

## **PART 1 GENERAL**

### **1.1 REFERENCES**

- .1 ASTM International (ASTM)
  - .1 ASTM C5-10, Standard Specification for Quicklime for Structural Purposes.
  - .2 ASTM C144-17, Standard Specification for Aggregate for Masonry Mortar.
  - .3 ASTM C207-06(2011), Standard Specification for Hydrated Lime for Masonry Purposes.
  - .4 ASTM C260/C260M-10a(2016), Standard Specification for Air-Entraining Admixtures for Concrete.
  - .5 ASTM C270-14a, Standard Specification for Mortar for Unit Masonry.
  - .6 ASTM C780-17, Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
  - .7 ASTM C1072-13e1, Standard Test Method for Measurement of Masonry Flexural Bond Strength.
  - .8 ASTM E4-16, Standard Practices for Force Verification of Testing Machines.
- .2 CSA Group (CSA)
  - .1 CSA A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete, Includes Update No.1 (2011).
  - .2 CAN/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 A3000-13, Cementitious materials compendium (Consists of A3001, A3002, A3003, A3004 and A3005), Includes Update No. 1 (2014), Update No. 2 (2014), Update No. 3 (2014), Update No. 4 (2016), Update No. 5 (2017).
  - .6 CSA S304-14, Design of Masonry Structures, Includes Update No. 1 (2015).

### **1.2 DEFINITIONS**

- .1 Raking: the removal of loose/deteriorated mortar until 4x the joint thickness is reached.
- .2 Repointing: filling and finishing of masonry joints from which mortar is missing, has been raked out, or has been omitted.
- .3 Tooling: finishing of masonry joints using tool to provide final contour.
- .4 Repair: using adhesives to rebond sections of fractured masonry.
- .5 Consolidation: strengthening masonry units to prevent deterioration (spalling).
- .6 Descaling: the removal of loose portions of the masonry (usually spalled area) through impact with a brush hammer or similar device.
- .7 Grout: cementitious or epoxy mixture of liquid consistency suitable for pouring or pumping, to fill voids between masonry elements.

### **1.3 SYSTEM DESCRIPTION**

- .1 Work of this section includes but is not limited to:
  - .1 Visually inspecting for obvious signs of deteriorated masonry and testing/verification of masonry joints.

- .2 Raking identified unsound joints.
- .3 Preparation of masonry surface including joints surface cleaning, flushing of voids and open joints, and masonry wetting.
- .4 Repointing of identified masonry joints.
- .5 Resetting of dislodged masonry units.
- .6 Installing new precast chimney cap.
- .7 Ensuring cure of mortar.
- .8 Grouting by hand, small voids.
- .9 Consolidation of fractured masonry units or spalled units.
- .10 Replacement of deteriorated or missing units.

#### **1.4 SAMPLES**

- .1 Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
  - .1 Cementitious Materials:
    - .1 Include brand, type, and name of manufacturer for Work Site mixed mortar materials.
    - .2 Submit proposed mix proportions and sand analysis reports and compressive strength reports on the proposed mortar mix(es).
- .2 Provide samples in accordance with Section 01 33 00 – Submittal Procedures.
  - .1 Provide labelled samples of materials used on project for approval before work commences.
  - .2 Provide samples in quantity and size in accordance with CAN/CSA-A179.
- .3 Test Reports:
  - .1 Submit laboratory test reports in accordance with Section 01 33 00- Submittal Procedures.

#### **1.5 QUALITY ASSURANCE**

- .1 Perform masonry work in accordance with requirements of CSA S304, unless indicated otherwise by this specification.
- .2 Sole Source:
  - .1 For work of this section, obtain masonry from a single manufacturer for entire project for each type of unit required.
- .3 Conform to CSA A371, except as modified by this specification.
- .4 The masonry contractor shall be a member in good standing of the Canadian Masonry Contractors' Association (CMCA) through a registered Chapter.
- .5 The masonry contractor shall have experience on projects of similar size and magnitude and shall provide continuous active supervision by a journeyman mason while masonry work is in progress.
- .6 Masonry work shall be performed by experienced, qualified journeyman masons under the direct and continual full-time supervision of certified masons.
- .7 Before starting masonry work, establish mix proportions based on the limitations set out in Table 2 of CAN/CSA A179.

- .8 Test laboratory prepared samples of the proposed mortar(s) for compressive strength in accordance with CAN/CSA A179 by a laboratory approved by Departmental Representative. Departmental Representative will pay for the initial cost of mortar testing. Any re-testing required as a result of the original test failing will be borne by the Contractor.
- .9 Connectors and joint reinforcement shall conform to CSA A370.
- .10 Miscellaneous masonry accessories and their use where not otherwise specified but shown or required for proper completion of the Work, shall conform to CSA A371.
- .11 Regulatory Requirements: Provide fire resistance rated materials and construction identical to those of assemblies with fire resistance ratings determined by ULC Listings.

#### **1.6 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver masonry units on pallets or cubes, suitably protected from road grime and moisture absorption due to exposure to rain or melting snow.
- .2 Unload and store on dry, level areas.
- .3 Remove plastic wrappings from concrete masonry units and cover with waterproof coverings that will provide protection from the elements but allow for air circulation.
- .4 Deliver cement, lime, and mortar in dry condition with manufacturer's label intact and store under waterproof cover and protected from elements.

#### **1.7 DELIVERY, STORAGE AND HANDLING**

- .1 Packing, shipping, handling and unloading:
  - .1 Deliver, store, handle and protect materials in accordance with manufacturer's instructions.
  - .2 Store cementitious materials and aggregates in accordance with CAN/CSA A23.1.
  - .3 Store lime putty in plastic lined sealed drums.
  - .4 Keep material dry. Protect from weather, freezing and contamination.
  - .5 Ensure that manufacturer's labels and seals are intact upon delivery.
  - .6 Remove rejected or contaminated material from site.
  - .7 At end of each working day, cover unprotected work with waterproof membranes. Membranes should extend to 0.5 m over surface area of work and be tightly installed to prevent finished work from drying out too rapidly.
  - .8 Protect adjacent finished work against damage which may be caused by on-going work.

#### **1.8 EXISTING CONDITIONS**

- .1 Report in writing, to Departmental Representative areas of deteriorated masonry revealed during work. Obtain Departmental Representative approval and instructions of repair and replacement of masonry units before proceeding with repair work.

