

Approved: 2017-04-25

**Part 1            General**

- .1    Section 01 33 00 – Submittal Procedures
- .2    Section 04 05 00 – Common Work Results for Masonry
- .3    Section 04 05 13 – Masonry Mortar and Grouting
- .4    Section 04 05 19 – Masonry Anchorage and Reinforcing
- .5    Section 04 05 23 – Masonry Accessories

**1.2                REFERENCE STANDARDS**

- .1    CSA Group
  - .1    CAN/CSA-A165 Series, CSA Standards on Concrete Masonry Units (Consists of A165.1, A165.2 and A165.3).
  - .2    CAN/CSA-A179, Mortar and Grout for Unit Masonry.
  - .3    CAN/CSA-A371, Masonry Construction for Buildings.
- .2    International Masonry Industry All-Weather Council (IMIAC)
  - .1    Recommended Practices and Guide Specification for Cold Weather Masonry Construction.

**1.3                ADMINISTRATIVE REQUIREMENTS**

- .1    Pre-installation meetings: comply with Section 01 31 19- Project Meetings. Conduct pre-installation meeting one week prior to commencing work of this Section to:
  - .1    Verify project requirements, including mock-up requirements.
  - .2    Verify substrate conditions.
  - .3    Co-ordinate products, installation methods and techniques.
  - .4    Sequence work of related sections.
  - .5    Co-ordinate with other building subtrades.
  - .6    Review manufacturer's installation instructions.
  - .7    Review masonry cutting operations, methods and tools and determine worker safety and protection from dust during cutting operations.
  - .8    Review warranty requirements.
- .2    Sequencing: sequence with other work in accordance with Section 01 32 16.06- Construction Progress Schedule - Critical Path Method (CPM). Comply with manufacturer's written recommendations for sequencing construction operations.
- .3    Scheduling: schedule with other work in accordance Section 01 32 16.06- Construction Progress Schedule - Critical Path Method (CPM).

**1.4                ACTION AND INFORMATIONAL SUBMITTALS**

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

- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for masonry and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Saskatchewan, Canada.
  - .2 Submit shop drawings detailing temporary bracing required, designed to resist wind pressure and lateral forces during installation.
- .4 Samples:
  - .1 Provide samples as follows:
    - .1 2 of each type of concrete and brick masonry unit specified, including special shapes, supplemented with specific requirements in Sections.
    - .2 2 cured, coloured samples of mortar, illustrating mortar colour and colour range, supplemented with specific requirements in Section 04 05 13- Masonry Mortar and Grout.
    - .3 2 of each type of masonry accessory and flashing specified, supplemented by specific requirements in Section 04 05 23- Masonry Accessories.
    - .4 2 of each type of masonry anchorage, reinforcement and connector proposed for use, supplemented by specific requirements in Section 04 05 19- Masonry Anchorage and Reinforcing.
    - .5 Samples: used for testing and when accepted become standard for material used.
- .5 Certificates: submit manufacturer's product certificates certifying materials comply with specified requirements.
- .6 Test and Evaluation Reports:
  - .1 Submit certified test reports in accordance with Section 01 29 83- Payment Procedures for Testing Laboratory Services.
  - .2 Test reports to certify compliance of masonry units and mortar ingredients with specified performance characteristics and physical properties.
  - .3 Submit data for masonry units, in addition to requirements set out in referenced CSA and ASTM Standards, indicating initial rates of absorption.
- .7 Installer Instructions: provide manufacturer's installation instructions, including storage, handling, and safety and cleaning.
- .8 Manufacturer's Reports: provide written reports prepared by manufacturer's on-site personnel to include:
  - .1 Verification of compliance of work with Contract.
  - .2 Site visit reports providing detailed review of installation of work, and installed work.
- .9 Sustainable Design Submittals:

- .1 Construction Waste Management:
  - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.

### **1.5 CLOSEOUT SUBMITTALS**

- .1 Submit manufacturer's instructions for care, cleaning and maintenance of prefaced masonry units for incorporation into manual specified in Section 01 78 00- Closeout Submittals.

### **1.6 EXTRA MATERIALS**

- .1 Submit manufacturer's instructions in accordance with Section 01 78 00- Closeout Submittals covering maintenance requirements and parts catalogue, with cuts and identifying numbers.

### **1.7 QUALITY ASSURANCE**

- .1 Mock-ups:
  - .1 Construct mock-ups in accordance with Section 01 45 00- Quality Control.
  - .2 Construct mock-up panel of exterior masonry wall construction 1200 x 1800 mm showing masonry colours and textures, use of reinforcement, ties, through-wall flashing, weep holes, jointing, pointing, coursing, mortar and quality of work.
  - .3 Mock-up used:
    - .1 To judge quality of work, substrate preparation, operation of equipment and material application.
    - .2 For testing to determine compliance with performance requirements. Perform following tests.
      - .1 For clay units, in addition to requirements set out in referenced CSA and ASTM Standards include data indicating initial rate of absorption.
  - .4 Construct mock-up where directed by Departmental Representative.
  - .5 Allow 72 hours for inspection of mock-up by Departmental Representative before proceeding with work.
  - .6 When accepted by Departmental Representative, mock-up to demonstrate minimum standard for this work. Mock-up may not remain as part of finished work.
  - .7 Start work only upon receipt of written approval of mock-up by Departmental Representative.

### **1.8 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 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 and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Store and protect material packages from nicks, scratches, and blemishes.
- .3 Keep materials dry until use except where wetting of bricks is specified.
- .4 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.
- .5 Replace defective or damaged materials with new.

## **1.9 SITE CONDITIONS**

- .1 Ambient Conditions: assemble and erect components when temperatures are above 4 degrees C.
- .2 Weather Requirements: to CAN/CSA-A371.
- .3 Cold weather requirements:
  - .1 To CAN/CSA-A371 with following requirements.
    - .1 Maintain temperature of mortar between 5 degrees C and 50 degrees C until batch is used or becomes stable.
    - .2 Maintain ambient temperature of masonry work and its constituent materials between 5 degrees C and 50 degrees C and protect site from wind chill.
    - .3 Maintain temperature of masonry above 0 degrees C for minimum of 28 days, after mortar is installed.
    - .4 Preheat unheated wall sections in enclosure for minimum 72 hours above 10 degrees C, before applying mortar.
  - .2 Hot weather requirements:
    - .1 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.
    - .2 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until masonry work is completed and protected by flashings or other permanent construction.
  - .3 Spray mortar surface at intervals and keep moist for maximum of 3 days after installation.

## **1.10 WARRANTY**

- .1 For Work in this Section 04 05 00- Common Work Results for Masonry.

## **Part 2 Execution**

### **2.1 INSTALLERS**

- .1 Experienced and qualified masons to carry out erection, assembly and installation of masonry work.

## 2.2 EXAMINATION

- .1 Examine conditions, substrates and work to receive work of this Section.
  - .1 Co-ordinate with Section 01 71 00- Examination and Preparation.
- .2 Examine openings to receive masonry units. Verify opening size, location, and that opening is square and plumb, and ready to receive work of this Section.
  - .1 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .2 Proceed with installation after unacceptable conditions have been remedied and after receipt of written approval from Departmental Representative.
- .3 Verification of Conditions:
  - .1 Verify that:
    - .1 Substrate conditions which have been previously installed under other sections or contracts are acceptable for product installation in accordance with manufacturer's instructions prior to installation of concrete block.
    - .2 Site conditions are acceptable and are ready to receive work.
    - .3 Built-in items are in proper location, and ready for roughing into masonry work.
  - .2 Commencing installation means acceptance of existing substrates.

