

## PART 1 - GENERAL

- |                                   |    |   |
|-----------------------------------|----|---|
| <u>1.1 Measurement Procedures</u> | .1 | No measurement will be made under this Section. Include costs in items of work for which concrete formwork and falsework is required. |
|-----------------------------------|----|---|
- 
- |                       |    |   |
|-----------------------|----|---|
| <u>1.2 References</u> | .1 | Canadian Standards Association (CSA)<br>.1 CAN/CSA-A23.1-94, Concrete Materials and Methods of Concrete Construction.<br>.2 CAN/CSA-O86.1-94, Departmental Representativeing Design in Wood (Limit States Design).<br>.3 CSA O121-M1978, Douglas Fir Plywood.<br>.4 CSA O151-M1978, Canadian Softwood Plywood.<br>.5 CSA O153-M1980, Poplar Plywood.<br>.6 CAN3-O188.0-M78, Standard Test Methods for Mat-Formed Wood Particleboards and Waferboard.<br>.7 CSA O437 Series-93, Standards for OSB and Waferboard.<br>.8 CSA S269.1-1975, Falsework for Construction Purposes.<br>.9 CAN/CSA-S269.3-M92, Concrete Formwork. |
|                       | .2 | Council of Forest Industries of British Columbia (COFI)<br>.1 COFI Exterior Plywood for Concrete Formwork.  |
- 
- |                          |    |   |
|--------------------------|----|---|
| <u>1.3 Shop Drawings</u> | .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 Comply with CAN/CSA-S269.3 for formwork drawings. |
-

- 
- |                                       |    |  |
|---------------------------------------|----|--|
| <u>1.3 Shop Drawings<br/>(Cont'd)</u> | .3 | Indicate formwork design data, such as permissible rate of concrete placement, and temperature of concrete, in forms.                          |
|                                       | .4 | Indicate sequence of erection and removal of formwork/falsework as directed by Departmental Representative .                                   |
|                                       | .5 | Each shop drawing submission shall bear stamp and signature of qualified professional engineer registered or licensed in Provinces of, Canada. |
| <hr/>                                 |    |  |
| 1.4 Waste Management and Disposal     | .1 | Separate and recycle waste materials in accordance with the Waste Reduction Workplan.  |
|                                       | .2 | Place materials defined as hazardous or toxic waste in designated containers.  |
|                                       | .3 | Ensure emptied containers are sealed and stored safely for disposal away from children.  |
|                                       | .4 | Use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low VOC's.                                   |

## PART 2 - PRODUCTS

- 
- |                      |    |  |
|----------------------|----|--|
| <u>2.1 Materials</u> | .1 | Formwork materials:<br>.1 For concrete without special architectural features, use wood and wood product formwork materials to CSA-0121 CAN/CSA-086.1 CSA 0437 Series CSA-0153.<br>.2 For concrete with special architectural features, use formwork materials to CAN/CSA-A23.1.<br>.3 Wood cement composites:.<br>.4 Rigid insulation board: to,. |
|                      | .2 | Pan forms: removable permanent steel reinforced plastic aluminum as indicated.   |
|                      | .3 | Tubular column forms: round, spirally wound laminated fiber forms steel, internally treated with release material. Spiral pattern to show not to show in hardened concrete.  |
-

2.1 Materials  
(Cont'd)

- .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 dia. in concrete surface.
  - .2 For Architectural concrete, use snap ties complete with plastic cones and light grey concrete plugs.
- .5 Form liner:
  - .1 Plywood: high density overlay medium density overlay Douglas Fir to CSA 0121 Canadian Softwood Plywood to CSA 0151 Poplar to CSA 0153, grade, T and G square edge, mm thick.
  - .2 Waferboard: to CAN3-0188.0, grade, mm thick.
- .6 Form release agent: non-toxic, biodegradable, low VOC,.
- .7 Form stripping agent: colourless mineral oil, non-toxic, biodegradable, low VOC, free of kerosene, with viscosity between 70 and 110s Saybolt Universal 15 to 24 mm<sup>2</sup> /s at 40°C, flashpoint minimum 150°C, open cup.
- .8 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 Departmental Representative's approval for use of earth forms 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 and COFI Exterior Plywood for Concrete Formwork.