#### **1.9 ENVIRONMENTAL REQUIREMENTS**

- .1 Maintain masonry temperature between 10 degrees C and 25 degrees C for duration of work.
- .2 When ambient temperature is 10 degrees C:

- .1 Store cements and sands for immediate use within heated enclosure. Allow cement and sands to reach minimum temperature of 10 degrees C.
- .2 Heat and maintain water to minimum of 20 degrees C and maximum of 30 degrees C:
  - .1 At time of use temperature of mortar to be minimum of 15 degrees C and maximum of 30 degrees C.
  - .2 Do not mix cement with water or with aggregate or with water-aggregate mixtures having higher temperature than 30 degrees C.
  - .3 Maintain aggregate temperature between 10 degrees C and 30 degrees.
  - .4 Maintain mortar mix between 10 degrees and 40 degrees.
  - .5 Provide hot water to a maximum 90 degrees C on site during cold weather.

## **PART 2 PRODUCTS**

### **2.1 PERFORMANCE AND DESIGN CRITERIA**

- .1 Match new mortar with existing mortar in colour, texture and tooling.
- .2 New masonry units to match the existing masonry units.
- .3 Testing Standards:
  - .1 Flow and cube strength: to ASTM C270.
  - .2 Vicat cone test: to ASTM C780.
  - .3 Cube strength: to CAN/CSA A179, Appendix B.
  - .4 Flexural bond strength: to ASTM C1072.

### **2.2 MATERIALS**

- .1 Water: potable, clean and free from contaminants.
- .2 Sand: to ASTM C144.

Sieve Size	% By Weight Passing Each Sieve	% By Weight Retained on Each Sieve
No. 4 (4.75 mm)	100	0
No. 8	90	5
No. 16	70	25
No. 30 (600 micron)	50	20
No. 50 (300 micron)	30	20
No. 100 (150 micron)	15	15
No. 200 (75 micron)	0	15

- .1 Sharp, screened and washed pit sand, free of organic material, with final grading and colour to review of Departmental Representative.
- .2 Custom blend sands where necessary to provide appropriate colour match and gradation to review of Departmental Representative.
- .3 Portland cement: to CAN/CSA A3000 (A5).
- .4 Masonry cement: to CAN/CSA A3000 (A8).
- .5 Lime:

- .1 Processed Lime (Quicklime): to ASTM C5, fresh, finely ground and crushed; high calcium, 3/16" fines, dry bagged.
- .2 Hydrated Lime:
  - .1 Dolomitic finishing lime, Type S, to ASTM C207.
  - .2 Hydrated, high calcium, Type N masons' lime to ASTM C207.
- .6 Colour:
  - .1 Ground coloured natural aggregates, metallic oxide pigments, and/or coloured sand to match existing. Use minimum amount necessary.
  - .2 Maximum colour: 10% of total volume of aggregate.
  - .3 Match core of freshly broken sample of original mortar.
  - .4 Coloured admixtures: maximum 15% of binder content by mass.
- .7 Additives:
  - .1 Obtain written approval of Departmental Representative before using additives.
- .8 Air entrainment:
  - .1 Vinsol resin type: to ASTM C260.

## 2.3 MORTAR MIXES

- .1 Mix mortar ingredients in accordance with CAN/CSA A179 in quantities needed for immediate use.
- .2 Property requirements:
  - .1 Mortar for parapet walls, chimneys, unprotected walls: type S based on proportion specifications, to CAN/CSA A179.
  - .2 Pointing Mortar: CAN/CSA A179, Type N using property specification.
- .3 Mortar Mixing:
  - .1 Mix mortar ingredients in accordance with CAN/CSA A179 in quantities needed for immediate use.
  - .2 Maintain sand uniformly damp immediately before mixing process.
  - .3 Add mortar colour and admixtures in accordance with manufacturer's instructions. Provide uniformity of mix and colouration.
  - .4 Do not use admixtures, including pigments, air entraining agents, accelerators, retarders, water repellent agents, or other admixtures; unless approved in writing by the Departmental Representative.
  - .5 Do not use anti-freeze compounds including calcium chloride or chloride based compounds.
  - .6 Use a batch type mixer in accordance with CAN/CSA A179.
  - .7 Pointing mortar: pre-hydrate pointing mortar by mixing ingredients dry, then mix again adding just enough water to produce damp unworkable mix that will retain its form when pressed into ball. Allow to stand for not less than 1 hour no more than 2 hours then remix with sufficient water to produce mortar of proper consistency for pointing.
  - .8 Re-temper mortar only within two hours of mixing, when water is lost by evaporation.
  - .9 Use mortar within 2 hours after mixing at temperatures of 32 degrees C, or 2-1/2 hours at temperatures under 10 degrees C.

- .4 Grout Mixes:
  - .1 Grout: Minimum compressive strength of 12.5 MPa at 28 days. Maximum aggregate size and grout slump: CAN/CSA A179.
- .5 Grout Mixing:
  - .1 Mix batched and delivered grout in accordance with CSA A23.1 transit mixed.
  - .2 Mix grout ingredients in quantities needed for immediate use in accordance with CAN/CSA A179 coarse grout.
  - .3 Add admixtures in accordance with manufacturer's instructions; mix uniformly.
  - .4 Do not use calcium chloride or chloride-based admixtures.
- .6 Mix Tests:
  - .1 Testing Mortar Mix:
    - .1 Test mortar to requirements of Section 01 45 00 - Quality Control, and in accordance with CAN/CSA A179. Test prior to construction and during construction for:
      - .1 Compressive strength.
      - .2 Consistency.
      - .3 Mortar aggregate ratio.
      - .4 Sand/cement ratio.
      - .5 Water content and water/cement ratio.
      - .6 Air content.
      - .7 Splitting tensile strength
  - .2 Testing Grout Mix:
    - .1 Test grout to requirements of Section 01 45 00 - Quality Control, and in accordance with CAN/CSA A179, for grout based on proportion specification. Test prior to construction and during construction for:
      - .1 Compressive strength.
      - .2 Sand/cement ratio.
      - .3 Water content and water/cement ratio.
      - .4 Slump.

## **2.4 PRECAST CHIMNEY CAPS**

- .1 Provide precast chimney caps, sloped to drain, with drip edge extending minimum 25 mm past vertical plane of brickwork beneath.