## 2.3 PREPARATION

- .1 Surface Preparation: prepare surface in accordance with manufacturer's written recommendations and co-ordinate with Section 01 71 00- Examination and Preparation.
- .2 Establish and protect lines, levels, and coursing.
- .3 Protect adjacent materials from damage and disfiguration.

## 2.4 INSTALLATION

- .1 Do masonry work in accordance with CAN/CSA-A371 except where specified otherwise.
- .2 Build masonry plumb, level, and true to line, with vertical joints in alignment, respecting construction tolerances permitted by CAN/CSA-A371.
- .3 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

## 2.5 CONSTRUCTION

- .1 Exposed masonry:
  - .1 Remove chipped, cracked, and otherwise damaged units, in accordance with CAN/CSA-A165, in exposed masonry and replace with undamaged units.
- .2 Jointing:
  - .1 Allow joints to set just enough to remove excess water, and then tool with round jointer to provide smooth, joints true to line, compressed, uniformly concave joints where concave joints are indicated.

- .2 Allow joints to set just enough to remove excess water, and then rake joints uniformly to 6 mm depth and compress with square tool to provide smooth, compressed, raked joints of uniform depth where raked joints are indicated.
- .3 Strike flush joints concealed in walls and joints in walls to receive plaster, tile, insulation, or other applied material except paint or similar thin finish coating.
- .3 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.
- .4 Building-In:
  - .1 Build in items required built into masonry.
  - .2 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.
  - .3 Brace door jambs to maintain plumb. Fill spaces between jambs and masonry with mortar.
- .5 Wetting of bricks:
  - .1 Except in cold weather, wet bricks having initial rate of absorption exceeding 1 g/minute/1000 mm<sup>2</sup>: wet to uniform degree of saturation, 3 to 24 hours before laying, and do not lay until surface dry.
  - .2 Wet tops of walls built of bricks qualifying for wetting, when recommencing work on such walls.
- .6 Support of loads:
  - .1 Use Masonry Concrete Fill, where concrete fill is used instead of solid units.03 30 00- Cast-in-Place Concrete
  - .2 Use grout to CAN/CSA-A179 where grout is used instead of solid units.
  - .3 Install building paper below voids to be filled with grout; keep paper 25 mm back from faces of units.
- .7 Provision for movement:
  - .1 Leave 3 mm space below shelf angles.
  - .2 Leave 6 mm space between top of non-load bearing walls and partitions and structural elements. Do not use wedges.
  - .3 Built masonry to tie in with stabilizers, with provision for vertical movement.
- .8 Loose steel lintels:
  - .1 Install loose steel lintels. Center over opening width.
- .9 Control joints:
  - .1 Construct continuous control joints as indicated.
- .10 Movement joints:
  - .1 Build-in continuous movement joints as indicated.
- .11 Interface with other work:

- .1 Cut openings in existing work as indicated.
- .2 Openings in walls: approved by Departmental Representative.
- .3 Make good existing work. Use materials to match existing.

## **2.6 SITE TOLERANCES**

- .1 Tolerances in notes to CAN/CSA-A371 apply.

## **2.7 SITE QUALITY CONTROL**

- .1 Site Tests, Inspection:
  - .1 Perform site inspection and testing in accordance with Section 01 45 00- Quality Control.
  - .2 Notify inspection agency minimum of 48 hours in advance of requirement for tests.
- .2 Manufacturer's Services:
  - .1 Have manufacturer of products supplied under this Section review work involved in handling, installation/application, and protection of its products, and submit written reports in acceptable format to verify compliance of work with Contract.
  - .2 Manufacturer's site services: provide manufacturer's site services, consisting of product use recommendations and periodic site visits for inspection of product installation, in accordance with manufacturer's instructions.
  - .3 Schedule site visits to review work as installation is about to begin.
  - .4 Schedule site visits to review work at stages listed:
    - .1 After delivery and storage of products, and when preparatory work on which work of this Section depends is complete, but before installation begins.
    - .2 Twice during progress of work at 25% and 60% complete.
    - .3 Upon completion of work, after cleaning is carried out.
  - .5 Obtain reports within 3 days of review and submit immediately to Departmental Representative.

## **2.8 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.
  - .1 Leave Work area clean at end of each day.

## **2.9 PROTECTION**

- .1 Temporary Bracing:
  - .1 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.
  - .2 Bracing approved by Departmental Representative.
  - .3 Brace masonry walls as necessary to resist wind pressure and lateral forces during construction.

- .2 Moisture Protection:
  - .1 Keep masonry dry using waterproof, non staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until completed and protected by flashing or other permanent construction.
  - .2 Cover completed and partially completed work not enclosed or sheltered with waterproof covering at end of each work day. Anchor securely in position.
  - .3 Air Temperature Protection: protect completed masonry as recommended in 1.9, SITE CONDITIONS.

**END OF SECTION**

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**Part 1 General**

**1.1 RELATED WORK**

- .1 Section 04 05 00 Common Work Results for Masonry
- .2 Section 04 05 19 Masonry Reinforcement and Connectors
- .3 Section 04 05 13 Natural Stone Veneer.

**1.2 REFERENCE STANDARDS**

- .1 CSA Group
  - .1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
  - .2 CAN/CSA-A179, Mortar and Grout for Unit Masonry.
  - .3 CAN/CSA-A371, Masonry Construction for Buildings.
  - .4 CAN/CSA-A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
- .2 International Masonry Industry All-Weather Council (IMIAC)
  - .1 Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.
- .3 South Coast Air Quality Management District (SCAQMD)
  - .1 SCAQMD Rule 1168, Adhesive and Sealant Applications.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for masonry mortar and grout and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section-01 47 15-Health and Safety Requirements. Indicate VOC's mortar, grout, parging, colour additives and admixtures. Expressed as grams per litre (g/L).
- .3 Samples:
  - .1 Samples: submit unit samples in accordance with Section 04 05 00- Common Work Results for Masonry, supplemented as follows:
    - .1 Submit samples, prior to mixing or preparation of mortars, to Departmental Representative of:
      - .1 Aggregate: course aggregate and sand.
      - .2 Cement.
      - .3 Lime.
      - .4 Colour pigment samples.

- .4 Manufacturers' Instructions: submit manufacturer's installation instructions.

#### **1.4 QUALITY ASSURANCE**

- .1 Test Reports: submit certified test reports including sand gradation tests in accordance with CAN/CSA-A179 showing compliance with specified performance characteristics and physical properties, and in accordance with Section 04 05 00- Common Work Results for Masonry.
- .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Mock-ups:
  - .1 Construct mock-ups in accordance with Section 01 45 00- Quality Control and requirements of Section 04 05 00- Common Work Results for Masonry.

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

- .1 Deliver, store and handle materials in accordance with Section 01 61 00- Common Product Requirements.
- .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 in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.