3.1 Fabrication and .5  
Erection  
(Cont'd)

- Refer to architectural drawings for concrete members requiring architectural exposed finishes.
- .6 Do not place shores and mud sills on frozen ground.
- .7 Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .8 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.
- .9 Align form joints and make watertight. Keep form joints to minimum.
- .10 Locate horizontal form joints for exposed columns 2400 mm above finished floor elevation.
- .11 Use 25 mm chamfer strips on external corners and/or 25 mm fillets at interior corners , joints, unless specified otherwise.
- .12 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .13 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.
- .14 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.
- .15 Line forms for following surfaces:  
.1 Outer face of outside girders beams and vertical edge of bridge sidewalk slab.  
.2 Soffit of girders and underside of bridge decks if exposed.  
.3 Exposed faces of abutments, wingwalls, piers and pylons. Do not stagger joints of

3.1 Fabrication and Erection  
(Cont'd)

- .15 Line forms for following surfaces:(Cont'd)  
.3 (Cont'd)  
form lining material. Align joints to obtain uniform pattern.
- .16 Clean formwork in accordance with CAN/CSA-A23.1, before placing concrete.
- .17 If slip forming and flying forms are used, submit details of equipment and procedures for Departmental Representative's approval.

3.2 Removal and Reshoring

- .1 Leave formwork in place for following minimum periods of time after placing concrete.
  - .1 days for walls and sides of beams.
  - .2 days for columns.
  - .3 days for beam soffits, slabs, decks and other structural members, or days when replaced immediately with adequate shoring to standard specified for falsework.
  - .4 days for footings and abutments.
- .2 Remove formwork when concrete has reached % of its design strength or minimum period noted above, whichever comes later, and replace immediately with adequate reshoring.
- .3 Provide all 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 CAN/CSA-A23.1.

PART 1 - GENERAL

- |                             |    |  |
|-----------------------------|----|--|
| <u>1.1 Related Sections</u> | .1 | Section 03 30 00 - Cast-in-Place Concrete. |
|-----------------------------|----|--|
- 
- |                                   |    |   |
|-----------------------------------|----|---|
| <u>1.2 Measurement Procedures</u> | .1 | Reinforcing steel will be measured in kilograms tonnes of steel incorporated into work, computed from theoretical unit mass specified in CAN/CSA-G30.18 for lengths and sizes of bars as indicated or authorized in writing by Departmental Representative. |
|                                   | .2 | No measurement will be made under this section. Include costs in items of concrete work for which reinforcement is required.  |
- 
- |                       |    |  |
|-----------------------|----|--|
| <u>1.3 References</u> | .1 | American Concrete Institute (ACI)  |
|                       | .1 | ACI 315R-80, Manual of Engineering and Placing Drawings for Reinforced Concrete Structure. |
|                       | .2 | American National Standards Institute/American Concrete Institute (ANSI/ACI)               |
|                       | .1 | ANSI/ACI 315-80, Details and Detailing of Concrete Reinforcement.                          |
|                       | .3 | American Society for Testing and Materials (ASTM)  |
|                       | .1 | ASTM A 775/A 775M- 91c, Specification for Epoxy-Coated Reinforcing Steel Bars.             |
|                       | .4 | Canadian Standards Association (CSA)   |
|                       | .1 | CAN/CSA-A23.1-94, Concrete Materials and Methods of Concrete Construction.                 |
|                       | .2 | CAN3-A23.3-94, Design of Concrete Structures for Buildings.                                |
|                       | .3 | CSA G30.3-M1983(R1991), Cold Drawn Steel Wire for Concrete Reinforcement.                  |
|                       | .4 | CSA G30.5-M1983(R1991), Welded Steel Wire Fabric for Concrete Reinforcement.               |
|                       | .5 | CSA G30.14-M1983(R1991), Deformed Steel Wire for Concrete Reinforcement.                   |
|                       | .6 | CSA G30.15-M1983(R1991), Welded Deformed Steel Wire Fabric for Concrete Reinforcement.     |
-