## **2.5 ACCESSORIES**

- .1 Prepare mortars in:
  - .1 A mortar mill comprising mortar pan with adjustable cast iron sprung rollers on cranked roller shaft, steel scrapers and blades.
  - .2 A spiral paddle mill comprising a mechanically driven rotating barrel with integral internal paddles.
    - .1 To each batch add up to 6 big beach stones to tumble and pound mortar during mixing process.
  - .3 Plasterer's metal troughs.

### **PART 3 EXECUTION**

#### **3.1 SITE VERIFICATION OF CONDITIONS**

- .1 Report in writing to Departmental Representative areas of deteriorated masonry not previously identified.
- .2 Obtain Departmental Representative written approval and instructions for repair and replacement of masonry units before proceeding with repair work.
- .3 Stop work in that area and report to Departmental Representative immediately evidence of mould.

#### **3.2 EXAMINATION**

- .1 Procedure of testing: examine joints visually for obvious signs of deteriorated masonry.
- .2 Examine joints not visually deteriorated as follows:
  - .1 Test for voids and weakness by using hammers or other approved means.
  - .2 Perform in co-operation with Departmental Representative so that unsound joints can be marked and recorded.

#### **3.3 GENERAL**

- .1 Perform work in accordance with CSA A371.
- .2 Use manual raking tool to remove deteriorated mortar and ensure that no masonry units are chipped/alterd/damaged by work to remove mortar.
- .3 Tool and compact using jointing tool to force mortar into joint.
- .4 Finish joints to match existing joints, except where specified otherwise.
- .5 Use suitable approved jointing tool to form tooled joints to match existing.

#### **3.4 REPLACEMENT**

- .1 Perform work in accordance with CSA A371.
- .2 Remove fractured unit without damaging adjacent units.
- .3 Install new brick units into Work and repoint with specified mortar as rest of Work.

#### **3.5 RAKING JOINTS**

- .1 Remove deteriorated mortar to sound mortar full depth of deteriorated mortar but in no case less than 4x the joint thickness leaving square corners and a flat surface at back of cut. Clean out voids and cavities encountered.
- .2 Do not cut or damage brick units or widen mortar joints. Do not sawcut perpendicular joints. Use of mini-grinders permitted provided bricks are not cut, ground or damaged when removing mortar.
- .3 Ensure that no masonry units are chipped, altered or damaged by work to remove mortar.
- .4 Clean by compressed air, with non-ferrous brush by moderate water wash surfaces of joints without damaging texture of exposed joints or masonry units.
- .5 Flush open joints and voids; clean open joints and voids with low pressure water and if not free draining blow clean with compressed air.
- .6 Leave no standing water.

### **3.6 REPOINTING**

- .1 Dampen joints.
- .2 Keep masonry damp while pointing is being performed.
- .3 Completely fill joint with mortar. If surface of masonry units has worn rounded edges keep pointing back from surface to keep same width of joint. Avoid feather edges. Pack mortar solidly into voids and joints.
- .4 Tool and compact using jointing tool to force mortar into joint.
- .5 Build-up pointing in layers not exceeding 12 mm in depth. Allow each layer to set before applying subsequent layers. Maintain joint width.
- .6 Tool joints to match existing profile as shown on drawings as directed by Departmental Representative.
- .7 Remove excess mortar from masonry face before it sets.

### **3.7 INSTALLING NEW PRECAST CAPS**

- .1 Install new precast chimney caps fully bedded in Type S mortar and grout any gap or space between cap and chimney flu; caulk joint between flu and cap using Type S-7 sealant to Section 07 92 00, or as otherwise recommended by chimney flu manufacturer.

### **3.8 GROUTING**

- .1 Clean out void with water until water runs clear.
- .2 Fill joints and cracks with mortar set back 50 mm from final mortar surface.
- .3 Pour cement grout through tube until void is full.
- .4 Point as rest of work.

### **3.9 FIELD QUALITY CONTROL**

- .1 Field quality control inspections and testing: in accordance with the requirements of Division 01: Quality Control.
- .2 Allow access to scaffold and worksite as required to perform inspections and tests.
- .3 Have a qualified independent testing and inspecting agency perform field tests and inspections and prepare test reports as follows:
  - .1 Testing Frequency: One set of tests for each chimney.
  - .2 Mortar and Test (Proportion Specification): For each mix provided, in accordance with CSA A179 for mortar air content and compressive strength.
  - .3 Prism Test: For each type of construction provided, in accordance with CSA A179 at 7 days and at 28 days.
  - .4 Concrete Cylinder Tests at 7 days and at 28 days.

**3.10 PROGRESS CLEANING**

- .1 Progress Cleaning: clean in accordance with Division 01: Cleaning. Leave Work area clean at end of each day.
- .2 Clean surfaces of mortar droppings, stains and other blemishes resulting from work of this section as work progresses.
- .3 Remove droppings and splashings using clean sponge and water.
- .4 Do further cleaning using stiff natural bristle brushes after mortar has obtained its initial set and has not fully cured.
- .5 Clean masonry with stiff natural bristle brushes and plain water only if mortar has fully cured.
- .6 Clean masonry with low pressure 15 to 45 psi clean water and soft natural bristle brush.
- .7 Obtain approval of Departmental Representative prior to using other cleaning methods for persistent stains.

**3.11 FINAL CLEANING**

- .1 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Division 01: Cleaning. Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Manage and dispose of demolition and construction waste materials in accordance with Division 01: Construction/Demolition Waste Management and Disposal.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 WORK INCLUDED**

- .1 The Executed Agreement including General Conditions, Division 1, applicable Drawings and Amendments are part of and to be read in conjunction with this Section.
- .2 This section of the Specifications complements the drawings in describing services, labour and materials necessary to complete supply, fabrication and erection of masonry necessary to complete the Work summarized as but not necessarily limited to:
  - .1 Concrete block walls.

**1.2 RELATED SECTIONS**

- .1 Masonry Mortar and Grout: Section 04 05 12.
- .2 Concrete Unit Masonry: Section 04 22 00.

**1.3 REFERENCES**

- .1 CSA-A179-14, Mortar and Grout for Unit Masonry.
- .2 CSA-A371-14, Masonry Construction for Buildings.