#### **1.6 SITE CONDITIONS**

- .1 Ambient Conditions: maintain materials and surrounding air temperature to:
  - .1 Minimum 10 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 Weather Requirements: CAN/CSA-A371.

### **Part 2 Products**

#### **2.1 MATERIALS**

- .1 Use same brands of materials and source of aggregate for entire project.
- .2 Cement:
  - .1 Portland Cement: to CAN/CSA-A3000, Type GU - General use hydraulic cement (Type 10).
  - .2 Masonry Cement: to CAN/CSA-A3002 and CAN/CSA-A179, Type S.
  - .3 Mortar Cement: to CAN/CSA-A3002 and CAN/CSA-A179, Type S.
- .3 Aggregate: supplied by one supplier.
  - .1 Fine Aggregate: to CAN/CSA-A179, natural sand.

- .2 Course Aggregate: to CAN/CSA-A179.
- .4 Water: clean and potable.
- .5 Lime:
  - .1 Quick Lime: to CAN/CSA-A179, Type S.
  - .2 Hydrated Lime: to CAN/CSA-A179, Type S.
- .6 Bonding Agent: latex type.
- .7 Polymer Latex: organic polymer latex admixture of butadiene-styrene type non-emulsifiable bonding admixture.

## **2.2 MORTAR MIXES**

- .1 Mortar for exterior masonry above grade:
  - .1 Load Bearing: type S based on property specifications.
  - .2 Non-Load Bearing: S based on property specifications.
- .2 Mortar for interior masonry:
  - .1 Load Bearing: type S based on property specifications.
  - .2 Non-Load Bearing: O based on property specifications.
- .3 Mortar for Parapet walls, chimneys, unprotected walls: type S based on property specifications, CAN/CSA-A179.
- .4 Pointing Mortar: CAN/CSA-A179, Type S using property specification with maximum 2 percent ammonium stearate or calcium stearate per cement weight.
- .5 Stain Resistant Pointing Mortar: one part Portland cement, 1/8 part hydrated lime, and two parts graded (80 mesh) aggregate, proportioned by volume. Add aluminum tristearate, calcium stearate, or ammonium stearate to 2 percent of Portland cement by weight.
- .6 Parging Mortar: type S to CAN/CSA-A179
- .7 Mortar for foundation walls, manholes, sewers, pavements, walks, patios and other exterior masonry at or below grade: type M based on proportion specifications, CAN/CSA-A179.
- .8 Following applies regardless of mortar types and uses specified above:
  - .1 Mortar for calcium silicate brick and concrete brick: type O based on proportion specifications.
  - .2 Mortar for stonework: type N based on property specifications.
  - .3 Mortar for grouted reinforced masonry: type S based on property specifications.

## **2.3 MORTAR MIXING**

- .1 Use pre-blended, pre-coloured mortar prepackaged under controlled factory conditions. Ingredients batching limitations to within 1% accuracy.
- .2 Mix mortar ingredients in accordance with CAN/CSA-A179 in quantities needed for immediate use.
- .3 Maintain sand uniformly damp immediately before mixing process.

- .4 Add mortar colour and admixtures in accordance with manufacturer's instructions. Provide uniformity of mix and colouration.
- .5 Using anti-freeze compounds including calcium chloride or chloride based compounds is prohibited.
- .6 Adding air entraining admixture to mortar mix is prohibited.
- .7 Use a batch type mixer in accordance with CAN/CSA-A179.
- .8 Pointing mortar: prehydrate 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.
- .9 Re-temper mortar only within two hours of mixing, when water is lost by evaporation.
- .10 Use mortar within 2 hours after mixing at temperatures of 32 degrees C, or 2-1/2 hours at temperatures under 10 degrees C.

#### **2.4 GROUT MIXES**

- .1 Bond Beams: grout mix 20 MPa strength at 28 days; 200-250mm slump; mixed in accordance with CAN/CSA-A179 fine grout.
- .2 Lintels: grout mix 20 MPa strength at 28 days; 200-250 mm slump mixed in accordance with CAN/CSA-A179 fine grout.
- .3 Grout: Minimum compressive strength of 20 MPa at 28 days. Maximum aggregate size and grout slump: CAN/CSA-A179.

#### **2.5 GROUT MIXING**

- .1 Mix batched and delivered grout in accordance with CSA A23.1/A23.2 transit mixed.
- .2 Mix grout ingredients in quantities needed for immediate use in accordance with CAN/CSA-A179 fine grout.
- .3 Add admixtures in accordance with manufacturer's instructions; mix uniformly.
- .4 Using calcium chloride or chloride based admixtures is prohibited.

#### **2.6 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, for mortar based on property specification. Test prior to 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, grout based on property specification. Test prior to construction for:
  - .1 Compressive strength.
  - .2 Sand/cement ratio.
  - .3 Water content and water/cement ratio.
  - .4 Slump.

### **Part 3 Execution**

#### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for masonry installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

#### **3.2 PREPARATION**

- .1 Apply bonding agent to existing concrete surfaces.
- .2 Plug clean-out holes with block masonry unit. Brace masonry for wet grout pressure.

#### **3.3 CONSTRUCTION**

- .1 Do masonry mortar and grout work in accordance with CAN/CSA-A179 except where specified otherwise.
- .2 Apply parging in uniform coating not less than 10 total mm thick, where indicated.

#### **3.4 MIXING**

- .1 Pointing mortar can be mixed using a regular paddle mixer. Only electric motor mixers are permissible. Mixers run on hydrocarbons are not permitted, due to fumes.
- .2 Clean mixing boards and mechanical mixing machine between batches.
- .3 Mortar: weaker than units it is binding.
- .4 Contractor to appoint one individual to mix mortar, for duration of project. In event that this individual is changed, mortar mixing must cease until new individual is trained, and mortar mix is tested.

#### **3.5 MORTAR PLACEMENT**

- .1 Install mortar to requirements of CAN/CSA-A179.
- .2 Remove excess mortar from grout spaces.

### **3.6 GROUT PLACEMENT**

- .1 Install grout in accordance with CAN/CSA-A179.
- .2 Work grout into masonry cores and cavities to eliminate voids.
- .3 Installing grout in lifts greater than 400 mm, without consolidating grout by rodding is prohibited.
- .4 Displacing reinforcement while placing grout is prohibited.

### **3.7 FIELD QUALITY CONTROL**

- .1 Site Tests, Inspection: in accordance with Section 04 05 00- Common Work Results for Masonry supplemented as follows:
  - .1 Test and evaluate mortar prior to construction in accordance with CAN/CSA-A179.
  - .2 Test and evaluate grout prior to construction to CAN/CSA-A179; test in conjunction with masonry unit sections specified.

### **3.8 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Remove droppings and splashing using clean sponge and water.
- .3 Clean masonry with low pressure clean water and soft natural bristle brush.
- .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11- Cleaning.

