shop drawings including placing of reinforcement in accordance with Section 01 33 00.
- .2 Indicate on shop drawings, bar bending details, lists, quantities of reinforcement, sizes, spacings, locations of reinforcement and mechanical splices if approved by Departmental Representative, with identifying code marks to permit correct placement without reference to structural drawings. Prepare reinforcement drawings in accordance with Reinforcing Steel Manual of Standard Practice- by Reinforcing Steel Institute of Canada.
- .3 Detail lap lengths and bar development lengths to CAN3-A23.3 unless noted otherwise.
- .4 Detail placement of reinforcement where congestion or special conditions occur.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Substitute different size bars only if permitted in writing by Departmental Representative
- .2 Reinforcing steel: billet steel, grade 400R, deformed bars to CAN/CSA-G30.18, unless indicated otherwise.

2.2 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CAN/CSA-A23.1 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .2 Obtain Departmental Representative's approval for locations of reinforcement splices other than those shown on placing drawings.
- .3 Ship bundles of bar/mesh reinforcement clearly identified in accordance with bar bending details and lists.

2.3 SOURCE QUALITY CONTROL

- .1 Upon request, provide Departmental Representative with a certified copy of mill test report of reinforcing steel, showing physical and chemical analysis,
- .2 Upon request, inform Departmental Representative of the proposed source of material to be supplied.

PART 3 - EXECUTION

3.1 FIELD BENDING

- .1 Do not field bend or field weld reinforcement except where indicated or authorized by Departmental Representative.
- .2 When field bending is authorized, bend without heat, applying a slow and steady pressure.

3.2 PLACING REINFORCEMENT

- .1 Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CAN/CSA-A23.1.
- .2 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.
- .3 Ensure cover to reinforcement is maintained during the concrete pour.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

- .1 Section 03 10 00 - Concrete Forms and Accessories.
- .2 Section 03 20 00 - Concrete Reinforcing.

1.2 REFERENCE STANDARDS

- .1 CAN/CSA-A5-(93), Portland Cement.
- .2 CAN/CSA-A23.1-19 Concrete Materials and Methods of Concrete Construction
- .3 CAN/CSA-A23.2- 19, Test Methods and Standard Practices for Concrete.
- .4 CAN/ CSA-A23.5-(M86(R1998), Supplementary Cementing Materials.
- .5 CAN/CSA A363-98 Cementitious Hydraulic Slag.

1.3 CERTIFICATES

- .1 Provide certification that mix proportions selected will produce concrete of quality, yield, and strength as specified in concrete mixes, and will comply with CAN/CSA-A23.1.
- .2 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CAN/CSA-A23.1.
- .3 Submit product data for admixtures, grout, joint fillers proposed.

1.4 QUALITY ASSURANCE

- .1 Prior to starting concrete work, submit proposed quality control procedures for Departmental Representative's approval for the following items:
 - .1 Hot weather concrete or cold weather concrete
 - .2 Curing.
 - .3 Finishes.
 - .4 Formwork removal.
 - .5 Joints.

PART 2 – PRODUCTS

2.1 MATERIALS

- .1 Portland cement replacement: to CAN/CSA-A5.
- .2 Blended hydraulic cement: to CANB-A362.
- .3 Supplementary cementing materials: to CAN/CSA-A23.5.

- .4 Cementitious hydraulic slag: to CAN/CSA-A363.
- .5 Water: to CAN/CSA-A23.1.
- .6 Aggregates: to CAN/CSA-A23.1 Coarse aggregates to be normal density.
- .7 Curing compound: to CAN/CSA-A23.1 to ASTM C309, Type 1.

2.2 MIXES

- .1 Concrete Mixes.
 - .1 Proportion of normal density concrete in accordance with CSA-A23.1, to give the following properties for all concrete exterior to the building.
 - .1 Cement: use Type GU of GUb cement.
 - .2 Minimum compressive strength at 28 days: 35 MPa
 - .3 Nominal size of coarse aggregate: 20mm
 - .4 Air Entrainment 5 to 8%
 - .5 Class of Exposure: C-1
 - .6 Slump at time and point of discharge: 75 mm.
 - .2 Proportion of normal density concrete in accordance with CSA-A23.1, to give the following properties for all interior concrete.
 - .1 Cement: use Type GU of GUb cement.
 - .2 Minimum compressive strength at 28 days: 30 MPa
 - .3 Nominal size of coarse aggregate: 20mm
 - .4 Slump at time and point of discharge: 75 mm.
 - .3 Use of calcium chloride or admixtures containing calcium chloride, not permitted.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Obtain Departmental Representative's approval before placing concrete. Provide 24 hours notice prior to placing of concrete.
- .2 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .3 Prior to placing of concrete obtain Departmental Representative's approval of the proposed method for protection of concrete during placing and curing.
- .4 Maintain accurate records of poured concrete items to indicate the date, location of pour, quality, air temperature, and test samples were taken.
- .5 Do not place the load upon new concrete until authorized by Departmental Representative.

3.2 CONSTRUCTION

- .1 Do cast-in-place concrete work in accordance with CAN/CSA-A23.1.
- .2 Sleeves and inserts.
 - .1 No sleeves, ducts, pipes or other openings shall pass through piers or footings, except where indicated or approved by Departmental Representative.

- .2 Where approved by Departmental Representative, set sleeves ties, pipe hangers and other inserts and openings as indicated or specified elsewhere. Sleeves and openings greater than 100x100 mm not indicated must be approved by Departmental Representative.
 - .3 Do not eliminate or displace reinforcement to accommodate the hardware. If inserts cannot be located as specified, obtain approval of modifications from Departmental Representative before placing of concrete.
 - .4 Check locations, sizes of sleeves and openings are shown on drawings.
 - .5 Set special inserts for strength testing as indicated and as required by the non-destructive method of testing concrete.
- .3 Anchor bolts
- .1 Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete.
 - .2 Protect anchor bolt holes from water accumulations, snow and ice build-ups.
- .4 Grout under base plates and machinery using procedures in accordance with manufacturer's recommendations which result in (100)% contact over the grouted area.
- .5 Finishing
- .1 Finish concrete in accordance with CAN/CSA-A23.1.
 - .2 Use procedures noted in CAN/CSA-A23.1 to remove excess bleed water. Ensure surface is not damaged.
 - .3 Use curing compounds compatible with the applied finish on concrete surfaces

3.3 SITE TOLERANCES

- .1 Slabs on grade shall have a steel trowel finish Class A in accordance with CAN/ CSA-A23.1, straight edge method.

3.4 FIELD QUALITY CONTROL

- .1 Inspection and testing of concrete and concrete materials will be carried out by testing laboratory designated by Departmental Representative for review to CSA A23.1/A23.2., and Section 01 45 00 – Quality Control.
- .2 Departmental Representative may take additional test cylinders during cold weather concreting. Cure cylinders on job site under the same conditions as concrete, which they represent.
- .3 Non-destructive Methods for Testing Concrete shall be in accordance with CAN/CSA-A23.2.

END OF SECTION