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**Part 1            GENERAL**

**1.1                RELATED SECTIONS**

- .1        Section 03 30 00 – Cast-in-Place Concrete.

**1.2                REFERENCES**

- .1        American Society for Testing and Materials (ASTM)
  - .1        ASTM A123/A123M-15, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - .2        ASTM C881/C881M-15, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
- .2        Canadian Standards Association (CSA International)
  - .1        CSA A165 SERIES-14, CSA Standards on Concrete Masonry Units.
  - .2        CSA A179-14, Mortar and Grout for Unit Masonry.
  - .3        CSA A370-14, Connectors for Masonry.
  - .4        CSA A371-14, Masonry Construction for Buildings.
  - .5        CSA G30.18-09 (R2014), Carbon Steel Bars for Concrete Reinforcement.
  - .6        CSA G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .7        CSA S304-14, Design of Masonry Structures.

**1.3                SUBMITTALS**

- .1        Product Data:
  - .1        Submit manufacturer's printed product literature, specifications and data sheet in accordance with Sections 01 33 00 - Submittal Procedures.
- .2        Shop Drawings:
  - .1        Submit shop drawings for reinforced masonry walls in accordance with Section 01 33 00 - Submittal Procedures.
  - .2        Shop drawings to include bar bending and splicing details, lists and placing drawings.
  - .3        On placing drawings, indicate sizes, spacing, location and quantities of reinforcement and connectors.
- .3        Samples:
  - .1        Submit samples in accordance with Sections 01 33 00 - Submittal Procedures.
  - .2        Submit duplicate full size samples of each type of masonry unit.
  - .3        One of each type of masonry reinforcement, tie and connector proposed for use.
  - .4        As required for testing purposes and as requested by Departmental Representative.

## **1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect masonry products from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

## **1.5 QUALITY ASSURANCE**

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

## **Part 2 PRODUCTS**

### **2.1 CONCRETE MASONRY UNITS**

- .1 Standard concrete block units: to CSA A165 Series (CSA A165.1).
  - .1 Classification: H/15/A/M.
  - .2 Size: modular.
  - .3 Special shapes: provide square bull-nosed units for exposed corners. Provide purpose-made shapes for lintels and bond beams. Provide additional special shapes as indicated.
  - .4 The ultimate compressive strength of all grouted masonry shall be a minimum of 7.5 MPa at 28 days.

### **2.2 REINFORCEMENT AND CONNECTORS**

- .1 Bar reinforcement: to CSA A371 and CSA G30.18, carbon steel, Grade 400 deformed bars.
- .2 Wire reinforcement: to CSA A371 and CSA G30.18, high tensile strength steel wire, ladder type, hot dip galvanized after fabrication to ASTM A123, Class B2, 458 g/m<sup>2</sup>.
- .3 Connectors shall be corrosion resistant: to CSA A370 and CSA S304.
- .4 Corrosion protection: to CSA S304, galvanized to CSA S304 and CSA A370.
- .5 Horizontal Reinforcement:
  - .1 For single wythe concrete block masonry: BL-10 Ladder Reinforcement or approved alternate, 9 gauge side and cross rods, hot dipped galvanized (458 g/m<sup>2</sup>).
  - .2 Provide prefabricated assemblies for corners.

- .6 Concrete masonry block reinforcing: as indicated and as shown on structural drawings.

## **2.3 ADHESIVE ANCHORAGE FOR RE-BAR DOWELS**

- .1 Acrylic adhesive for dowel and anchor rod anchorage: to ASTM C881, Type IV, Grade 3, Class A, B and C.
- .2 Acceptable materials:
  - .1 Sika Power Fix 4 Anchoring Resin as supplied by Action Fasteners.
  - .2 Epcon Acrylic 7 by ITW Ramset/Red Head.
  - .3 HIT HY200 Injection Adhesive System by HILTI.
  - .4 Acrylic-Tie Anchoring System by Simpson Strong-Tie.

## **2.4 MORTAR AND GROUT**

- .1 Mortar: to CSA A179.
  - .1 Use aggregate passing 1.18 mm sieve where 6 mm thick joints are indicated.
  - .2 Colour: ground coloured natural aggregates or metallic oxide pigments.
- .2 Mortar for structural concrete masonry block: Type S in accordance with CSA A179, based on property specifications.
- .3 Grout shall be to CSA A179, having a minimum compressive strength of 12 MPa, (based on a non-absorbing mould), at 28 days. Maximum aggregate size 12 mm. Grout shall be of fluid consistency having a slump of 250 mm.