1.3 References  
(Cont'd)

- .4 (Cont'd)
- .7 CAN/CSA-G30.18-M92, Billet-Steel Bars for Concrete Reinforcement.
- .8 CAN/CSA-G40.21-M92, Structural Quality Steels.
- .9 CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .10 CSA W186-M1990, Welding of Reinforcing Bars in Reinforced Concrete Construction.

1.4 Shop Drawings

- .1 Submit shop drawings including placing of reinforcement in accordance with Section 01 33 00 - Submittal Procedures.
- .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. Indicate sizes, spacings and locations of chairs, spacers and hangers. Prepare reinforcement drawings in accordance with Reinforcing Steel Manual of Standard Practice - by Reinforcing Steel Institute of Canada. ANSI/ACI 315 and ACI 315R, Manual of Engineering and Placing Drawings for Reinforced Concrete Structure.
- .3 Detail lap lengths and bar development lengths to CAN3-A23.3, unless otherwise indicated. Provide type A B C tension lap splices where indicated unless otherwise indicated.

1.5 Waste Management and Disposal

- .1 Separate and recycle waste materials in accordance with the Waste Reduction Workplan.
-

---

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 300 350 400, deformed bars to CAN/CSA-G30.18, unless indicated otherwise.
- .3 Reinforcing steel: weldable low alloy steel deformed bars to CAN/CSA-30.18.
- .4 Cold-drawn annealed steel wire ties: to CSA G30.3.
- .5 Deformed steel wire for concrete reinforcement: to CSA G30.14.
- .6 Welded steel wire fabric: to CSA G30.5. Provide in flat sheets only.
- .7 Welded deformed steel wire fabric: to CSA G30.15. Provide in flat sheets only.
- .8 Epoxy coating of non-prestressed reinforcement: to ASTM A 775/A 775M.
- .9 Galvanizing of non-prestressed reinforcement: to CSA G164, minimum zinc coating g/m<sup>2</sup>.
- .10 Chairs, bolsters, bar supports, spacers: to CAN/CSA-A23.1.
- .11 Mechanical splices: subject to approval of Departmental Representative .
- .12 Plain round bars: to CAN/CSA-G40.21.

2.2 Fabrication

- .1 Fabricate reinforcing steel in accordance with CAN/CSA-A23.1, ANSI/ACI 315, and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada. ACI 315R, Manual of Engineering and Placing Drawings for Reinforced Concrete Structures unless indicated otherwise.
-



2.2 Fabrication  
(Cont'd)

- .2 Obtain Departmental Representative's approval for locations of reinforcement splices other than those shown on placing drawings.
- .3 Upon approval of Departmental Representative, weld reinforcement in accordance with CSA W186.
- .4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

2.3 Source Quality Control

- .1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to commencing reinforcing work.
- .2 Upon request inform Departmental Representative of 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 Replace bars which develop cracks or splits.

3.2 Placing Reinforcement

- .1 Place reinforcing steel as indicated on reviewed approved placing drawings and in accordance with CAN/CSA-A23.1.
- .2 Use plain round bars as slip dowels in concrete. Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint. When paint is dry, apply a thick even film of mineral lubricating grease.

3.2 Placing  
Reinforcement  
(Cont'd)

- .3 Prior to placing concrete, obtain  
Departmental Representative's approval of  
reinforcing material and placement.
- .4 Ensure cover to reinforcement is maintained  
during concrete pour.
- .5 Protect epoxy and paint coated portions of  
bars with covering during transportation and  
handling.

3.3 Field Touch-up

- .1 Touch up damaged and cut ends of epoxy coated  
or galvanized reinforcing steel with  
compatible finish to provide continuous  
coating.