### **3.9 PROTECTION**

- .1 Cover completed and partially completed work not enclosed or sheltered with waterproof covering at end of each work day. Anchor securely in position.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 01 33 00: Submittal Procedures
- .2 Section 04 05 00: Common Work Results for Masonry
- .3 Section 04 05 12: Masonry Mortar and Grout
- .4 Section 07 24 00: Exterior Insulation and Finish System
- .5 Section 04 05 23: Masonry Accessories
- .6 Section 04 21 13: Brick Masonry
- .7 Section 04 22 00: Concrete Unit Masonry

**1.2 REFERENCE STANDARDS**

- .1 American Society for Testing and Materials (ASTM)
  - .1 ASTM A36/A36M, Standard Specification for Carbon Structural Steel.
  - .2 ASTM A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
  - .3 ASTM A307, Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
  - .4 ASTM A580/A580M, Standard Specification for Stainless Steel Wire.
  - .5 ASTM A641/A641M, Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
  - .6 ASTM A666, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
  - .7 ASTM A1022, Standard Specification for Deformed and Plain Stainless Steel Wire and Welded Wire for Concrete Reinforcement.
- .2 Canadian Standards Association (CSA)
  - .1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
  - .2 CAN/CSA-A179, Mortar and Grout for Unit Masonry.
  - .3 CAN/CSA-A370, Connectors for Masonry.
  - .4 CAN/CSA-A371, Masonry Construction for Buildings.
  - .5 CSA G30.18, Carbon Steel Bars for Concrete Reinforcement.
  - .6 CSA S304, Design of Masonry Structures.
  - .7 CSA W186, Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .3 Reinforcing Steel Institute of Canada (RSIC)
  - .1 Reinforcing Steel Manual of Standard Practice.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for anchorage and reinforcing materials and include product characteristics, performance criteria, physical size, finish and limitations.

- .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06- Health and Safety Requirements.
- .3 Shop Drawings:
  - .1 Submit drawings detailing bar bending details, anchorage details lists and placement drawings
  - .2 On placement drawings, indicate sizes, spacing, location and quantities of reinforcement and connectors.
- .4 Manufacturers' Instructions: submit manufacturer's installation instructions.

#### **1.4 QUALITY ASSURANCE**

- .1 Test Reports: showing compliance with specified performance characteristics and physical properties, and in accordance with Section 04 05 00- Common Work Results for Masonry.
- .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Mock-ups:
  - .1 Construct mock-ups in accordance with Section 01 45 00- Quality Control and requirements of Section 04 05 00- Common Work Results for Masonry.

#### **1.5 SITE MEASUREMENTS**

- .1 Make site measurements necessary for proper fit of members.

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

- .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions and 01 61 00- Common Product Requirements.
- .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 in dry location, off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect anchorage and reinforcing materials from nicks, scratches, stain and blemishes.
  - .3 Replace defective or damaged materials with new.

### **Part 2 Products**

#### **2.1 MATERIALS**

- .1 Bar reinforcement: Steel to CAN/CSA-A371 and CSA G30.18, Grade 400W Connectors: to CAN/CSA-A370 and CSA S304.1.
- .2 Fasteners: installed post-construction:
  - .1 Screw Shields and Plugs: plastic, install in mortar joints.
- .3 Ties: hot dip galvanized to CAN/CSA-A370 Table 5.2 steel finish.
  - .1 Unit ties, to CAN/CSA-A370: rectangular], fabricated from cold-drawn steel, size to suit application.

- .2 Adjustable Unit Ties: to CAN/CSA-A370: proprietary type ties, type, style and size to suit application in accordance with manufacturer's recommendations.
- .3 Joint Reinforcement Ties: CSA A371 with corrosion protection to CSA S304 and CSA A370:
  - .1 Ladder type: to ASTM A82, steel 4.8 mm side and cross rods.
- .4 Anchors: to CAN/CSA-A370:
  - .1 Conventional Anchors: plate anchors, steel bolts with bent bar anchors, through bolts, sized to suit application.
  - .2 Wedge Anchors: expansion anchors sized to suit application.
  - .3 Dovetail Anchors: bent steel strap, 3.2 mm thick x 30 mm wide.
  - .4 Stone Anchors: series 300 stainless steel conforming to ASTM A666. Anchors manufactured according to drawings.
- .5 Cartridge Injection Adhesive Anchors: Threaded steel rod, inserts or reinforcing dowels, complete with nuts, washers, polymer or hybrid mortar adhesive injection system, and manufacturer's installation instructions. Type and size as indicated on Drawings.

## **2.2 FABRICATION**

- .1 Fabricate reinforcing in accordance with CSA A23.1/A23.2 and Reinforcing Steel Manual of Standard Practice by Reinforcing Steel Institute of Canada.
- .2 Fabricate connectors in accordance with CAN/CSA-A370.
- .3 Obtain Departmental Representative's approval for locations of reinforcement splices other than shown on placing drawings.
- .4 Upon approval of Departmental Representative, weld reinforcement in accordance with CSA W186.
- .5 Ship reinforcement and connectors, clearly identified in accordance with drawings.

## **2.3 SOURCE QUALITY CONTROL**

- .1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcement steel and connectors, showing physical and chemical analysis, minimum 5 weeks prior to commencing reinforcement work.
- .2 Upon request inform Departmental Representative of proposed source of supplied material.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for anchorage and reinforcing materials installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions remedied and after receipt of written approval to proceed from Departmental Representative.

### **3.2 PREPARATION**

- .1 Direct and coordinate placement of metal anchors for masonry supplied to other Sections.

### **3.3 INSTALLATION**

- .1 Supply and install masonry connectors and reinforcement in accordance with CAN/CSA-A370, CAN/CSA-A371, CSA A23.1/A23.2 and CSA S304.1 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 to masonry as indicated.

### **3.4 BONDING AND TYING**

- .1 Bond walls of two or more wythes using metal connectors in accordance with CSA S304.1, CAN/CSA-A371 and as indicated.
- .2 Tie masonry veneer to backing in accordance with National Building Code of Canada (NBC), CSA S304.1, and CAN/CSA-A371 and as indicated.
- .3 Install unit, adjustable, single wythe and multiple wythe joint reinforcement where indicated and in accordance with CAN/CSA-A370 and CAN/CSA-A371 and manufacturer's instructions.
  - .1 Bond walls of two or more wythes using metal connectors in accordance with CAN/CSA-A371 and as indicated.
  - .2 Install horizontal joint reinforcement 400 mm on centre.
  - .3 Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 400 mm each side of opening.
  - .4 Place joint reinforcement continuous in first and second joint below top of walls.
  - .5 Lap joint reinforcement ends minimum 2 cross wire locations.
  - .6 Connect stack bonded unit joint corners and intersections with strap anchors 400 mm on centre.

### **3.5 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 S304.1, CAN/CSA-A371, and CAN/CSA-A179.
- .3 Support and position reinforcing bars in accordance with CAN/CSA-A371.

### **3.6 GROUTING**

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

### **3.7 ANCHORS**

- .1 Supply and install metal anchors in accordance with CAN/CSA-A370 and CAN/CSA-A371 as indicated.

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

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

**3.9 MOVEMENT JOINTS**

- .1 Reinforcement not continuous across movement joints unless otherwise indicated.

**3.10 FIELD BENDING**

- .1 Do not field bend reinforcement and connectors except where indicated or authorized by Departmental Representative.
- .2 When field bending authorized, bend without heat, applying slow and steady pressure.
- .3 Replace bars and connectors with cracks or splits.