## **Part 3 EXECUTION**

### **3.1 INSTALLATION**

- .1 Do masonry work in accordance with CSA A371 except where specified otherwise.
  - .1 Concrete block:
    - .1 Bond: running stretcher bond with vertical joints in perpendicular alignment and centred on adjacent stretchers above and below.
    - .2 Coursing height: 200 mm for one block and one joint.
    - .3 Jointing: tool where exposed or where paint or other finish coating is specified to provide smooth compressed concave surface cut joints flush.

### **3.2 CONSTRUCTION**

- .1 Exposed masonry:
  - .1 Remove chipped, cracked, and otherwise damaged units, in exposed masonry and replace with undamaged units.
  - .2 Cut out for electrical switches, outlet boxes, and other recessed or built-in objects. Make cuts straight, clean, and free from uneven edges.
- .2 Jointing:
  - .1 Allow joints to set just enough to remove excess water, then tool with round jointer to provide smooth, compressed, uniformly concave joints where concave joints are indicated.

- .2 Strike flush all joints concealed in walls and joints in walls to receive tile, insulation, or other applied material except paint or similar thin finish coating.
- .3 Uneven horizontal/vertical joint widths within continuous wall sections will not be accepted.
- .4 Remove mortar fins from the inside surfaces of all cells to be grouted so that grout will flow easily into position and no obstruction will occur.
- .3 Building-In:
  - .1 Install masonry connectors and reinforcement where indicated on drawings.
  - .2 Build in items required to be built into masonry.
  - .3 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.
  - .4 Brace door jambs to maintain plumb. Fill spaces between jambs and masonry with mortar.
- .4 Concrete block lintels:
  - .1 Install reinforced concrete block lintels over openings in masonry where steel or reinforced concrete lintels are not indicated.
  - .2 End bearing: not less than 200 mm and as indicated on drawings.
- .5 Support of loads:
  - .1 Use 30 MPa concrete to Section 03 30 00 - Cast-in-Place Concrete, where concrete fill is used in lieu of solid units.
  - .2 Use grout to CSA A179 where grout is used in lieu of solid units.
  - .3 Install building paper below voids to be filled with concrete or grout; keep paper 25 mm back from faces of units.
- .6 Provision for movement:
  - .1 Leave 6 mm space between top of non-load bearing walls and partitions and structural elements. Do not use wedges.
  - .2 Built masonry to tie in with stabilizers, with provision for vertical movement.
- .7 Build in flashings in masonry in accordance with CSA A371.

### **3.3 REINFORCING AND CONNECTING**

- .1 Install masonry connectors and reinforcement in accordance with CSA A370, CSA A371 and CSA S304 unless indicated otherwise.
- .2 Prior to placing concrete, mortar and grout, obtain Departmental Representative's approval of placement of reinforcement and connectors.
- .3 Supply and install additional reinforcement in masonry as indicated.
- .4 Spacing of horizontal reinforcing to be as indicated on drawings.
- .5 Vertical reinforcing steel shall be placed in the centre of the core and not less than one bar diameter between bars. Where splicing is required, the minimum lap shall be 40 bar diameters.
- .6 Replace bars and connectors which develop cracks or splits.

- .7 Where possible run horizontal joint reinforcement continuously. Where require provide minimum lap lengths of 500 mm. Stagger laps in adjacent in adjacent courses a minimum of 1200 mm.
- .8 Provide additional vertical reinforcing on each side of each opening in masonry walls and as indicated. Install dowels of the same size as the vertical reinforcing into the floor or foundation wall as shown on the drawings at each wall vertical reinforcing bar.
- .9 Tie walls to foundations and floor slabs using 15M dowel bars as detailed on the drawings. Coordinate dowels with wall reinforcement placement in centres of grouted cells.
- .10 Reinforcing steel shall be handled and sorted in such a manner to keep it free of dirt, mud and water. Any reinforcing steel which is dirty, muddy and/or rusty shall be cleaned with wire brushes and/or shot blasted to the satisfaction of Departmental Representative.
- .11 Place vertical reinforcing in its proper position and secure with reinforcing bar positioners. Maximum spacing of positioners shall not exceed 192 bar diameters, unless shown otherwise on the drawings.
- .12 Place vertical reinforcing at each end of each wall and at all corners.