**1.4 SAMPLES**

- .1 Submit samples:
  - .1 If requested, three of each type of masonry accessory specified.
  - .2 If requested, three of each type of masonry reinforcement, tie and connector proposed for use.
  - .3 As required for testing purposes.

**1.5 TEST REPORTS**

- .1 Submit laboratory test reports certifying compliance of masonry units and mortar ingredients with specification requirements.

**1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver materials to job site in dry condition.
- .2 Keep materials dry until use.
- .3 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.

**PART 2 PRODUCTS**

**2.1 MATERIALS**

- .1 Masonry materials are specified in related Sections indicated in 1.2.
- .2 Reinforcing steel to CSA G30.18.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- .1 Do masonry work in accordance with CSA-A371 except where specified otherwise. Masonry to match the existing in colour, texture, coursing alignment and all other aspects of the work. For new work mortar joint width to be 10 mm.
- .2 Build masonry plumb, level, and true to line, with vertical joints in alignment.
- .3 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

### **3.2 CONSTRUCTION**

- .1 Jointing:
  - .1 Allow joints to set just enough to remove excess water, then tool to provide smooth, joints true to line, compressed and matching existing.
  - .2 Strike flush all joints concealed in walls.
- .2 Cutting:
  - .1 Cut out for electrical switches, outlet boxes, and other recessed or built-in objects.
  - .2 Make cuts straight, clean, and free from uneven edges.
- .3 Building-In:
  - .1 Build in items required to be built into masonry.
  - .2 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.
- .4 Support of loads:
  - .1 Use 20 MPA concrete grout 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; keep paper 25 mm back from faces of units.
- .5 Vertical Reinforcing:
  - .1 Install vertical reinforcing in center of block cores. Grout all reinforced cores solid.

### **3.3 SITE TOLERANCES**

- .1 Tolerances in notes to Clause 5.3 of CSA-A371 apply.

### **3.4 FIELD QUALITY CONTROL**

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

END

**PART 1 GENERAL**

**1.1 WORK INCLUDED**

- .1 The Executed Agreement including General Conditions, Division 1, applicable Drawings and Amendments are part of and to be read in conjunction with this Section.
- .2 This section of the Specifications complements the drawings in describing services, labour and materials necessary to complete supply, fabrication and erection of masonry necessary to complete the Work summarized as but not necessarily limited to:
  - .1 Concrete block walls

**1.2 RELATED SECTIONS**

- .1 Masonry Procedures: Section 04 05 00.
- .2 Concrete Unit Masonry: Section 04 22 00.

**1.3 REFERENCES**

- .1 CSA-A179-14, Mortar and Grout for Unit Masonry.

**PART 2 PRODUCTS**

**2.1 MATERIALS**

- .1 Use same brands of materials and source of aggregate for entire project.
- .2 Mortar and grout: CSA A179.
- .3 Portland Cement: CAN/CSA-A3000-13.
- .4 Mortar for all masonry:
  - .1 Type N based on Proportion specifications.
- .5 Grout: to CSA A179, Table 3.
- .6 Calcium chloride is not to be used in any mortar.

**PART 3 EXECUTION**

**3.1 CONSTRUCTION**

- .1 Do masonry mortar and grout work in accordance with CSA A179 except where specified otherwise.
- .2 Preparation: Remove loose and broken mortar. Broom immediate area and water.

END

## **PART 1 GENERAL**

### **1.1 REFERENCES**

- .1 ASTM International (ASTM)
  - .1 ASTM A116-11(2016), Standard Specification for Metallic-Coated, Steel Woven Wire Fence Fabric.
  - .2 ASTM A123/A123M-17, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - .3 ASTM A153/A153M-16a, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  - .4 ASTM A307-14e1, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
  - .5 ASTM A496-07, Standard Specification for Deformed Steel Wire For Concrete Reinforcement.
  - .6 ASTM A653/A653M-17, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 CSA International (CSA)
  - .1 CSA A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete, Includes Update No.1 (2011).
  - .2 CAN/CSA A165 SERIES-14, CSA Standards on Concrete Masonry Units (Consists of A165.1, A165.2 and A165.3).
  - .3 CAN/CSA A179-14, Mortar and Grout for Unit Masonry.
  - .4 CSA A370-14, Connectors for Masonry.
  - .5 CSA A371-14, Masonry Construction for Buildings.
  - .6 CSA A3000-13, Cementitious materials compendium (Consists of A3001, A3002, A3003, A3004 and A3005), Includes Update No. 1 (2014), Update No. 2 (2014), Update No. 3 (2014), Update No. 4 (2016), Update No. 5 (2017).
  - .7 CSA S304-14, Design of Masonry Structures, Includes Update No. 1 (2015).

### **1.2 ADMINISTRATIVE REQUIREMENTS**

- .1 Coordination:
  - .1 Coordinate lines, levels and coursing with work of other trades.
  - .2 Obtain built-in items prior to start of this work.

### **1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Division 01: Submittal Procedures.
  - .1 Provide manufacturer's printed product literature, specifications and data sheet. Indicate masonry types, shapes, sizes, and textures.
  - .2 Cementitious Materials:
    - .1 Include brand, type, and name of manufacturer for site mixed mortar materials.
    - .2 Submit proposed mix proportions and sand analysis reports and compressive strength reports on the proposed mortar mixes.

#### **1.4 QUALITY ASSURANCE**

- .1 Perform masonry work in accordance with requirements of CSA S304, unless indicated otherwise by this specification.
- .2 Design wind loading for walls and windows is: 1.1 kPa.
- .3 Sole Source:
  - .1 For work of this section, obtain brick masonry from a single manufacturer for entire project for each type of brick required.
  - .2 Obtain concrete masonry units from a single supplier for entire project.
- .4 Conform to CSA A371, except as modified by this specification.
- .5 The masonry contractor shall be a member in good standing of the Canadian Masonry Contractors' Association (CMCA) through a registered Chapter.
- .6 The masonry contractor shall have experience on projects of similar size and magnitude and shall provide continuous active supervision by a journeyman mason while masonry work is in progress.
- .7 Masonry work shall be performed by experienced, qualified journeyman masons under the direct and continual full-time supervision of certified masons.
- .8 Before starting masonry work, establish mix proportions based on the limitations set out in Table 2 of CAN/CSA A179.
- .9 Test laboratory prepared samples of the proposed mortar(s) for compressive strength in accordance with CAN/CSA A179 by a laboratory approved by Departmental Representative. Departmental Representative will pay for the initial cost of mortar testing. Any re-testing required as a result of the original test failing will be borne by the Contractor.
- .10 Connectors and joint reinforcement shall conform to CSA A370.
- .11 Miscellaneous masonry accessories and their use where not otherwise specified but shown or required for proper completion of the Work, shall conform to CSA A371.
- .12 Regulatory Requirements: Provide fire resistance rated materials and construction identical to those of assemblies with fire resistance ratings determined by ULC Listings.