**3.11 FIELD QUALITY CONTROL**

- .1 Site inspections in accordance with Section 04 05 00- Common Work Results for Masonry.
- .2 Obtain Departmental Representative approval of placement of reinforcement and connectors, prior to placing grout or mortar.

**3.12 FIELD TOUCH-UP**

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

**3.13 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00- Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00- Cleaning.
- .3 Waste Management: separate waste materials for recycling and reuse in accordance with Section 01 74 19- Waste Management.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCE STANDARDS**

- .1 ASTM International
  - .1 ASTM D2240, Standard Test Method for Rubber Property - Durometer Hardness.
- .2 CSA Group
  - .1 CAN/CSA-A371, Masonry Construction for Buildings.
- .3 International Organization for Standardization (ISO)
  - .1 ISO 14021, Environmental Labels and Declarations - Self Declared Environmental Claims (Type II Environmental Labelling).
- .4 South Coast Air Quality Management District (SCAQMD)
  - .1 SCAQMD Rule 1168, Adhesive and Sealant Applications.

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for masonry accessories and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Saskatchewan, Canada.
  - .2 Indicate on drawings:
    - .1 Flashing, installation details, sizes, spacing, location and quantities of fasteners.

**1.3 QUALITY ASSURANCE**

- .1 Test Reports: submit certified test reports including sand gradation tests in accordance with CAN/CSA-A179 showing compliance with specified performance characteristics and physical properties, and in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Manufacturer's Instructions: submit manufacturer's instructions.

**1.4 SITE MEASUREMENTS**

- .1 Make site measurements necessary to ensure proper fit of members.

**1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements 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 in dry location, off ground, indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect masonry accessories from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Control joint filler: purpose made elastomer to ASTM D2240 of size and shape indicated. Use low VOC products in compliance with SCAQMD Rule 1168.
- .2 Lap adhesive: recommended by masonry flashing manufacturer.
- .3 Mechanical fasteners: recommended by flashing manufacturer to suit project requirements.
- .4 Weep hole vents: galvanized steel

### **2.2 FLASHINGS**

- .1 Wall Base Flashing, 0.91 mm - same material as building flashings, refer to Section 05 50 00 – Metal Fabrication, factory pre-coat colour to be selected from manufacturer's standard range of colours
- .2 Lintel Flashing - Similar to wall base flashing except 0.61 mm thickness.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for masonry accessories installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions remedied and after receipt of written approval to proceed from Departmental Representative.

### **3.2 INSTALLATION: MATERIALS**

- .1 Install continuous movement joint fillers in movement joints at locations indicated on drawings.
- .2 Lap adhesive: apply adhesive to flashing lap joints.
- .3 Mechanical fasteners: install fasteners to suit application and in accordance with manufacturer's written installation instructions.
- .4 Reglets: install reglets at locations indicated on drawings.

- .5 Brick vents: install brick vents at locations indicated on drawings.

### **3.3 INSTALLATION: MOISTURE CONTROL**

- .1 Install weep hole vents in vertical joints immediately over flashings, in exterior wythes of cavity wall and masonry veneer wall construction, at maximum horizontal spacing of 600 mm on centre.
- .2 Mortar diverters: install purpose made diverters in cavities where indicated and as directed, size and shape to suit purpose and function.
- .3 Grout screens: install purpose made screens in cavities where indicated and as directed, size and shape to suit purpose and function.

### **3.4 INSTALLATION: FLASHINGS**

- .1 Build in flashings in masonry in accordance with CAN/CSA-A371.
  - .1 Install flashings under exterior masonry bearing on foundation walls, slabs, shelf angles, and steel angles over openings, and at base of cavity wall and where cavity interrupted by horizontal members or supports and as shown on drawings. Install flashings under weep hole courses and as indicated.
  - .2 In cavity walls and veneered walls, carry flashings from front edge of exterior masonry, under outer wythe, then up backing minimum 150 mm, and as follows:
    - .1 For masonry backing, embed or bond flashing 25 mm in joint.
    - .2 For concrete backing, insert or bond flashing into reglets.
    - .3 For wood frame backing, staple flashing to walls behind water resistive paper, and lap joints.
  - .3 Lap joints 150 mm and seal with adhesive.
- .2 Form flashing (end dams) at lintels, sills and wall ends to prevent water from travelling horizontally past flashing ends.
- .3 Install vertical flashing where outer veneer returns at window or door jambs, to prevent contact of veneer with inner wall.

### **3.5 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00- Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00- Cleaning.
- .3 Waste Management: separate waste materials for recycling and reuse in accordance with Section 01 74 19- Waste Management.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED SECTIONS**

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 04 05 00 – Common Work Results for Masonry
- .3 Section 04 05 13 – Masonry Mortar and Grouting
- .4 Section 04 05 19 – Masonry Anchorage and Reinforcing
- .5 Section 04 05 23 – Masonry Accessories

**1.2 REFERENCE STANDARDS**

- .1 ASTM International
  - .1 ASTM C73-10, Standard Specification for Calcium Silicate Brick (Sand-Lime Brick).
  - .2 ASTM C216-13, Standard Specification for, Facing Brick (Solid Masonry Units Made of Clay or Shale).
- .2 Brick Industry Association (BIA)
  - .1 Technical Note No. 20-2006, Cleaning Brick Work.
- .3 CSA Group
  - .1 CAN/CSA-A82-06(R2011), Fired Masonry Brick Made From Clay or Shale.
  - .2 CAN/CSA-A165 Series-04(R2009), CSA Standards on Concrete Masonry Units (Consists of A165.1, A165.2 and A165.3).
  - .3 CAN/CSA-A371-04(R2009), Masonry Construction for Buildings.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for brick masonry and include product characteristics, performance criteria, physical size, finish and limitations.

**1.4 QUALITY ASSURANCE**

- .1 Test Reports: showing compliance with specified performance characteristics and physical properties, and in accordance with Section 04 05 00- Common Work Results for Masonry.
- .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Mock-ups: Construct mock-ups in accordance with Section 01 45 00- Quality Control and requirements of Section 04 05 00- Common Work Results for Masonry.

- .1 Construct mock-up panel (1800 x 2400mm) of brick construction.

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

- .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions 01 61 00- Common Product Requirements.
- .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 in dry location, off ground, indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect brick masonry from nicks, scratches, mud splatters, staining and blemishes.
  - .3 Replace defective or damaged materials with new.

## **1.6 SITE CONDITIONS**

- .1 Ambient Conditions: assemble and erect components only when temperature is above 4°C (40°F).

## **Part 2 Products**

### **2.1 MANUFACTURED UNITS**

- .1 Face brick:
  - .1 Fired clay brick: to CAN/CSA-A82.
    - .1 Type: FBS
    - .2 Grade: EG.
    - .3 Size: Engineer Modular (site confirmed to match the surrounding building)
    - .4 Colour, pattern and texture: as selected by the Departmental Representative to match existing, from manufacturer's selection of options.
    - .5 Minimum compressive strength for individual brick: 2,500 psi
  - .2 Reinforcement:
    - .1 Reinforcement in accordance with Section 04 05 19- Masonry Anchorage and Reinforcing.
  - .3 Connectors:
    - .1 Connectors in accordance with Section 04 05 19- Masonry Anchorage and Reinforcing.
  - .4 Flashings:
    - .1 Flashing: in accordance with Section 04 05 23- Masonry Accessories.
  - .5 Mortar Mixes:

- .1 Mortar and mortar mixes in accordance with Section 04 05 13- Masonry Mortar and Grouting.
- .6 Grout Mixes:
  - .1 Grout and grout mixes in accordance with Section 04 05 13- Masonry Mortar and Grouting.
- .7 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.
  - .3 Cleaning compounds compatible with brick masonry units and in accordance with manufacturer's written recommendations and instructions.