### **3.4 REINFORCED LINTELS AND BOND BEAMS**

- .1 Reinforce masonry lintels and bond beams as indicated.
- .2 Place and grout reinforcement in accordance with CSA S304, CSA A371, and CSA A179.

### **3.5 MORTAR**

- .1 Mixing mortar:
  - .1 Thoroughly mix mortar in a power mixer for a period of not less than 5 minutes after all materials have been placed in the mixer.
  - .2 The method of proportioning materials for the mortar used in construction shall be such that the specified proportions of the mortar materials can be controlled and accurately maintained.
  - .3 After the initial mixing, keep mortar tempered by adding water as required, so that the mortar will contain the maximum amount of water consistent with good workability.
  - .4 Discard mortar not used within the following time limits: temperature 27°C or higher – 2½ hours, temperature from 27°C to 10°C – 3½ hours, under 10°C – 2½ hours.
- .2 Placing mortar:
  - .1 All joints shall be full mortar joints with no voids.
  - .2 Butter ends of units with mortar and push into place.
  - .3 When mortar is thumbprint hard, strike joints with a trowel and tool to a hard concave surface.
  - .4 All block work must be finished to a standard acceptable for exposed and finished masonry.

- .5 Where cells are to be grouted, place mortar in webs to prevent loss of grout into adjacent cells not designated to receive grout. Clean all mortar fins from surfaces of calls to receive grout.
- .6 All mortar droppings and other foreign materials have been removed from all cells to be grouted. Clean-outs shall be provided to the bottom of all cells to be grouted by the high lift method.

### **3.6 GROUT**

- .1 Grout masonry in accordance with CSA S304, CSA A371 and CSA A179 and as indicated.
- .2 Proposed grouting procedure to be submitted to Departmental Representative for review prior to start of work.
- .3 Grouting shall be carried out by either the high or low lift method as specified under CSA A371.
- .4 Mixing grout:
  - .1 Mix all ingredients thoroughly for at least 5 minutes.
  - .2 Discard grout which is not placed within 1½ hours after water is first added.
- .5 Placing grout:
  - .1 Grouting operations shall meet requirements of CSA S304 and CSA A371.
  - .2 Grout shall be placed in cells using a method submitted in writing and approved by Departmental Representative, prior to start of work.
  - .3 Place Grout after mortar has set and gained sufficient strength to prevent blowout. Masonry walls to be a minimum of 12 hours old.
  - .4 Move grout from the mixer to the point of deposit as fast as practical. Pumping shall be used to prevent segregation of the mix and cause a minimum of splatter on surfaces not to be encased in grout.
  - .5 Vibrate or rod grout during placement to ensure complete filling of the grout space.
  - .6 Except in the top course of a wall, stop grout 38 mm below the top of all masonry lifts.
  - .7 If required, re-rod or re-vibrate the grout shortly after it has begun to stiffen to overcome settlement shrinkage.
  - .8 Walls shall be grouted as noted on drawings and as follows:
  - .9 Grout all lintel bond beam block and all vertical cells containing reinforcement.
  - .10 Grout behind all frames in walls, around all loose and miscellaneous items of steel, and other appurtenances.

### **3.7 ANCHORS**

- .1 Supply and install metal anchors as indicated.

### **3.8 LATERAL SUPPORT AND ANCHORAGE**

- .1 Supply and install lateral support and anchorage in accordance with CSA S304 and as indicated.

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**3.9 SITE TOLERANCES**

- .1 Tolerances to be in accordance with CSA A371 and as follows:
  - .1 Variation from specified joint width: plus 2 mm and minimum 0 mm.
  - .2 Maximum variation from plane of unit to adjacent unit: 1 mm.
  - .3 Maximum variation from flat plane: 3 mm in 3 m., non-cumulative.

**3.10 FIELD QUALITY CONTROL**

- .1 Inspection and testing will be carried out by Testing Laboratory designated by Departmental Representative.

**3.11 CLEANING – GENERAL**

- .1 Clean concrete block and unglazed clay masonry as work progresses.
- .2 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.
- .3 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

**3.12 PROTECTION**

- .1 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.
- .2 Repair damage to adjacent materials caused by masonry products installation.

**END OF SECTION**