#### **1.5 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver masonry units on pallets or cubes, suitably protected from road grime and moisture absorption due to exposure to rain or melting snow.
- .2 Unload and store on dry, level areas.
- .3 Remove plastic wrappings from concrete masonry units and cover with waterproof coverings that will provide protection from the elements but allow for air circulation.
- .4 Deliver cement, lime, and mortar in dry condition with manufacturer's label intact and store under waterproof cover and protected from elements.

#### **1.6 SITE CONDITIONS**

- .1 Ambient Conditions: maintain materials and surrounding air temperature to:
  - .1 Minimum 5 degrees C prior to, during, and 48 hours after completion of masonry work.

- .2 Maximum 32 degrees C prior to, during, and 48 hours after completion of masonry work.
- .2 Provide adequate bracing for masonry during construction and until permanent lateral supports are in place.

## **1.7 WARRANTY**

- .1 For the work of this Section, the 12-month warranty period prescribed in Subsection GC 3.13 of General Conditions "C" is extended to 24 months.

## **PART 2 PRODUCTS**

### **2.1 CONCRETE MASONRY UNITS**

- .1 Standard Concrete Masonry Units: to CAN/CSA A165 and as follows:
  - .1 Standard Weight Block: H/15/A/M.
  - .2 Semi-Lightweight Block: H/15/B/M.
  - .3 Size: as indicated on Drawings, and as required to meet coursing requirements.
  - .4 Special shapes: provide bull nosed units for exposed corners as indicated on Drawings. Lintels and bond beams are constructed using knock-out lintel units. Provide additional special shapes as indicated.
  - .5 Refer to Drawings for indication of where standard weight and semi-lightweight block is required; if not indicated, use standard weight. If clarification is required, ask Departmental Representative for clarification in writing and wait for written response. If the term 'lightweight block' is used, this shall mean 'semi-lightweight block' for the purposes of this Contract.
- .2 Fire-Rated Concrete Masonry Units: to CSA A165 Series (CSA A165.1), and as follows:
  - .1 Classification: H/15/B/M, except as modified by fire resistance requirements, 75% solid.
  - .2 Concrete Composition: Type L230S Concrete
  - .3 Fire Rating: as indicated on Drawings.
  - .4 Size: as indicated on Drawings.
  - .5 Special shapes: provide bull nosed units for exposed corners as indicated on Drawings. Lintels and bond beams constructed using knock-out lintel units. Provide additional special shapes as indicated.
- .3 Material tests shall be supplied to the Departmental Representative, and certified as representative of materials supplied to the job site. Such tests shall have been made within previous three months.
- .4 Protect concrete block against wetting prior to laying in walls. Cover tops of walls after erection to prevent rainwater or snow from entering wall system prior to closing-in of building.

### **2.2 CONCRETE**

- .1 Concrete used in masonry work shall have a minimum compressive strength of 20 MPa in 28 days, to Section 03 30 00 – Cast-in-Place Concrete.

### 2.3 MORTAR AND PARGING MATERIALS

- .1 Parging (applied to exterior face of concrete masonry units at exterior assemblies): proprietary latex-modified cement-based coating with water-repellent additives.
- .2 Use same brands of materials and source of aggregate for entire project.
- .3 Cement:
  - .1 Portland Cement: to CSA A3000, Type GU - General use hydraulic cement (Type 10), gray colour.
    - .1 Use low VOC products in compliance with SCAQMD Rule 1168.
  - .2 Masonry Cement: to CSA A3002 and CAN/CSA A179, Type N or S as specified.
- .4 Aggregate: supplied by one supplier.
  - .1 Fine Aggregate: to CAN/CSA A179, manufactured sand.
  - .2 Course Aggregate: to CAN/CSA A179.
- .5 Water: clean and potable.
- .6 Lime:
  - .1 Hydrated Lime: to CAN/CSA A179, Type SA.
- .7 Admixtures (Concrete Masonry Units Only):
  - .1 Water Repellent Agents: polymeric:
    - .1 Use low VOC products in compliance with SCAQMD Rule 1168.
- .8 Mortar Mixes
  - .1 Mortar for exterior masonry above grade:
    - .1 Loadbearing: type S based on proportion specifications.
    - .2 Non-Loadbearing: type N based on proportion specifications.
  - .2 Mortar for interior masonry:
    - .1 Loadbearing: type N based on proportion specifications.
    - .2 Non-Loadbearing: type N based on proportion specifications.
  - .3 Mortar for parapet walls, chimneys, unprotected walls: type S based on proportion specifications, to CAN/CSA A179.
  - .4 Pointing Mortar: CAN/CSA A179, Type N using property specification.
  - .5 Parging mortar: type M to CAN/CSA A179.
  - .6 Mortar for foundation walls, manholes, sewers, pavements, walks, patios and other exterior masonry at or below grade: type S based on proportion specifications, CAN/CSA A179.
    - .1 For water-repellent block, mortar shall contain a polymeric water repellent mortar admixture to enhance bond, as recommended by the block manufacturer.
  - .7 Following applies regardless of mortar types and uses specified above:
    - .1 Mortar for stonework: type N based on proportion specifications.
    - .2 Mortar for grouted reinforced masonry: type S based on proportion specifications.

