## Part 1 General

### 1.1 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CAN/CSA-A23.1-04 Concrete Materials and Methods of Concrete Construction.

.2 CAN/CSA-086.1-94, Contract administratoring Design in Wood (Limit States Design).

.3 CSA 0121M1978, Douglas Fir Plywood.

.4 CSA 0151-M1978, Canadian Softwood Plywood.

.5 CSA 0153-M1980, Poplar Plywood.

.6 CSA S269.11975, Falsework for Construction Purposes.

.7 CAN/CSA-S269.3-M92, Concrete Formwork.

### 1.2 SHOP DRAWINGS

.1 Submit shop drawings for formwork and falsework. Make submittals in accordance with Section 01330 Submittal Procedures.

.2 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special contract administratorural exposed finishes, ties, liners, and locations of temporary embedded parts. Comply with CAN/CSA-S269.3 for formwork drawing.

.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 Contract Administrator.

.5 Each shop drawing submission shall bear stamp and signature of qualified professional contract administrator registered or licensed in Province of Manitoba, Canada.

## Part 2 Products

### 2.1 MATERIALS

.1 Formwork materials:

.1 For concrete without special contract administrator features, use wood and wood product formwork materials to CSA-0121, CAN/CSA-086.1, CSA-0153.

.2 Form ties:

.1 For concrete not designated 'Contract administrator', use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm dia. in concrete surface.

.3 Form liner:

.1 Plywood: Douglas Fir to CSA O121, Canadian Softwood Plywood to CSA O151.

.4 Form release agent: non-toxic.

.5 Form stripping agent: colourless mineral oil, non-toxic free of kerosene, with viscosity 15 to 24 $mm^2/s$ at 40ºC, flashpoint minimum 150ºC, open cup.

.6 Falsework materials: to CSA-S269.1.

.7 Sealant: to Section 07900 - Joint Sealers.

## 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 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.

.3 Fabricate and erect falsework in accordance with CSA S269.1.

.4 Do not place shores and mud sills on frozen ground.

.5 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.

.6 Align form joints and make watertight. Keep form joints to minimum.

.7 Locate horizontal form joints for exposed columns 2400 mm above finished floor elevation.

.8 Use 25 mm chamfer strips on external corners and/or 25 mm fillets at interior corners, joints, unless specified otherwise.

.9 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.

.10 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.

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

## 3.2 REMOVAL AND RESHORING

.1 Re-use formwork and falsework subject to requirements of CAN/CSA-A23.1.

END OF SECTION

## Part 1 General

### 1.1 REFERENCES

.1 American Concrete Institute (ACI)

.1 ACI 315R-80, Manual of Contract administratoring 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 Canadian Standards Association (CSA)

.1 CAN/CSA-A23.1-04, Concrete Materials and Methods of Concrete Construction.

.2 CAN3-A23.3-00, Design of Concrete Structures for Buildings.

.3 CSA G30.12

### 1.2 SHOP DRAWINGS

.1 Submit shop drawings including placing of reinforcement in accordance with Section 01330 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 Contract Administrator, 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 Contract administratoring and Placing Drawings for Reinforced Concrete Structure.

.3 Detail lap lengths and bar development lengths to CAN3-A23.3, unless otherwise indicated.

### 1.3 CO-ORDINATION

.1 Not Used.

## Part 2 Products

### 2.1 MATERIALS

.1 Substitute different size bars only if permitted in writing by Contract Administrator.

.2 Reinforcing steel: billet steel, grade 400.

.3 Chairs, bolsters, bar supports, spacers: to CAN/CSA-A23.1.

.4 Mechanical splices: subject to approval of Contract Administrator.

## 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

.2 Canada. ACI 315R, Manual of Contract administrator and Placing Drawings for Reinforced Concrete Structures unless indicated otherwise.

.3 Obtain Contract Administrator's approval for locations of reinforcement splices other than those shown on placing drawings.

.4 Upon approval of Contract Administrator, weld reinforcement in accordance with CSA W186.

.5 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

## 2.3 SOURCE QUALITY CONTROL

.1 Upon request, provide Contract Administrator with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis.

.2 Upon request inform Contract Administrator 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 Contract Administrator.

.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 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 Prior to placing concrete, obtain Contract Administrator's approval of reinforcing material and placement.

.4 Ensure cover to reinforcement is maintained during concrete pour.

## 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.

END OF SECTION

## Part 1 General

### 1.1 REFERENCES

.1 American Society for Testing and Materials (ASTM)

- .1 ASTM C260-94, Specification for Air-Entraining Admixtures for Concrete.
- .2 ASTM C309-94, Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- .3 ASTM C494-92, Specification for Chemical Admixtures for Concrete.
- .4 ASTM D1751-83(1991), Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

.2 Canadian Standards Association (CSA)

- .1 CAN/CSA-A5-93, Portland Cement.
- .2 CAN/CSA-A23.1-04, Concrete Materials and Methods of Concrete Construction.
- .3 CAN/CSA-A23.2-04, Methods of Test for Concrete.

### 1.2 SAMPLES

.1 Submit samples in accordance with Section 01330 Submittal Procedures.

.2 At least 4 weeks prior to commencing work, inform Contract Administrator of proposed source of aggregates and provide access for sampling.