### **Part 3 Execution**

#### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for brick masonry installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

#### **3.2 PREPARATION**

- .1 Protect adjacent finished materials from damage due to masonry work.

#### **3.3 INSTALLATION**

- .1 Construction to conform to CAN/CSA-A371.
- .2 Bond: Stretcher Bond / Running Bond (site confirmed to match the surrounding building).
- .3 Coursing height: 200 mm for two bricks and two joints (site confirmed to match the surrounding building).
- .4 Jointing: concave where exposed or where paint or similar thin finish coating is specified.
  - .1 Mixing and blending: mix units within each pallet and with other pallets to ensure uniform blend of colour and texture.
  - .2 Clean unglazed clay masonry as work progresses.
  - .3 Reinforcement:
    - .1 Install reinforcing in accordance with Section 04 05 19- Masonry Anchorage and Reinforcing.

- .4 Connectors:
  - .1 Install connectors in accordance with Section 04 05 19- Masonry Anchorage and Reinforcing.
- .5 Flashings:
  - .1 Install flashings in accordance with Section 04 05 23- Masonry Accessories.
- .6 Mortar Placement:
  - .1 Place mortar in accordance with Section 04 05 13- Masonry Mortar and Grouting.
- .7 Grout Placement:
  - .1 Place grout in accordance with Section 04 05 13- Masonry Mortar and Grouting.
- .8 Repair/Restoration:
  - .1 Upon completion of masonry, fill holes and cracks, remove loose mortar and repair defective work.
- .9 Field Quality Control:
  - .1 Site Tests, Inspection: in accordance with Section 04 05 00- Common Work Results for Masonry.
  - .2 Manufacturer's Field Services: in accordance with Section 04 05 00- Common Work Results for Masonry.
- .10 Tolerances:
  - .1 To CAN/CSA-A371 unless noted below.

### **3.4 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00- Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.
- .3 Clean unglazed masonry with stiff brush and clear water. If cleaning by water does not produce satisfactory results, apply cleaning agent to sample wall area of 10 sqm. in the location acceptable to the Departmental Representative. Do not proceed with cleaning until sample area is acceptable to the Departmental Representative. If no harmful effects appear and after mortar has set and cured, protect windows, sills, doors, trim and other work, and clean brick masonry as follows.
  - .1 Remove large particles with wood paddles without damaging surface. Saturate masonry with clean water and flush off loose mortar and dirt.
  - .2 Scrub with solution of 25 ml trisodium phosphate and 25 ml household detergent dissolved in 1 L of clean water using stiff fibre brushes, then clean off immediately with clean water using hose. Alternatively, use proprietary compound recommended by brick masonry manufacturer in accordance with manufacturer's directions.
  - .3 Repeat cleaning process as often as necessary to remove mortar and other stains.

- .4 Use acid solution treatment for difficult to clean masonry as described in Technical Note No.20 by the Brick Industry Association.
- .5 Follow manufacturer's recommendations for use of cleaning agents
- .4 Clean concrete brick masonry as work progresses.
  - .1 Allow mortar droppings on masonry to partially dry then remove by means of trowel, followed by rubbing lightly with small piece of brick and finally by brushing.
- .5 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00- Cleaning.
- .6 Waste Management: separate waste materials for recycling and reuse in accordance with Section 01 74 19- Waste Management.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### **3.5**

#### **PROTECTION**

- .1 Brace and protect brick masonry in accordance with Section 04 05 00- Common Work Results for Masonry.

**END OF SECTION**

**Part 1      General**

**1.1          REFERENCE STANDARDS**

- .1      ASTM International
  - .1          ASTM E336, Standard Test Method for Measurement of Airborne Sound Attenuation Between Rooms in Buildings.
- .2      CSA Group
  - .1          CAN/CSA-A165 Series, CSA Standards on Concrete Masonry Units.
  - .2          CAN/CSA-A371, Masonry Construction for Buildings.
  - .3          CSA S304.1, Design of Masonry Structures.
- .3      National Research Council Canada (NRC)
  - .1          National Building Code of Canada 2015 (NBC).
- .4      South Coast Air Quality Management District (SCAQMD)
  - .1          SCAQMD Rule 1168, Adhesive and Sealant Applications.
- .5      Underwriters Laboratories of Canada (ULC)
  - .1          CAN/ULC-S101, Standard Methods of Fire Endurance Tests of Building Construction and Materials.

**1.2          ACTION AND INFORMATIONAL SUBMITTALS**

- .1      Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2      Product Data:
  - .1          Submit manufacturer's instructions, printed product literature and data sheets for concrete masonry units and include product characteristics, performance criteria, physical size, finish and limitations.
- .3      Sustainable Design Submittals:
  - .1          Construction Waste Management:
    - .1              Submit project Waste Management Plan and Waste Reduction Workplan highlighting recycling and salvage requirements.
    - .2              Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 75 % of construction wastes were recycled or salvaged.
  - .2          Recycled Content:
    - .1              Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-industrial content, and total cost of materials for project.

**1.3          QUALITY ASSURANCE**

- .1      Test Reports: submit certified test reports in accordance with CAN/CSA-A179 showing compliance with specified performance characteristics and physical properties, and in accordance with Section 04 05 00- Common Work Results for Masonry.

- .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Mock-ups:
  - .1 Construct mock-ups in accordance with Section 01 45 00- Quality Control and requirements of Section 04 05 00- Common Work Results for Masonry. Supplemented as follows:
    - .1 Construct mock-up panel of concrete unit masonry construction 1200 x 1800 mm.

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

- .1 Deliver, store and handle materials in accordance with Section 01 61 00- Common Product Requirements 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.
  - .1 Offload concrete unit masonry packages using equipment that will not damage the surfaces.
  - .2 Do not use brick tongs to move or handle masonry.
- .3 Storage and Handling Requirements:
  - .1 Store materials indoors, off ground, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Do not double stack cubes of concrete unit masonry.
  - .3 Cover masonry units with non-staining waterproof membrane covering.
  - .4 Allow air circulation around units.
  - .5 Installation of wet or stained masonry units is prohibited.
  - .6 Keep concrete unit masonry in individual cardboard packaging provided by manufacturer until units are ready to be installed.
  - .7 Store and protect concrete unit masonry from nicks, scratches, and blemishes.
  - .8 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan and Waste Reduction Workplan related to Work of this Section.
- .5 Packaging Waste Management: remove for reuse by manufacturer and return of pallets, crates, packaging materials padding, as specified in Waste Reduction Workplan and Construction Waste Management Plan in accordance with Section 01 74 19- Waste Management and Disposal.