PART 1 - GENERAL

1.1 Related  
Sections

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

1.2 Measurement  
Procedures

- .1 Cast-in-place concrete will be measured in Section 01 29 00.
- .2 Heating of water and aggregates and providing cold weather protection will not be measured but considered incidental to work.
- .3 Cooling of concrete and providing hot weather protection will not be measured but considered incidental to work.
- .4 Supply and installation of anchor bolts, nuts and washers and bolt grouting will not be measured but considered incidental to work.

1.3 References

- .1 American Society for Testing and Materials (ASTM)
    - .1 ASTM C 109/C109M-95, Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 in. or 50-mm Cube Specimens).
    - .2 ASTM C 260-94, Specification for Air-Entraining Admixtures for Concrete.
    - .3 ASTM C 309-94, Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
    - .4 ASTM C 332-87(1991), Specification for Lightweight Aggregates for Insulating Concrete.
    - .5 ASTM C 494-92, Specification for Chemical Admixtures for Concrete.
    - .6 ASTM C 827-95a, Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures.
    - .7 ASTM C 939-94a, Test Method for Flow of Grout for Preplaced-Aggregate Concrete.
    - .8 ASTM D 412-92, Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.
-

1.3 References  
(Cont'd)

- .1 (Cont'd)
  - .9 ASTM D 624-91, Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.
  - .10 ASTM D 1751-83(1991), Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
  - .11 ASTM D 1752-84(1992), Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-37.2-M88, Emulsified Asphalt, Mineral Colloid-Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.
  - .2 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
  - .3 CGSB 81-GP-1M-77, Flooring, Conductive and Spark Resistant.
- .3 Canadian Standards Association (CSA)
  - .1 CAN/CSA-A5-93, Portland Cement.
  - .2 CAN/CSA-A23.1-94, Concrete Materials and Methods of Concrete Construction.
  - .3 CAN/CSA-A23.2-94, Methods of Test for Concrete.
  - .4 CAN/CSA-A23.5-M86(R1992), Supplementary Cementing Materials.
  - .5 CAN/CSA A363-M88(R1996), Cementitious Hydraulic Slag.

1.4 Samples

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

1.5 Certificates

- .1 Submit certificates in accordance with Section 01 33 00 - Submittal Procedures.

1.6 Quality Assurance

- .1 Minimum 4 weeks prior to starting concrete work, submit proposed quality control procedures in accordance with Section 01 45 00 - Quality Control for Departmental Representative's approval for following items:
  - .1 Falsework erection.
  - .2 Hot weather concrete.
  - .3 Cold weather concrete.
  - .4 Curing.
  - .5 Finishes.
  - .6 Formwork removal.
  - .7 Joints.
  - .8.

PART 2 - PRODUCTS

2.1 Materials

- .1 Portland cement with 40% fly ash replacement: to CAN/CSA-A5.
- .2 Blended hydraulic cement: to.
- .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 low high density.
- .7 Low density aggregate for insulating concrete: to CAN/CSA-A23.1 and ASTM C 332 group I group II.
- .8 Air entraining admixture: to ASTM C 260.
- .9 Chemical admixtures: to ASTM C 494. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .10 Concrete retarders: to ASTM C 494 water based,, low VOC, solvent free. Do not allow moisture of any kind to come in contact with the retarder film.

2.1 Materials  
(Cont'd)

- .11 Shrinkage compensating grout: premixed compound consisting of metallic non-metallic aggregate, Portland cement, water reducing and plasticizing agents.
  - .1 Compressive strength: MPa at 28 days.
  - .2 Consistency:
    - .1 Fluid: to ASTM C 827. Time of efflux through flow cone ( ASTM C 939), under 30s.
    - .2 Flowable: to ASTM C 827. Flow table, 5 drops in 3s, (ASTM C 109, applicable portion) 125 to 145%.
    - .3 Plastic: to ASTM C 827. Flow table, 5 drops in 3 s, (ASTM C 109, applicable portions) 100 to 125 %.
    - .4 Dry pack to manufacturer's requirements.
  - .3 Net shrinkage at 28 days: maximum %.
- .12 Post-Tensioning ducts: to CAN/CSA-A23.1.
- .13 Curing compound: to CAN/CSA-A23.1 white and to ASTM C 309, Type 1-chlorinated rubber Typel-D with fugitive dye.
- .14 Polyethylene film: mm thickness to CAN/CGSB-51.34.

