

## **1 GENERAL**

### **1.01 WORK INCLUDED**

- .1 This section specifies requirements for supplying, transporting, and installing concrete forms and accessories.

### **1.02 RELATED WORK**

- .1 Concrete Reinforcing: Section 03 20 00
- .2 Cast-in-place Concrete: Section 03 30 00

### **1.03 REFERENCES**

- .1 CSA A23.1-09/A23.2-19, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
- .2 CSA 086-19, Consolidation (R2006), Engineering Design in Wood.
- .3 CSA 0121-17, Douglas Fir Plywood.
- .4 CSA 0153-19, Poplar Plywood.
- .5 CSA S269.1-16, Falsework for Construction Purposes.
- .6 CSA S269.3-M92(R2013), Concrete Formwork.

### **1.04 SHOP DRAWINGS**

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate method and schedule of construction, materials, arrangement of joints, ties, shores, and locations of temporary embedded parts. Comply with CSA S269.1, for falsework drawings and CSA S269.3 for formwork drawings.
- .3 Each shop drawing submitted to bear the stamp and signature of qualified professional engineer registered in the Province of Prince Edward Island.
- .4 Submit all proposed construction joint locations to the Departmental Representative for review prior to commencing any formwork erection.

## **2 PRODUCTS**

### **2.01 MATERIALS**

- .1 Formwork lumber: plywood and wood formwork materials to CSA 0121, CSA 086 and CSA 0153.
- .2 Falsework materials: to CSA S269.1.
- .3 Form ties:
  - .1 Removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm diameter in concrete surface.
  - .2 In water/effluent retaining structures: snap-off metal ties, fixed length snap ties with breakback points set back minimum 25 mm from finished concrete surface. Maximum tie cone size 25 mm. Remove cone and fill void with grout flush with finished surface.
- .4 Form release agent: chemically active release agents containing compounds that react with free lime present in concrete to provide water insoluble soaps, preventing concrete from sticking to forms. Form release agents must be compatible with potable water quality and waterproofing systems where applicable.

## **3 EXECUTION**

### **3.01 ERECTION**

- .1 Verify lines, levels and column centres before proceeding with formwork and ensure dimensions agree with drawings.
- .2 Earth forms will not be accepted.
- .3 Fabricate and erect falsework in accordance with CSA S269.1.
- .4 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.
- .5 Obtain the Departmental Representative's permission before framing openings not indicated in concrete structure including slabs, walls, columns, beams, footings, etc.
- .6 Align form joints and make watertight. Keep form joints to minimum.
- .7 Location of all construction joints are to be reviewed and approved by the Departmental Representative prior to any erection

of formwork and cutting and bending of reinforcement. The maximum length of concrete wall pour shall be 12.2 m. The maximum height of concrete pour shall be 4.6 m.

.8 Construction Joints:

- .1 In general incorporate either horizontal or vertical construction joints in accordance with CSA A23.1 and to the Departmental Representative's approval. Submit proposed joint locations for review prior to start of formwork erection.
- .2 Provide construction joints in concrete where work is left off at day's end. Run reinforcement continuous through joints and shear key unless indicated otherwise.
- .3 Provide proper key and reinforcement. In beams, provide inclined shear bars as required.
- .4 Immediately before next pour, clean construction joint and brush with grout of neat cement.

.9 Use 25 mm chamfer strips on external corners.

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

.11 Build in anchors, sleeves, miscellaneous metals 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.

.12 Clean formwork in accordance with CSA A23.1, before placing concrete.

.13 Leave formwork in place until the concrete has attained sufficient strength to sustain all loadings. For walls of water retaining structures, leave forms in place until concrete has reached sufficient strength to sustain all loadings and a minimum of three (3) days.

.14 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.

.15 Space reshoring in each principal direction at not more than 3000 mm apart.

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

**END OF SECTION**

## **1 GENERAL**

### **1.01 WORK INCLUDED**

- .1 This section includes providing all labour, tools, material, and equipment for supplying, fabricating and placing reinforcement for cast-in-place concrete.