### **Part 2 Products**

#### **2.1 MATERIALS**

- .1 Standard concrete block units: to CAN/CSA-A165 Series (CAN/CSA-A165.1).
  - .1 Classification: H/20/C/M
  - .2 Dimensions Nominal: 200 mm wide x 200 mm high x 400 mm long.
  - .3 Special shapes: provide bull-nosed units for exposed corners. Provide purpose-made shapes for lintels, beams and bond beams. Provide additional special shapes as indicated.

## **2.2 REINFORCEMENT**

- .1 Reinforcement in accordance with Section 04 05 19- Masonry Anchorage and Reinforcing.

## **2.3 CONNECTORS**

- .1 Connectors in accordance with Section 04 05 19- Masonry Anchorage and Reinforcing.

## **2.4 FLASHING**

- .1 Flashing: in accordance with Section 04 05 23- Masonry Accessories.

## **2.5 MORTAR MIXES**

- .1 Mortar and mortar mixes in accordance with Section 04 05 13- Masonry Mortar and Grouting.

## **2.6 GROUT MIXES**

- .1 Grout and grout mixes in accordance with Section 04 05 13- Masonry Mortar and Grouting.

## **2.7 CLEANING COMPOUNDS**

- .1 Use VOC compliant cleaning agents and surface treatments.
- .2 Compatible with substrate and acceptable to masonry manufacturer for use on products.
- .3 Cleaning compounds compatible with concrete unit masonry and in accordance with manufacturer's written recommendations and instructions.

## **2.8 TOLERANCES**

- .1 Tolerances for standard concrete unit masonry tolerances in accordance with CAN/CSA-A165.1, supplemented as follows:
  - .1 Maximum variation between units within specific job lot 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.
- .2 Tolerances for architectural concrete masonry units 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.

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**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for concrete unit masonry installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

**3.2 PREPARATION**

- .1 Protect adjacent finished materials from damage due to masonry work.

**3.3 INSTALLATION**

- .1 Concrete block units:
  - .1 Bond: running
  - .2 Coursing height: 200 mm for one block and one joint.
  - .3 Jointing: Concave where exposed or where paint or other finish coating is specified.

**3.4 REINFORCEMENT**

- .1 Install reinforcing in accordance with Section 04 05 19- Masonry Anchorage and Reinforcing.

**3.5 CONNECTORS**

- .1 Install connectors in accordance with Section 04 05 19- Masonry Anchorage and Reinforcing.

**3.6 FLASHING**

- .1 Install flashings: in accordance with Section 04 05 23- Masonry Accessories.

**3.7 MORTAR PLACEMENT**

- .1 Place mortar in accordance with Section 04 05 13- Masonry Mortar and Grouting.

**3.8 GROUT PLACEMENT**

- .1 Place grout in accordance with Section 04 05 13- Masonry Mortar and Grouting.

**3.9 CONSTRUCTION**

- .1 Cull out masonry units, in accordance with CAN/CSA-A165 and approved range of colour samples, with chips, cracks, broken corners, excessive colour and texture variation.
- .2 Build in miscellaneous items such as bearing plates, steel angles, bolts, anchors, inserts, sleeves and conduits.

- .3 Construct masonry walls using running bond unless otherwise noted.
- .4 Build around frames previously set and braced. Fill behind hollow frames within masonry walls with mortar or grout and embed anchors.
- .5 Fit masonry closely against electrical and plumbing outlets so collars, plates and covers overlap and conceal cuts.
- .6 Install movement joints and keep free of mortar where indicated.
- .7 Hollow Units: spread mortar setting 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.
- .8 Solid Units: apply mortar over entire vertical and horizontal surfaces. Avoid bridging of airspace between brick veneer and backup wall with mortar.
- .9 Ensure compacted head joints. Use full or face-shell joint as indicated.
- .10 Tamp units firmly into place.
- .11 Do not adjust masonry units after mortar has set. Where resetting of masonry is required, remove, clean and reset units in new mortar.
- .12 Tool exposed joints flush for interior work.
- .13 After mortar has achieved initial set up, tool joints.
- .14 Do not interrupt bond below or above openings.

### **3.10 REPAIR/RESTORATION**

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

### **3.11 FIELD QUALITY CONTROL**

- .1 Site Tests, Inspection: in accordance with Section 04 05 00- Common Work Results for Masonry supplemented as follows:
  - .1 Concrete masonry units will be sampled and tested by independent testing agency appointed and paid by Departmental Representative in accordance with CSA S304.1.
  - .2 Noise reduction between two rooms will be tested by independent testing agency appointed and paid by Departmental Representative in accordance with ASTM E336.
  - .3 Notify inspection agency minimum of 24 hours in advance of requirement for tests.
- .2 Manufacturer's Field Services: in accordance with Section 04 05 00- Common Work Results for Masonry.

### **3.12 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.
  - .1 Leave Work area clean at end of each day.
  - .2 Standard Concrete Unit Masonry:

- .1 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 Architectural Concrete Unit Masonry:
  - .1 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.
  - .4 Prefaced Concrete Unit Masonry:
    - .1 Clean masonry as work progresses using soft, clean cloths, within few minutes after laying. Upon completion, when mortar has set so that it will not be damaged by cleaning, clean with soft sponge or clean cloths, brush, and clean water. Polish with soft, clean cloths.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11- Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19- Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### **3.13 PROTECTION**

- .1 Brace and protect concrete unit masonry in accordance with Section 04 05 00- Common Work Results for Masonry.

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCE STANDARDS**

- .1 ASTM International
  - .1 ASTM C144, Standard Specification for Aggregate for Masonry Mortar.
  - .2 ASTM C207, Standard Specification for Hydrated Lime for Masonry Purposes.
  - .3 ASTM C568/C568M, Standard Specification for Limestone Dimension Stone.
  - .4 ASTM C616/C616M, Standard Specification for Quartz-Based Dimension Stone.
- .2 CSA Group
  - .1 CAN/CSA-A370, Connectors for Masonry.
  - .2 CAN/CSA-A371, Masonry Construction for Buildings.
  - .3 CAN/CSA-A3000, Cementitious Materials Compendium
- .3 South Coast Air Quality Management District (SCAQMD)
  - .1 SCAQMD Rule 1168, Adhesive and Sealant Applications.

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for quarried stone veneer cladding and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Saskatchewan, Canada.
  - .2 Indicate sizes and sections of stone veneer, arrangements of joints and bonding, anchoring, dowelling and cramping.
  - .3 Each section of stone indicated on shop drawings must bear corresponding number marked on its back or bed.
- .4 Samples:
  - .1 Submit sample for each finish product specified, 2 complete sets representing manufacturer's full range of available colours, textures, and patterns.
- .5 Sustainable Design Submittals:
  - .1 Construction Waste Management:
    - .1 Submit project Waste Management Plan and Waste Reduction Workplan] highlighting recycling and salvage requirements.
    - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 75 % of construction wastes were recycled or salvaged.

- .2 Recycled Content:
  - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-industrial content, and total cost of materials for project.

### **1.3 QUALITY ASSURANCE**

- .1 Test Reports: submit certified test reports accordance with CAN/CSA-A179 showing compliance with specified performance characteristics and physical properties, and in accordance with Section 04 05 00- Common Work Results for Masonry.
- .2 Installer Qualifications: A qualified installer who employs experienced stonemasons and stone fitters.
- .3 Mock-ups:
  - .1 Construct mock-up panel of quarried stone veneer construction showing colours and textures, use of reinforcement, ties, through wall flashing, weep holes, jointing, coursing, mortar and quality of work.
  - .2 Mock-up used:
    - .1 To judge quality of work, substrate preparation, operation of equipment and material application.