### 1.3 CERTIFICATES

.1 Submit certificates in accordance with City of Winnipeg Standard Construction Specification Submittal Procedures.

.2 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.

.3 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CAN/CSA-A23.1.

### 1.4 CO-ORDINATION

.1 Co-ordinate with Division 15 for any repair necessary during pouring of concrete.

.2 Division 15 will maintain air pressure inside the buried pipe throughout the concrete pour and a minimum of 24 hours after the concrete emplacement is completed.

## Part 2 Products

### 2.1 MATERIALS

.1 Portland cement: to CAN/CSA-A5.

.2 Supplementary cementing materials: to CAN/CSA-A23.5.

.3 Water: to CAN/CSA-A23.1.

.4 Aggregates: to CAN/CSA-A23.1.

.5 Air entraining admixture: to ASTM C260.

.6 Chemical admixtures: to ASTM C494. Contract Administrator to approve accelerating or set retarding admixtures during cold and hot weather placing.

.7 Concrete retarders: to ASTM C494. Do not allow moisture of any kind to come in contact with the retarder film.

.8 Shrinkage compensating grout: as indicated.

.9 Curing compound: to CAN/CSA-A23.1 and to ASTM C309.

.10 Premoulded joint fillers:

.1 Bituminous impregnated fiber board: to ASTM D1751.

### 2.2 MIXES

.1 Proportion concrete in accordance with CAN/CSA-A23.1, to give quality and yield for concrete as indicated.

## Part 3 Execution

### 3.1 PREPARATION

.1 Obtain Contract Administrator's approval before placing concrete. Provide 48 h ours notice prior to placing of concrete.

.2 Pumping of concrete will not be permitted.

.3 Ensure reinforcement and inserts are not disturbed during concrete placement.

.4 Prior to placing of concrete obtain .Contract Administrator'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 Do not place load upon new concrete until authorized by Contract Administrator.

## 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 joists, beams, column capitals or columns, except where indicated or approved by Contract Administrator.

.2 Where approved by Contract Administrator, 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 Contract Administrator.

.3 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain approval of modifications from Contract Administrator 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 Contract Administrator, 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 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 Grout under base plates and machinery using procedures in accordance with manufacturer's recommendations which result in 100 % contact over grouted area.

.5 Finishing.

.1 Finish concrete in accordance with CAN/CSA-A23.1.

.2 Use procedures acceptable to Contract Administrator 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. Provide written declaration that compounds used are compatible.

.4 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radius edges unless otherwise indicated.

.6 Joint fillers.

.1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Contract Administrator. 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 construction, expansion joints as indicated. Install joint filler.

## 3.3 SITE TOLERANCE

.1 Concrete tolerance in accordance with CAN/CSA-A23.1 and 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 Contract Administrator in accordance with CAN/CSA-A23.1.

.2 Contract Administrator 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.

.4 Inspection or testing by Contract Administrator will not augment or replace Contractor quality control nor relieve him of his contractual responsibility.

.5 Cold weather requirements

.1 Maintain temperature of working environment between 10°C and 50°C during working period thru to end of cureing period.

END OF SECTION

## Part 1 General

1.01 WORK INCLUDED

.1 The work included under this section shall conform to the industry standard and be accepted by the local construction and trade associations.

## Part 2 Products

2.01 COMPOUNDS, HARDENERS AND SEALERS

.1 Curing Compound (Exterior slabs): ASTM CS309, Type 1, clear, Sternson Ritecure, Elsro Kurez, CPD Clear Cure or approved equal.

.2 Curing Compound (Interior Slabs): cc Chemical CS 309; Sonneborne Core and Seal; CPD Acrylic Cure and Seal; Tamms Clearseal.

.3 Colour Curing Compound: Sternson Hardener Colourplate; Sternson Phorseal; CPD Chlorinated Rubber Cure and Seal; Target Cure and Seal.

2.02 ACCESSORIES

.1 Water: potable and non-detrimental to concrete

.2 Film: 6 mil thick, clear.

## Part 3 Execution

3.01 INSPECTION

.1 Verify that slab surfaces are ready to receive work and elevations are as indicated on drawings.

.2 Beginning of installation means acceptance of existing surfaces.

3.02 FLOOR FINISHING

.1 Finish concrete floor surfaces in accordance with CAN3-A23.1M.

.2 Uniformly spread, screed, and float concrete. Do not use grate tampers or mesh rollers. Do not spread concrete by vibration.

.3 Steel trowel surfaces that will receive carpeting, resilient flooring.

.4 Steel trowel all surfaces left exposed to view.

.5 Apply hardener on concrete floor surfaces that do not receive additional flooring material. Apply in accordance with manufacturer's recommendations.

.6 Apply sealer on floor surfaces to receive hardener. Apply in accordance with manufacturer's recommendations.

.7 Saw cut control joints as called for to CAN3-A23.3-M94.

3.03 TOLERANCES

.1 Maintain surface flatness, with maximum variation of 3 mm in 3 m.

.2 In areas with floor drains, maintain floor level at walls and pitch surfaces uniformly to drains at 20 mm per meter nominal as indicate on drawings.

END OF SECTION