2.2 Mixes

- .1 Proportion normal low semi-lowhigh density concrete in accordance with CAN/CSA-A23.1, Alternative 1 to give following quality and yield m<sup>3</sup> /h: for all concrete for concrete in for concrete as indicated.
  - .1 Cement:
    - .1 Type Portland cement.
    - .2 Type blended hydraulic cement.
    - .3 Mix of type Portland cement and blended hydraulic cement.
  - .2 Minimum compressive strength at 28 days: 35 MPa.
  - .3 Minimum cement content: 390 kg/m<sup>3</sup> of concrete.
  - .4 Class of exposure: Type C
  - .5 Nominal size of coarse aggregate: 20 mm.
  - .6 Air content: 5 to 8 %.
  - .7 Chemical admixtures: following admixtures in accordance with ASTM C 494, type, quantity, water reducing strength increasing set retarding accellerating

- 
- |                       |    |   |
|-----------------------|----|---|
| 2.2 Mixes<br>(Cont'd) | .1 | (Cont'd)  |
|                       | .7 | Chemical admixtures:(Cont'd)<br>strength increasing air entraining super<br>plasticizers. |
- 

PART 3 - EXECUTION

- |                        |    |   |
|------------------------|----|---|
| <u>3.1 Preparation</u> | .1 | Obtain Departmental Representative's approval before placing concrete. Provide 24 h ours notice prior to placing of concrete.   |
|                        | .2 | Pumping of concrete will not be permitted is permitted only after approval of equipment and mix.  |
|                        | .3 | Ensure reinforcement and inserts are not disturbed during concrete placement.   |
|                        | .4 | Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing in adverse weather.  |
|                        | .5 | Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.   |
|                        | .6 | In locations where new concrete is dowelled to existing work, drill holes in existing concrete. Place steel dowels of deformed steel reinforcing bars and pack solidly with shrinkage compensating grout epoxy grout to anchor and hold dowels in positions as indicated. |
|                        | .7 | Do not place load upon new concrete until authorized by Departmental Representative .   |
- 
- |                         |    |  |
|-------------------------|----|--|
| <u>3.2 Construction</u> | .1 | Do cast-in-place concrete work in accordance with CAN/CSA-A23.1.   |
|                         | .2 | Sleeves and inserts.<br>.1 No sleeves, ducts, pipes or other openings shall pass through joists, beams, column capitals or columns, except where |
-

3.2 Construction  
(Cont'd)

---

- .2 (Cont'd)
    - .1 (Cont'd)  
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 100 x 100 mm not indicated, must be approved by Departmental Representative .
    - .3 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain approval of modifications from Departmental Representative before placing of concrete.
    - .4 Check locations and sizes of sleeves and openings shown on drawings.
    - .5 Set special inserts for strength testing as indicated and as required by 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 With approval of Departmental Representative , grout anchor bolts in preformed holes or holes drilled after concrete has set. Formed holes to be minimum 100 mm diameter. Drilled holes to be minimum 25 mm larger in diameter than bolts used to manufacturers's recommendations.
    - .3 Protect anchor bolt holes from water accumulations, snow and ice build-ups.
    - .4 Set bolts and fill holes with shrinkage compensating grout epoxy grout.
    - .5 Locate anchor bolts used in connection with expansion shoes, rollers and rockers with due regard to ambient temperature at time of erection.
  - .4 Drainage holes and weep holes:
    - .1 Form weep holes and drainage holes in accordance with Section 03 10 00 - Concrete Forming and Accessories. If wood forms are used, remove them after concrete has set.
    - .2 Install weep hole tubes and drains as indicated.
-