### **1.02 RELATED WORK**

- .1 Concrete Forming and Accessories: Section 03 10 00
- .2 Cast-in-place Concrete: Section 03 30 00

### **1.03 REFERENCES**

- .1 ASTM A1046/A1064M-18, Specification for Carbon Steel Wire, and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
- .2 CSA A23.1-09/A23.2-19, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .3 CSA A23.3-19, Design of Concrete Structures.
- .4 CSA G30.18-09(R2014), Carbon Steel Bars for Concrete Reinforcement.
- .5 CSA G40.20-04/G40.21-13(R2018), General Requirements for Rolled or Welded Structural Quality Steel/ Structural Quality Steel.
- .6 CSA W186-M1990 (R2016), Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .7 Reinforcing Steel Institute of Canada, Manual of Standard Practice, 2018.

### **1.04 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 four (4) weeks prior to commencing reinforcing work.
- .2 Upon request inform Departmental Representative of proposed source of material to be supplied.

### **1.05 SHOP DRAWINGS**

- .1 Submit shop drawings including placing drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate bar bending details, lists and quantities of reinforcement, indicate sizes, spacings, locations and quantities of reinforcement and mechanical splices (where 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.
- .3 Location of construction joints are to be shown on the reinforcing steel shop drawings. Obtain the Departmental Representative's approval for location of joints prior to cutting and bending reinforcement.
- .4 Detail lap lengths and bar development lengths to CSA A23.3, unless otherwise indicated. Provide Class B tension lap to CSA A23.3 unless otherwise indicated.

### **1.06 SUBSTITUTES**

- .1 Substitute different size bars only if permitted in writing by the Departmental Representative.

## **2 PRODUCTS**

### **2.01 MATERIALS**

- .1 Reinforcing steel: billet steel, grade 400, deformed bars to CSA G30.18, unless indicated otherwise.
- .2 Cold-drawn annealed steel wire ties: to ASTM A1064/A1064M.
- .3 Welded steel wire fabric: to ASTM A1064/A1064M. Provide in flat sheets only.
- .4 Chairs, bolsters, bar supports, spacers: to CSA-A23.1.
- .5 Mechanical splices: subject to approval of the Departmental Representative.
- .6 Plain round bars: to CSA G40.21.

## **2.02 FABRICATION**

- .1 Fabricate reinforcing steel in accordance with CSA A23.1, ACI SP-66, and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .2 Obtain the 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.

## **3 EXECUTION**

### **3.01 FIELD BENDING**

- .1 Examine formwork to confirm it has been completed and adequately braced in place before starting reinforcement placing.
- .2 Do not field bend or field weld reinforcement except where indicated or authorized by the Departmental Representative.
- .3 When field bending is authorized, bend without heat, applying a slow and steady pressure.
- .4 Replace bars which develop cracks or splits.

### **3.02 PLACING REINFORCEMENT**

- .1 Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CSA A23.1 and as follows.
  - .1 Clean all reinforcing of millscale, oil grease, or other deleterious material before and after erection.
  - .2 Secure reinforcing steel rigidly in position with annealed wire or use approved clips at intersections supported on reinforcing chairs.
  - .3 Take care to confirm the position of the bars do not alter during concreting and that the correct cover is maintained at all times.
- .2 Use plain round bars as slip dowels in concrete. Paint portion of dowel intended to move within hardened concrete with one coat of lead or asphalt paint. When paint is dry, apply a thick even film of mineral lubricating grease.

- .3 Provide the Departmental Representative with 48 hours notice prior to placing concrete to provide time for Departmental Representative to inspect reinforcing steel prior to pouring concrete. Do not pour any concrete without the Departmental Representative's approval of the reinforcing material and placement.
- .4 Maintain cover to reinforcement during concrete pour to the dimensions shown on the drawings.