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

- .1 Deliver, store and handle materials in accordance with Section 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 elevated platforms, under cover, and in a dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect quarried stone veneer cladding from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Develop Waste Reduction Workplan and Construction Waste Management Plan related to Work.
- .5 Packaging Waste Management: remove for reuse by manufacturer and return of packaging materials, crates, padding, pallets, as specified in Construction Waste Management Plan and Waste Reduction Workplan in accordance with Section 01 74 19- Waste Management and Disposal.

### **1.5 SITE CONDITIONS**

- .1 Cold Weather Protection: Comply with the following requirements;
  - .1 Remove ice or snow formed on the beds of the stone to be installed by carefully applying heat to the stone until those surfaces are dry to the touch.

- .2 Remove stone veneer work damaged by freezing conditions.
- .3 Perform the following construction procedures while stone veneer work is progressing (mani;
  - .1 Temperature ranges indicated apply to ambient air temperatures existing at the time of installations
  - .2 When healing mortar materials, maintain mixing temperatures selected within 10 degrees F; do not heat water for mortar to above 160 degrees F.
  - .3 Mortar: at 40 degrees F and below, produce mortar temperature between 40 degrees F and 120 degrees F by heating mixing water, and at temperatures of 32 degrees F and below, heat sand as well. Always maintain temperature on mortarboards above 40 degrees F.
  - .4 At 25 degrees F to 20 degrees F, heat both sides of walls under construction and use windbreaks or enclosures when wind is in excess of 15 mph. At 20 degrees F and below, maintain mortar and stone veneer work at temperatures above 40 degrees F for a minimum of 72 hours after the last stone is set.
- .2 Field Measurements:
  - .1 Make site measurements necessary to ensure proper fit of members.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Limestone: to ASTM C568/C568M, category II - Medium Density colour and texture to match approved sample.
- .2 Miscellaneous Accessories: Provide non-corrosive connection and anchorage hardware required, including interlocking channels, anchor plates, Z-sections, angle clips and threaded inserts.
- .3 Sealants: Provide sealant materials as specified in section 07 92 00 - Sealants. Test sealant for compatibility with the natural stone facings specified.

### **2.2 MORTAR AND ADHESIVE MATERIALS**

- .1 Portland cement: to CAN/CSA-A3000, type I.
- .2 Sand: to ASTM C144, passing 16 mesh.
- .3 Hydrated lime: to ASTM C207, Type S.
- .4 Latex additive: formulated for use in Portland cement mortar and thin set bond coat.
- .5 Water: potable and free of minerals and chemicals which are detrimental to mortar and grout mixes.
- .6 Dry set Portland cement mortar: to ANSI A108.1.
- .7 Latex Portland cement mortar: to ANSI A108.1.

- .8 Adhesive: The adhesive shall be a two-component epoxy consisting of epoxy resin and hardener.
- .9 Bond Breaker when require: preformed, compressible, resilient, non-staining, non-waxing, closed-cell polyethylene foam pad, non-absorbent to liquid and gas, 3.2 mm thick or polyethylene sheet, 6 to 10 mil thick.

## **2.3 FINISHES**

- .1 Machine dress exposed surfaces of stone to smooth finish without tool marks or ridges.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for quarried stone veneer cladding installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

### **3.2 PREPARATION**

- .1 Protect adjacent finished materials from damage due to masonry work.
- .2 Cut stone to shape and dimensions and full to square with joints as indicated. Dress exposed faces true.
- .3 Make joints 6 mm thick.
- .4 Cut-in reglets for flashings where indicated.
- .5 Execute moulded work from full size details. Make exposed arrises in true alignment and ease slightly to prevent snipping.
- .6 Round stone edges.
- .7 Form treads with 10 mm wash lips.
- .8 Back-check stone contacting structural members as indicated. Allow minimum of 25 mm clearance between back of stone and steel and concrete structural members. Shape beds of stone resting on structural work to fit supports.
- .9 Cut stones for anchors, clamps, dowels and support systems. Provide Lewis pin and clamp holes in pieces which cannot be manually lifted. Do not cut holes in exposed surfaces.

### **3.3 INSTALLATION**

- .1 Construction in accordance with CAN/CSA-A371.

- .2 Apply asphalt emulsion to concrete surfaces, shelf angles, structural steel supports against which stone is to be applied.
- .3 Waterproof exterior slabs on back prior to setting.
- .4 Clean stone exposed surfaces by washing with stiff fibre brush and water.
- .5 Drench dry stones with clean water just before setting.
- .6 Install anchors, dowels and cramps.
- .7 Set stones plumb, true, level in full bed of mortar with vertical joints slushed full except where otherwise specified. Completely fill anchor, dowel and lifting holes. Keep edges and faces aligned to respect indicated tolerances.
- .8 Embed in mortar ends only of lugged sills and steps. Leave balance of joint open for final pointing.
- .9 Place soft-wood wedges, plastic or lead setting pads under stones to maintain joint thickness. Set heavy stones and projecting courses after mortar in courses below has hardened sufficiently to support weight.
- .10 Prop and anchor projecting stones until wall above is set.
- .11 Use soaked softwood wedges to support stone in proper alignment until mortar has set. Remove wedges when dry and without breaking them off, fill voids with pointing mortar.
- .12 Install 6 to 10 mil polyethylene sheet to prevent bond between back of stone facing and concrete substrate or install 3 mm polyethylene foam bond breaker. Maintain minimum projection requirements of stone anchors into concrete substrate.
- .13 Use plastic weep hole vents.
- .14 Install air breather vents in joints at top of cavity wall and below shelf angles or structural support.
- .15 Tool joints after initial set has occurred.
- .16 Rake out joints to 20 mm depth and make ready for pointing with pointing mortar sealant. Sponge stone face along joints and remove droppings and splashed mortar immediately.
- .17 Pointing: remove dirt and loose mortar from joints by using pressure air stream.
  - .1 Wet joints for mortar pointing. Dry joints for sealant pointing.
  - .2 Point joints with pointing mortar in 3 stages. Rub smooth with plastic tool to slightly concave joint.

### **3.4 TOLERANCES**

- .1 To CAN/CSA-A371 unless noted below.

### **3.5 FIELD QUALITY CONTROL**

- .1 Site Tests Inspection: in accordance with Section 04 05 00- Common Work Results for Masonry] supplemented as follows:
  - .1 After setting, protect projecting areas, corners, etc., with boards. Cover walls at night and during rains.

**3.6 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 At end of each working day, brush off loose mortar from stone face.
- .3 At completion, wash stonework with stiff-fibre brushes and clean water.
- .4 Waste Management: separate waste materials for reuse and recycling.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**3.7 PROTECTION**

- .1 Brace and protect quarried stone veneer cladding in accordance with Section 04 05 00- Common Work Results for Masonry.

**3.8 SCHEDULE**

- .1 Item: 01
  - .1 Location: As Indicated in the drawing.
  - .2 Finish: Smooth

**END OF SECTION**