- .9 Mortar Mixing:
- .1 Mix mortar ingredients in accordance with CAN/CSA A179 in quantities needed for immediate use.
  - .2 Maintain sand uniformly damp immediately before mixing process.
  - .3 Add mortar colour and admixtures in accordance with manufacturer's instructions. Provide uniformity of mix and colouration.
  - .4 Do not use admixtures, including pigments, air entraining agents, accelerators, retarders, water repellent agents, or other admixtures; unless approved in writing by the Departmental Representative.
  - .5 Do not use anti-freeze compounds including calcium chloride or chloride-based compounds.
  - .6 Use a batch type mixer in accordance with CAN/CSA A179.
  - .7 Pointing mortar: pre-hydrate pointing mortar by mixing ingredients dry, then mix again adding just enough water to produce damp unworkable mix that will retain its form when pressed into ball. Allow to stand for not less than 1 hour no more than 2 hours then remix with sufficient water to produce mortar of proper consistency for pointing.
  - .8 Re-temper mortar only within two hours of mixing, when water is lost by evaporation.
  - .9 Use mortar within 2 hours after mixing at temperatures of 32 degrees C, or 2-1/2 hours at temperatures under 10 degrees C.
- .10 Grout Mixes:
- .1 Mortar for grouted reinforced masonry: type S based on proportion specifications.
  - .2 Bond Beams: grout mix 10 to 12.5 MPa strength at 28 days; 200-250 mm slump; mixed in accordance with CAN/CSA A179 coarse grout.
  - .3 Lintels: grout mix 10 to 12.5 MPa strength at 28 days; 200-250 mm slump; mixed in accordance with CAN/CSA A179 coarse grout.
  - .4 Grout: Minimum compressive strength of 12.5 MPa at 28 days. Maximum aggregate size and grout slump: CAN/CSA A179.
- .11 Grout Mixing:
- .1 Mix batched and delivered grout in accordance with CSA A23.1 transit mixed.
  - .2 Mix grout ingredients in quantities needed for immediate use in accordance with CAN/CSA A179 coarse grout.
  - .3 Add admixtures in accordance with manufacturer's instructions; mix uniformly.
  - .4 Do not use calcium chloride or chloride based admixtures.
- .12 Mix Tests:
- .1 Testing Mortar Mix:
    - .1 Test mortar to requirements of Section 01 45 00 - Quality Control, and in accordance with CAN/CSA A179. Test prior to construction and during construction for:
      - .1 Compressive strength.
      - .2 Consistency.
      - .3 Mortar aggregate ratio.
      - .4 Sand/cement ratio.

- .5 Water content and water/cement ratio.
  - .6 Air content.
  - .7 Splitting tensile strength
- .2 Testing Grout Mix:
- .1 Test grout to requirements of Section 01 45 00 - Quality Control, and in accordance with CAN/CSA A179, for grout based on proportion specification. Test prior to construction and during construction for:
    - .1 Compressive strength.
    - .2 Sand/cement ratio.
    - .3 Water content and water/cement ratio.
    - .4 Slump.

## 2.4 STEEL FINISHES - GENERAL

- .1 The following requirements apply to steel anchors, ties, reinforcing and accessories where requirements are not otherwise specifically listed.
- .2 Exterior Wall Assemblies: all steel materials and products used and incorporated into exterior wall assembly shall be Stainless Steel, SAE / AISI Type 304 (also known as A2 or 18/8 stainless steel):
  - .1 Fasteners and anchors: Stainless Steel to ASTM F593 or F738M.
  - .2 Stainless steel products: Stainless Steel to ASTM A484/A484M.
  - .3 Other steel elements: Stainless Steel, SAE / AISI Type 304.
- .3 Partition Wall Assemblies - Interior Use at Normal to Low Humidity Locations:
  - .1 Ties and Reinforcing: Mill Galvanized, to ASTM A116, Class 3.
  - .2 Hot Dip Hardware and Bolts (HDGAF): to ASTM A153, Class B-2.
  - .3 Hot Dip Sheet Steel (HDGAF): to ASTM A653, Coating Designation Z600.
  - .4 Structural Shapes and Pipes (HDGAF): to ASTM A123, Grade 85.

## 2.5 REINFORCEMENT

- .1 Bar reinforcement: Steel to CSA A371 and CSA G30.18, Grade 400W.
- .2 Masonry Joint Reinforcement: to CSA A371 and ASTM A496, with corrosion protection in accordance with CSA S304 and CSA A370, and as follows:
  - .1 Interior Walls: Hot dip galvanized after fabrication.
  - .2 Exterior Walls: Type 304 stainless steel.
  - .3 Wire Size for Side Rods: W1.7 or 3.8 mm diameter.
  - .4 Wire Size for Cross Rods: W1.7 or 3.8 mm diameter.
  - .5 Spacing of Cross Rods, Tabs, and Cross Ties: At a maximum of 400 mm on centre.
  - .6 Lengths: A minimum of 3000 mm, with prefabricated corner and tee units.
- .3 Connectors: to CSA A370 and CSA S304, Type 304 stainless steel.
- .4 Single Wythe Masonry Joint Reinforcement: ladder type with single pair of side rods.

## 2.6 TIES AND ANCHORS

- .1 Ties and anchors shall be to CSA A370 as follows:
  - .1 Deflection: Maximum 2 mm, including free play, when acted upon by a lateral load of 0.45 kN, in all possible positions of adjustment.
  - .2 Positive restraint at position of maximum adjustment.
  - .3 Free play of multi-component ties maximum 1.2 mm when assembled in all possible configurations.
  - .4 Anchors shall allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall.
- .2 Lateral Partition Supports (Top of Wall Anchors):
  - .1 Angle Support: Fabricated from 2.657 mm h Type 304 stainless steel plate having 75 mm long legs fastened to deck structure to allow vertical movement of masonry assembly; hot dip galvanized; coordinate with Section 07 84 00 for firestopping insulation and smoke seals.
  - .2 Plate Support: Fabricated from 2.657 mm Type 304 stainless steel plate with 10 mm diameter metal 150 mm long welded to plate having closed end plastic tube fitted over rod that allows rod to move in and out of tube; hot dip galvanized after fabrication.
- .3 Rigid T-Intersection Anchors: Fabricate from steel bars 38 mm wide x 6 mm thick x 600 mm long with ends turned up 50 mm or with cross pins at installers option; Type 304 stainless steel.
- .4 Anchor Bolts: Headed or L-shaped steel bolts in accordance with ASTM A307, Grade A; with ASTM A563 hex nuts and, where indicated, flat washers; Type 304 stainless steel in accordance with ASTM A153, Class C.
- .5 Post-Installed Anchors: Provide torque-controlled expansion anchors, with capability to sustain, without failure, a load equal to six times the load imposed when installed in solid or grouted unit masonry and equal to four times the load imposed when installed in concrete when tested in accordance with ASTM E488 conducted by a qualified independent testing agency, and as follows:
  - .1 Indoor Locations: Carbon-steel components zinc-plated in accordance with ASTM B633, Class Fe/Zn 5.
  - .2 Outdoor and High Humidity Locations: Alloy Group 1 or 2 stainless steel bolts complying with ASTM F593/F738M and nuts complying with ASTM F594/ASTM F836M.
  - .3 Fastening into Solid Concrete or Solidly Grouted Installation, to CSA A371: Two component, injectable adhesive specifically manufactured for use in installing dowels or threaded anchor rods and inserts into new or existing concrete or grout, and as follows:
    - .1 Epoxy Composition: Sealed packaging containing resin, hardener, cement and water; components.
    - .2 Curing Time: Rapid set, high strength and stiffness; maximum time 45 minutes at 20 C.
  - .4 Fastening to Hollow Wall Installation, to CSA A371: Two component, injectable adhesive specifically manufactured for use in installing dowels or threaded anchor rods and inserts, with cylindrical mesh screen tube into new or existing masonry cavity wall, and as follows:

- .1 Composition: Sealed packaging containing resin, hardener, cement and water.
- .2 Curing Time: Rapid set, high strength and stiffness; maximum time 60 minutes at 20 C.
- .6 Toggle Bolts: Tumble wing type, class, and style as required for supported construction.

## **2.7 FLASHING**

- .1 Sheet metal flashing and trim: to Section 07 62 00.
- .2 Flexible Through-Wall Flashing and Damproofing Course: nominal 40 mils thick, to CSA A371.
  - .1 Primers: as recommended by flashing manufacturer; use primers is a requirement of this Contract.

## **2.8 ACCESSORIES**

- .1 Preformed gaskets at concrete block control joints: to CSA A371.
- .2 Steel Lintels: refer to Section 05 50 00 – Metal Fabrications.
- .3 Joint Sealants: as specified under Section 07 92 00 - Joint Sealants. Colour to match adjacent masonry.
- .4 Firestopping: to Section 07 84 00 – Fire Stopping and Smoke Seals.
- .5 Foam-in-Place Insulation: to Section 07 21 19 – Foam-in-Place Insulation.
- .6 Joint Fillers: Control Joint Fillers: Preformed rubber, neoprene or polyvinylchloride, size and profile to suit intended application.
- .7 Bond Breaker Strips: #15 asphalt saturated, organic roofing felt in accordance with CSA A123.3.
- .8 Other accessories and materials as required for a complete installation.

## **2.9 CLEANING COMPOUNDS**

- .1 Use low VOC products in compliance with SCAQMD Rule 1168.
- .2 Compatible with substrate and acceptable to masonry manufacturer for use on products.

## **PART 3 EXECUTION**

### **3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's printed preparation and installation instructions and illustrations, technical datasheets, and specifications.

### **3.2 EXAMINATION**

- .1 Verify surfaces and conditions are ready to accept work of this Section.
- .2 Examine work of other Sections upon which work of this section is dependent. Should discrepancies be found which affect the proper performance of the work of this section, do not commence work until such discrepancies have been resolved.

### **3.3 PREPARATION**

- .1 Protect adjacent finished materials from damage due to masonry work.
- .2 Install dampproof course at top of foundation walls and where shown on Drawings. Lap dampproof course 100 mm at joints, seal lap with adhesive.

### **3.4 INSTALLATION – GENERAL**

- .1 Erect, install and build as required to meet or exceed the requirements of CSA A371 and CSA S304, and to the guidelines and recommendations of Canadian Concrete Masonry Producers Association (CCMPA).
- .2 Static Wind Loads: the design ultimate limit state loads for static wind force as determined to NBC 2015: Ground floor:  $82.0 \geq \text{kN}$ .
- .3 At interior locations where gypsum board is scheduled, coordinate as required and build-in components as required to facilitate gypsum board and metal framing installations.
- .4 Where mortar has started to harden at units requiring repositioning, remove and replace with fresh mortar.
- .5 Masonry horizontal and vertical joints to be 10 mm thick except where adjustments are necessary to maintain the bond pattern or to adjust coursing.
- .6 The cavity wall construction shall incorporate through-wall flashings, end-dammed at vertical terminations (window/door jambs).

### **3.5 CONCRETE MASONRY UNITS**

- .1 Standard, Semi-Lightweight and Fire-Rated Concrete Masonry Units:
  - .1 Bond: running, or as otherwise indicated.
  - .2 Coursing height: 200 mm for one block and one joint.
  - .3 Jointing: flush where exposed or where paint or other finish coating is specified.
- .2 Special Shapes:
  - .1 Install special units to form corners, returns, offsets, reveals and indents without cut ends being exposed and without losing bond or module.
  - .2 Install reinforced concrete block lintels over openings in masonry where steel or reinforced concrete lintels are not indicated.
  - .3 End bearing: not less than 200 mm, or as otherwise indicated on drawings.
  - .4 Install special site cut shaped units.
  - .5 Install pier sash blocks at control joints, coordinated with preformed gasket installation, backer rod, and sealant applications as required.
- .3 Cull out masonry units, in accordance with CSA A165 and reviewed range of colour samples, with chips, cracks, broken corners, excessive colour and texture variation.
- .4 Build in miscellaneous items such as bearing plates, steel angles, bolts, anchors, inserts, sleeves, and conduits.
- .5 Construct masonry walls using running bond unless otherwise noted.
- .6 Jointing at Exterior Wall Assemblies (Exterior Face): strike joints flush and trowel-apply an even, true, plumb, and smooth parging coat to exterior face of exterior concrete masonry walls, ready to receive air barrier applications.