### **3.03 STORAGE OF REINFORCEMENT ON SITE**

- .1 Store reinforcing steel stored on site on blocks so that it is not in direct contact with the ground. Cover reinforcing steel stored on site with tarpaulins to protect it from rain and snow.

**END OF SECTION**

## **1 GENERAL**

### **1.01 WORK INCLUDED**

- .1 This section includes providing all labour, tools, materials, and equipment to perform all cast-in-place concrete work.

### **1.02 RELATED WORK**

- .1 Concrete Formwork: Section 03 10 00
- .2 Concrete Reinforcement: Section 03 20 00
- .3 Interior Waterproofing: Section 07 10 00
- .4 Sheet Membrane Waterproofing: Section 07 13 00
- .5 Insulation: Section 07 21 00

### **1.03 REFERENCES**

- .1 ASTM C260-10(R2016), Specification for Air-Entraining Admixtures for Concrete.
- .2 ASTM C109/C109M-16A, Test Method for Compressive Strength of Hydraulic Cement Mortars Using 2" (50 mm) Cube Specimens.
- .3 ASTM C494/C494M-17, Specification for Chemical Admixtures for Concrete.
- .4 ASTM C309-19, Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- .5 ASTM C827-16, Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures
- .6 ASTM C939-16A, Test Method for Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method).
- .7 ASTM D1751-18, Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- .8 CSA A23.1/A23.2-19, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
- .9 CAN/CSA A3000-18, Cementitious Materials Compendium.

- .10 CAN/CGSB-51.34-M86 "AMEND", Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

#### **1.04 SAMPLES**

- .1 One (1) week prior to commencing work, inform Departmental Representative of proposed source of aggregates and provide access for sampling.

#### **1.05 CERTIFICATES**

- .1 One (1) week prior to starting concrete work, submit to Departmental Representative manufacturer's test data and certification by qualified independent inspection and testing laboratory that the following materials will meet specified requirements:
  - .1 Portland cement.
  - .2 Supplementary cementing materials.
  - .3 Grout.
  - .4 Admixtures.
  - .5 Aggregates.
  - .6 Water.
  - .7 Waterstops.
  - .8 Waterstop joints.
  - .9 Joint filler.
- .2 Provide certification that mix proportions selected will produce concrete of specified quality and yield and that strength will comply with CSA A23.1 and that mix design is adjusted to prevent alkali aggregate reactivity problems.
- .3 Provide certification that plant, equipment and materials to be used in concrete comply with requirements of CSA A23.1.

#### **1.06 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with applicable local, provincial and national regulations.
- .2 Use trigger operated spray nozzles for water hoses.
- .3 Designate a cleaning area for tools to limit water use and runoff.
- .4 Carefully coordinate the specified concrete work with weather conditions.
- .5 Seal emptied containers and store safely for disposal.

- .6 Prevent plasticizers, water-reducing agents and air-entraining agents from entering drinking water supplies or streams. Using appropriate safety precautions, collect liquid or solidify liquid with an inert, noncombustible material and remove for disposal. Dispose of all waste in accordance with applicable local, provincial and national regulations.
- .7 Choose least harmful, appropriate cleaning method which will perform adequately.

#### **1.07 START-UP MEETING - CONCRETE FLOOR FINISHING**

- .1 After award of Contract and prior to the finishing work, a start-up meeting will be held with the following people present:
  - .1 The Departmental Representative.
  - .2 The concrete floor finisher and their designated crew supervisors who will be working on site on this project.
- .2 The purpose of the meeting will be to discuss the specifications, job conditions, and concrete floor finishing work to be done with reference to the most recent product data sheets and application instructions.