3.2 Construction  
(Cont'd)

- .5 Dovetail anchor slots:
  - .1 Install continuous vertical anchor slot to forms where masonry abuts concrete wall or columns.
  - .2 Install continuous vertical anchor slots at 800 mm oc where concrete walls are masonry faced.
- .6 Grout under base plates and machinery using procedures in accordance with manufacturer's recommendations which result in 100 % contact over grouted area.
- .7 Finishing.
  - .1 Finish concrete in accordance with CAN/CSA-A23.1.
    - .1 Schedule:.
    - .2 Use procedures acceptable to Departmental Representative or those noted in CAN/CSA-A23.1 to remove excess bleed water. Ensure surface is not damaged.
    - .3 Use curing compounds compatible with applied finish on concrete surfaces. Applied finish on concrete: Provide written declaration that compounds used are compatible.
    - .4 Finish concrete floor to meet requirements of CGSB 81-GP-1M Class .
    - .5 Concrete floor to have finish hardness equal or greater than Mohs hardness in accordance with CAN/CSA-A23.1.
    - .6 Provide screed swirl-trowelled scratch finish where bonded topping terrazzo floor tile is to be applied. Provide depression s to accommodate bonded topping terrazzo floor file
  - .7 Provide screed float swirl-trowelled finish unless otherwise indicated.
  - .8 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radius edges unless otherwise indicated.
- .8 Toppings.
  - .1 Topping mixture to meet following requirements:
    - .1 Monolithic, mm thick:.
    - .2 Bonded overlay, mm thick:.
  - .2 In pouring base course, make allowance for monolithic and bonded overlay topping thickness.

3.2 Construction  
(Cont'd)

- .8 (Cont'd)
- .3 Place monolithic topping before base course has completely set in accordance with CAN/CSA-A23.1 and topping manufacturer's recommendations.
- .4 Place bonded topping over hardener base course in accordance with CAN/CSA-A23.1 and topping manufacturer's recommendations.
- .5 Follow instructions by Departmental Representative in case conflicting requirements arise between CAN/CSA-A23.1 and manufacturer's recommendations.
- .6 Apply cement/sand grout latex bonding agent modified cement/sand grout epoxy bonding agent to base course in accordance with CAN/CSA-A23.1 and manufacturer's recommendations before placing bonded topping. Observe manufacturer's safety recommendations.
- .7 Ensure that joints in topping are of the same as those in base course. Also ensure that their locations precisely match those in base course. Provide dividers edge strips reinforcing mesh as indicated.
- .9 Waterstops.
- .1 Install waterstops to provide continuous water seal. Do not distort or pierce waterstop in such a way as to hamper performance. Do not displace reinforcement when installing waterstops. Use equipment to manufacturer's requirements to field splice waterstops. Tie waterstops rigidly in place.
- .2 Use only straight heat sealed butt joints in field. Use factory welded corners and intersections unless otherwise approved by Departmental Representative .
- .10 Joint fillers.
- .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Departmental Representative . When more than one piece is required for a joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
- .2 Locate and form isolation construction expansion joints as indicated. Install joint filler.
- .3 Use 12 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to

- 
- 3.2 Construction (Cont'd)
- .10 (Cont'd)  
.3 (Cont'd)  
within 12 mm of finished slab surface unless indicated otherwise.
- .11 Dampproof membrane.  
.1 Install dampproof membrane under concrete slabs-on-grade inside building.  
.2 Lap dampproof membrane minimum 150 mm at joints and seal.  
.3 Seal punctures in dampproof membrane before placing concrete. Use patching material at least 150 mm larger than puncture and seal.
- 3.3 Site Tolerance
- .1 Concrete tolerance in accordance with CAN/CSA-A23.1 straight edge method location of floor: Ff =: FI = to tolerance schedule as indicated.
- 3.4 Field Quality Control
- .1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by Departmental Representative in accordance with CAN/CSA-A23.1 and Section 01 45 00 - Quality Control.
- .2 Departmental Representative will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
- .3 Non-destructive Methods for Testing Concrete shall be in accordance with CAN/CSA-A23.2.