- .7 Jointing at Interior: Tool exposed joints concave, weathered/raked for interior work; strike concealed joints flush.
- .8 Interior Partition Walls:
  - .1 Build around frames previously set and braced. Fill behind hollow frames within masonry walls with mortar or grout and embed anchors.
  - .2 Fit masonry closely against electrical and plumbing outlets so collars, plates, and covers overlap and conceal cuts.
- .9 Install movement and control joint systems as required, and keep free of mortar.
- .10 Hollow Units: spread mortar bed from outside edge of face shells. Gauge amount of mortar on top and end of unit to create full joints, equivalent to shell thickness. Avoid excess mortar.
- .11 Solid Units: apply mortar over entire vertical and horizontal surfaces. Avoid bridging of airspace between brick veneer and backup wall with mortar.
- .12 Ensure compacted head joints. Use full or face-shell joint as indicated.
- .13 Tamp units firmly into place.
- .14 Do not adjust masonry units after mortar has set. Where resetting of masonry is required, remove, clean, and reset units in new mortar.
- .15 After mortar has achieved initial set up, tool joints.
- .16 Do not interrupt bond below or above openings.
- .17 Tolerances in accordance with CAN/CSA A165.1, supplemented as follows:
  - .1 Maximum variation in length or height between units within specific job lot for specified dimension not to exceed 2 mm.
  - .2 No parallel edge length, width or height dimension for individual unit to differ by more than 2 mm.
  - .3 Out of square tolerance not to exceed 2 mm.
  - .4 Maximum variation in width between units within specific job lot for specified dimension not to exceed 2 mm.

### **3.6 CONNECTORS AND REINFORCEMENT**

- .1 Install masonry connectors and reinforcement in accordance with CSA A370, CSA A371, CSA A23.1 and CSA S304, unless indicated otherwise.
- .2 Prior to placing mortar and grout, obtain Departmental Representative's approval of placement of reinforcement and connectors.
- .3 Install additional premanufactured masonry reinforcement as required for a complete job meeting Code and design intent. If custom metal fabrication is required, refer to Division 05.

### **3.7 BONDING AND TYING**

- .1 Install unit, adjustable, single wythe joint reinforcement in accordance with CSA A370, CSA A371, and manufacturer's instructions.
  - .1 Install horizontal joint reinforcement 400 mm on centre.
  - .2 Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 400 mm each side of opening.

- .3 Place joint reinforcement continuous in first and second joint below top of walls.
- .4 Lap joint reinforcement ends minimum 200 mm.
- .5 Connect stack bonded unit joint corners and intersections with anchors 400 mm on centre.

### **3.8 REINFORCED LINTELS AND BOND BEAMS**

- .1 Reinforce masonry beams, masonry lintels and bond beams as indicated.
- .2 Place and grout reinforcement in accordance with CSA S304, CSA A371, and CAN/CSA A179.
- .3 Support and position reinforcing bars in accordance with CSA A371.

### **3.9 GROUTING**

- .1 Grout masonry in accordance with CSA S304, CSA A371 and CAN/CSA A179 and as indicated.

### **3.10 ANCHORS**

- .1 Install metal anchors in accordance with CSA A370 and CSA A371.

### **3.11 LATERAL SUPPORT AND ANCHORAGE**

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

### **3.12 CONTROL AND EXPANSION JOINTS**

- .1 Install control and expansion joint materials in unit masonry as masonry progresses; do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- .2 Form control joints in concrete masonry consisting of a complete vertical break free from mortar using one of the following methods:
  - .1 Break joint reinforcement at control joints, but extend bond beam reinforcing 400 mm into wall across control joint and wrap with 0.15 mm polyethylene bond breaker.
  - .2 Fit bond breaker strips into hollow contour in ends of concrete masonry units on one side of control joint; fill resultant core with grout and rake out joints in exposed faces for application of sealant.
  - .3 Install preformed control joint gaskets designed to fit standard sash block.
  - .4 Install interlocking units designed for control joints; install bond breaker strips at joint; keep head joints free and clear of mortar or rake out joint for application of sealant.
  - .5 Install temporary foam plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.
  - .6 Refer to Drawings for control and expansion joint locations, and vertical reinforcing requirements; confirm location with Departmental Representative before installation; confirm with Departmental Representative where not shown on Drawings.
- .3 Install a minimum 10 mm high horizontal, pressure relieving joints by inserting a compressible filler, sealant and backer rod specified in Section 07 92 00; locate horizontal, pressure relieving joints beneath lintels supporting masonry.

- .4 Locate joints at 6000 mm centres maximum and at a maximum of 4000 mm from any corners, any other indication notwithstanding.

### **3.13 FIELD BENDING**

- .1 Do not field bend reinforcement and connectors 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 and connectors that develop cracks or splits.

### **3.14 ACCESSORIES**

- .1 Install spray-foam insulation: to Section 07 21 19 – Foam-in-Place Insulation, at gaps and penetrations to ensure continuity of air seal.
- .2 Install sealants: to Section 07 92 00 – Joint Sealants, at joints and penetrations to ensure continuity of weatherproofing and soundproofing.
- .3 Install other accessories as required for a complete installation of wall assemblies.

### **3.15 REPAIR/RESTORATION**

- .1 Upon completion of masonry, fill holes and cracks, remove loose mortar and repair defective work.

### **3.16 FIELD QUALITY CONTROL**

- .1 Field quality control inspections and testing: in accordance with the requirements of Division 01: Quality Control.
- .2 Allow access to scaffold and worksite as required to perform inspections and tests.
- .3 Have a qualified independent testing and inspecting agency perform field tests and inspections and prepare test reports as follows:
  - .1 Testing Frequency: One set of tests for each 450 m<sup>2</sup> (5000 ft<sup>2</sup>) of wall area or portion remaining.
  - .2 Concrete masonry units will be sampled and tested by independent testing agency in accordance with CSA S304.1.
  - .3 Mortar and Test (Proportion Specification): For each mix provided, in accordance with CSA A179 for mortar air content and compressive strength.
  - .4 Prism Test: For each type of construction provided, in accordance with CSA A179 at 7 days and at 28 days.
  - .5 Concrete Cylinder Tests at 7 days and at 28 days.

**3.17 CLEANING - CONCRETE MASONRY UNIT**

- .1 Progress Cleaning: Allow mortar droppings on masonry to partially dry then remove by means of trowel, followed by rubbing lightly with small piece of block. Clean wall surface with suitable brush or burlap.

**3.18 PROJECT CLEANING - GENERAL**

- .1 Progress Cleaning: clean in accordance with Division 01: Cleaning. Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Division 01: Cleaning. Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .3 Manage and dispose of demolition and construction waste materials in accordance with Division 01: Construction/Demolition Waste Management and Disposal.

**3.19 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by Work of this Section.

**END OF SECTION**