### **2 PRODUCTS**

#### **2.01 MATERIALS**

- .1 Portland cement: to CSA A3000.
- .2 Supplementary cementing materials: to CSA A3000.
- .3 Water: to CSA A23.1.
- .4 Aggregates: to CSA A23.1. Coarse aggregates to be normal density.
- .5 Air entraining admixture: to ASTM C260.
- .6 Chemical admixtures: to ASTM C494. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing. All admixtures to be approved for use in potable water containing structures.
- .7 Shrinkage compensating grout: premixed compound consisting of non-metallic aggregate, Portland cement, water reducing and plasticizing agents.
  - .1 Compressive strength: 50 MPa at 28 days.
  - .2 Consistency:
    - .1 Fluid: to ASTM C827. Time of efflux through flow cone (ASTM C939), under 30 s.

- .2 Flowable: to ASTM C827. Flow table, 5 drops in 3 s, (ASTM C109, applicable portion) 125 to 145%.
- .3 Plastic: to ASTM C827. Flow table, 5 drops in 3 s, (ASTM C109, applicable portions) 100 to 125%.
- .4 Dry pack to manufacturer's requirements.
- .8 Curing compound: to CSA A23.1 and to ASTM C309, Type 1-D with fugitive dye for hidden or exterior use, and Type 1 for exposed concrete. Ensure compatibility with concrete floor hardeners. Curing compounds to be approved for use in potable water containing structures.
- .9 Waterstops:
  - .1 Ribbed waterstops: 10mm thick x 230mm high, made of extruded PVC.
  - .1 Acceptable product: Type 9380G by W.R. Meadows, or approved equivalent.
- .10 Premoulded joint fillers:
  - .1 Bituminous impregnated fibreboard: to ASTM D1751.
- .11 Vapour Barrier: to CAN/CGSB-51.34, thickness 10 mil.
- .12 Weep hole tubes: plastic.

## 2.02 CONCRETE MIXES

- .1 Proportion normal density concrete in accordance with CSA A23.1, Alternative 1 to give following properties for concrete in base slabs, tank walls and suspended subs.
  - .1 Cement: type GU.
  - .2 Minimum compressive strength at 28 days: 35 MPa.
  - .3 Class of exposure: F-1.
  - .4 Chemical admixtures: type as approved, and in accordance with ASTM C494.
- .2 Proportion normal density concrete in accordance with CSA A23.1, Alternative 1 to give following properties for concrete in mud slabs and pipe encasement:
  - .1 Cement: Type GU.
  - .2 Minimum compressive strength at 28 days: 20 MPa.
  - .3 Class of exposure: N.
  - .4 Chemical admixtures: type as approved, and in accordance with ASTM C494.

### **3 EXECUTION**

#### **3.01 EXAMINATION**

- .1 Confirm founding material on which footings and other concrete work are to be placed are free from water. Place concrete only on frost-free ground. Remove previously frozen bearing surfaces.
- .2 Ensure foundations, including mud slabs, bear on undisturbed till or structural fill. Place all structural fill as directed and under the continuous supervision of the Departmental Representative.
- .3 All foundation bearing surfaces will be subject to inspection and approval by the Departmental Representative's geotechnical engineer prior to placing concrete. If bearing surfaces are deemed unacceptable because conditions do not meet those anticipated during design, make adjustments as directed.
- .4 Confirm fill has been placed to meet specified requirements, and that underslab services have been installed, inspected, tested and approved.

#### **3.02 WORKMANSHIP**

- .1 Obtain the Departmental Representative's approval before placing concrete. Provide 48 hours' notice prior to placing of concrete.
- .2 Pumping of concrete is permitted only after approval of equipment and mix.
- .3 Do not disturb reinforcement and inserts during concrete placement.
- .4 Prior to placing of concrete obtain the 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 dowels and epoxy grout according to epoxy manufacturer's specifications.
- .7 Do not place load upon new concrete until authorized by the Departmental Representative.

- .8 Provide concrete protective cover to reinforcement as indicated on the drawings.
- .9 Accurately support bars in suspended slabs and slabs-on-grade on plastic coated steel chairs to maintain exact cover requirements.
- .10 Confirm all concrete construction is moist cured using either an approved curing compound or burlap maintained in moist conditions. For walls of water retaining structures, forms shall be left in place for a minimum of three (3) days after placement of concrete. After three (3) days, forms can be stripped and concrete can be moist cured as described above.
- .11 In cold weather protect concrete work to CSA A23.1 and following:
  - .1 Cold weather is defined as a period when the mean air temperature drops below 5°C for more than three (3) successive days.
  - .2 When air temperature is above 0°C and is forecast to remain so for 48 hours after placing, insulated tarps are acceptable protection provided concrete temperatures are monitored and comply with temperature limits specified in the following paragraph.
  - .3 For all other cold weather conditions protect concrete with a windproof enclosure of canvas or other material to allow free circulation of inside air around fresh concrete. At no point let walls of enclosure touch formwork and provide sufficient space for removal of formwork and for finishing. Supply approved heating equipment capable of keeping inside air at sufficient curing temperatures:
    - .1 For an initial three (3) days, at a temperature of not less than 15°C.
    - .2 Maintain concrete at temperatures of not less than 10°C for a total period of seven (7) days plus the initial three (3) days specified above.
    - .3 At no time shall concrete temperatures exceed 30°C at surfaces.
    - .4 Reduce enclosure air temperature at a rate not exceeding 10°C per day until outside air temperature has been reached.
    - .5 Take temperature readings both of air and of concrete surfaces at several points within area protected at start and at end of working day. Maintain complete records of temperature readings.
  - .4 Confirm concrete has cured without suffering damage. When enclosure is provided, avoid rapid drying of the concrete.
- .12 In hot weather protect concrete work to CSA A23.1 and following:
  - .1 When air temperature is at or above 25°C, do not use curing compounds and keep concrete surfaces moist continually

during protection stage using burlap maintained in a moist condition.

- .2 Generation of heat through hydration shall be regulated to control thermal gradients to prevent thermal cracking.

### **3.03 INSERTS**

- .1 No sleeves, ducts, pipes or other openings shall pass through joists, beams, walls, slabs, column capitals or columns, except where indicated or approved by Departmental Representative.
- .2 Where approved by Departmental Representative, set sleeves, ties, pipe hangers, miscellaneous metals 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 the Departmental Representative.
- .3 Core-drilling/cutting of holes in any concrete element is not permitted without written consent from the Departmental Representative. All proposed core-drilling/cutting must be submitted to the Departmental Representative for review prior to execution of work. Request for core-drilling/cutting must have 72 hours notice to allow Departmental Representative time to review proposed locations.
- .4 Do not eliminate or displace reinforcement to accommodate hardware larger than 400 mm. For inserts/ hardware less than 400 mm, displace bars to accommodate. If inserts cannot be located as specified, obtain approval of modifications from Departmental Representative before placing concrete.
- .5 Check locations and sizes of sleeves and openings shown on structural and civil drawings with mechanical and electrical drawings.
- .6 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.
- .7 Larger size openings in walls and slabs have been shown on the structural drawings. Refer to civil drawings for all remaining cast-in-place concrete penetrations. All pipe sleeves containing wall flanges are to be cast-in-place at time of concrete pour.

### **3.04 PLACING CONCRETE**

- .1 Place concrete as specified in CSA A23.1.
- .2 Inform the Departmental Representative at least 24 hours before each concrete placing operation.

- .3 Do not place concrete when it is raining or likely to rain. If rain begins after concrete is placed, protect with waterproof covers until set.
- .4 Do not permit vertical free fall of concrete mix to exceed 1.5 metres.
- .5 For exposed concrete, and concrete tanks, take special precautions when placing to prevent segregation of concrete, and to avoid cold joints, honeycombing or voids. Do not allow vibrator to touch formwork.
- .6 Use form vibrators only when sections are too narrow for internal type. Employ a sufficient number of vibrators to ensure complete consolidation of concrete throughout entire volume of each layer. Have available at least one (1) extra vibrator on hand for emergency.
- .7 Do not use vibrators for interior and exterior concrete slabs on fill.
- .8 Use only tools and handling equipment that are clear of rust or other harmful and foreign material to avoid effervescence and staining of slabs or hardened concrete.
- .9 Use concrete pumps to place concrete only with approval of methods, equipment and mix design.
- .10 Provide continuous supervision during placement of concrete including concrete grout to maintain reinforcing steel in the correct position.
- .11 Fill all bug holes with depth greater than 6 mm and/or diameter greater than 10 mm (surface air voids) in wall faces in contact with water with non-shrink grout.
- .12 Allow minimum of 48 hours between pours of adjacent wall and foundation slab sections in water retaining structures.

### **3.05 PLACING GROUT**

- .1 Grout where indicated using procedures in accordance with manufacturer's recommendations which result in 100% contact over grouted area.

### **3.06 SURFACE TOLERANCE**

- .1 Concrete tolerance in accordance with CSA A23.1, straight edge method.

### 3.07 FINISHING

- .1 Finish concrete in accordance with CSA A23.1.
- .2 Use smooth form finish for all concrete surfaces. Use form facing material that will produce a smooth, hard, uniform texture on the concrete. Do not use material with raised grain, torn surfaces, worn edges, patches, dents or other defects that will impair the texture of the concrete surface. Patch the holes and defects. Patch smooth all bug holes exceeding 10 mm in diameter and/or 6 mm in depth smooth. Completely remove all fins in all water holding tankage and water holding conduits.
- .3 Remove tie cones and patch with latex modified concrete finish. Provide mix in strict accordance with manufacturer's instructions.
- .4 Use rubbed finish for all interior concrete exposed to view. Remove fins exceeding 3 mm in height.
- .5 Provide steel trowel finish surfaces to floor in accordance with CSA A23.1, Classification A.
  - .1 Have the floor finisher inspect grades, lines, inserts and floor drains prior to commencement of work. Through careful leveling and execution of the work, confirm floors slope to the appropriate drains. In the event that drains do not collect water efficiently, repair floor defects at no additional cost to the contract and to the satisfaction of the Departmental Representative.
  - .2 Correct floor flatness and waviness deficiencies by grinding.
- .6 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radius edges unless otherwise indicated.
- .7 Use curing compounds compatible with applied finish on concrete surfaces. Provide written declaration that compounds used are compatible.
- .8 Finish concrete surfaces to receive weatherproofing in accordance with manufacturer's recommendations.

### 3.08 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 or field welded corners and intersections unless otherwise approved by the Departmental Representative.
- .3 Provide waterstops as required to provide continuous seal and as indicated on the drawings and at all construction joints in water-retaining structures. Note: not all waterstops are indicated on the Drawings.
- .4 Install expansion joint waterstops in accordance with manufacturer's directions.

### **3.09 JOINT FILLERS**

- .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by the Departmental Representative. When more than one (1) 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 and control joints as indicated. Install joint filler and sealants.
- .3 Use 6 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to within 12 mm of finished slab surface unless indicated otherwise. Finish caulk joint complete with backer rod.
- .4 Finish with sealants all cold joints around perimeters of equipment pads curbing and other similar locations, before painting work.

### **3.10 FIELD QUALITY CONTROL**

- .1 Inspection and testing of concrete and concrete materials will be carried out by the Department Representative or a Testing Laboratory designated by the Departmental Representative in accordance with CSA A23.1.
- .2 Provide a set of four (4) test cylinders for each class of concrete placed each day (only 3 will typically be tested). In larger pours, provide one (1) set of test cylinders per each 100 m<sup>3</sup>.
- .3 The Departmental Representative will require additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
- .4 Conduct non-destructive Methods for Testing Concrete in accordance with CSA A23.2.

- .5 Inspection or testing by Departmental Representative will not augment or replace Contractor quality control nor relieve them of their contractual responsibility.

### **3.11 LEAK REPAIR**

- .1 Repair all cracks observed on walls and slabs of new concrete construction using approved product compatible with potable water and installed as per manufacturer's recommendations.

**END OF SECTION**