

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 03 30 00 - Cast-in-Place Concrete.
- .2 Section 04 05 12 - Masonry Mortar and Grout.
- .3 Section 04 05 19 - Masonry Anchorage and Reinforcing.
- .4 Section 04 05 23 - Masonry Accessories.
- .5 Section 04 22 00 - Concrete Unit Masonry.
- .6 Section 05 50 00 - Metal Fabrications.
- .7 Section 07 21 13 - Board Insulation.
- .8 Section 07 92 00 - Joint Sealants.

**1.2 REFERENCES**

- .1 Canadian Standards Association (CSA International)
  - .1 CSA-A165 Series-14, Standards on Concrete Masonry Units.
  - .2 CSA A179-14, Mortar and Grout for Unit Masonry.
  - .3 CSA-A371-14, Masonry Construction for Buildings.
- .2 International Masonry Industry All-Weather Council (IMIAC)
  - .1 Recommended Practices and Guide Specification for Hot and Cold Weather Masonry Construction.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- .1 Pre-installation meetings: Conduct pre-installation meeting one week prior to commencing on-site installations 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. Comply with manufacturer's written recommendations for sequencing construction operations.
- .3 Scheduling: schedule with other work.

## **1.4 ACTION SUBMITTALS**

- .1 Provide Product Data:
  - .1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, limitations and colours.
  - .2 Provide electronic copies of Workplace Hazardous Materials Information System (WHMIS) - Material Safety Data Sheets (MSDS).
- .2 Samples:
  - .1 Provide samples as follows:
    - .1 Two of each type of concrete masonry unit specified, including special shapes, supplemented with specific requirements in Sections.
    - .2 Two cured, coloured samples of mortar and grout, illustrating mortar colour and colour range, supplemented with specific requirements in Section 04 05 12 - Masonry Mortar and Grout.
    - .3 Two of each type of masonry accessory and flashing specified, supplemented by specific requirements in Section 04 05 23 - Masonry Accessories.
    - .4 Two 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.
  - .3 Shop Drawings:
    - .1 Provide drawings stamped and signed by professional engineer registered or licensed in Province of New Brunswick, Canada.
    - .2 Provide shop drawings detailing temporary bracing required, designed to resist wind pressure and lateral forces during installation.

## **1.5 INFORMATION SUBMITTALS**

- .1 Certificates: provide manufacturer's product certificates certifying materials comply with specified requirements.
- .2 Installer Instructions: provide manufacturer's installation instructions, including storage, handling, safety and cleaning.

## **1.6 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Submit laboratory test reports certifying compliance of masonry units and mortar ingredients with specification requirements.
  - .2 Submit certified test reports showing compliance with specified performance characteristics and physical properties.
  - .3 Qualifications:
    - .1 Manufacturer: minimum five (5) years experience in manufacturing components similar to or exceeding requirements of project.

- .2 Installer: experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
- .3 Masons: company or person specializing in masonry installations with minimum five (5) years documented experience with masonry work similar to this project.
  - .1 Masons employed on this project must demonstrate ability to reproduce mock-up standards.
- .2 Mock-ups:
  - .1 Construct mock-ups.
  - .2 Construct mock-up panel of exterior and interior masonry wall construction 1200 x 1800 mm showing masonry colours and textures, use of reinforcement, ties, through-wall flashing, weep holes, jointing, coursing, mortar and workmanship.
  - .3 Mock-up used:
    - .1 To judge workmanship, substrate preparation, operation of equipment and material application.
    - .2 For testing to determine compliance with performance requirements. Perform following tests.
  - .4 Construct mock-up where directed by Departmental Representative.
  - .5 Allow 24 hours for inspection of mock-up by Departmental Representative and Consultant before proceeding with work.
  - .6 When accepted by Departmental Representative and Consultant, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.
  - .7 Start work only upon receipt of written acceptance of mock-up by Departmental Representative and Consultant.

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

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Storage and Handling Protection:
  - .1 Keep materials dry until use.
  - .2 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.

## **1.8 SITE CONDITIONS**

- .1 Ambient Conditions: assemble and erect components when temperatures are above 4 degrees C.
- .2 Weather Requirements: to CSA-A371.
- .3 Cold weather requirements:
  - .1 To 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 it's constituent materials between 5 degrees C and 50 degrees C and protect site from windchill.
- .3 Maintain temperature of masonry above 0 degrees C for minimum of 7 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 three days after installation.

## **1.9 WARRANTY**

- .1 For Work in this, 12 months warranty period is extended to 24 months.

## **Part 2 Products**

### **2.1 MANUFACTURERS**

- .1 Ensure manufacturer has minimum 5 years experience in manufacturing components similar to or exceeding requirements of project.

### **2.2 MATERIALS**

- .1 Masonry materials are specified in related Sections indicated in 1.1.

## **Part 3 Execution**

### **3.1 INSTALLERS**

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

### **3.2 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

### **3.3 EXAMINATION**

- .1 Examine conditions, substrates and work to receive work of this Section.

- .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 and Consultant of unacceptable conditions immediately upon discovery.
  - .2 Proceed with installation after unacceptable conditions have been remedied and after receipt of written approval from Consultant.
- .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 Field 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].

### **3.4 PREPARATION**

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

### **3.5 INSTALLATION**

- .1 Do masonry work in accordance with 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 CSA-A371.
- .3 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

### **3.6 CONSTRUCTION**

- .1 Exposed masonry:
  - .1 Remove chipped, cracked, and otherwise damaged units, in accordance with CSA A-165, in exposed masonry and replace with undamaged units.
- .2 Jointing:
  - .1 Allow joints to set just enough to remove excess water, 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, 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 to be 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 30 MPa concrete to Section 03 30 00 - Cast-in-Place Concrete, where concrete fill is used in lieu of solid units.
  - .2 Use grout to CSA A179 where grout is used in lieu of solid units.
  - .3 Install building paper below voids to be filled with 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. Centre 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: reviewed by Departmental Representative and Consultant.
  - .3 Make good existing work. Use materials to match existing.

### **3.7 SITE TOLERANCES**

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

### **3.8 FIELD QUALITY CONTROL**

- .1 Site Tests, Inspection:
  - .1 Perform field inspection and testing in accordance with Section 01 45 00 – Testing and Quality Control.
  - .2 Notify inspection agency minimum of 24 hours in advance of requirement for tests.
- .2 Manufacturer's Services:
  - .1 Inspection and testing will be carried out by Testing Laboratory designated by Departmental Representative.
  - .2 Departmental Representative will pay costs for testing.
  - .3 Re-testing as a result of deficient work will be paid for by contractor.
  - .4 Provide Certificate of Field Quality Inspection and testing to Owner's Representative for inclusion in Commissioning Manual.

### **3.9 CLEANING**

- .1 Progress Cleaning: in accordance with related masonry sections.
- .2 Final Cleaning:
  - .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
  - .2 Upon completion of installation and verification of performance of installation, remove surplus materials, rubbish, tools and equipment barriers.

### **3.10 PROTECTION**

- .1 Temporary Bracing:
  - .1 Provide temporary bracing and supports of masonry work during and after erection until permanent lateral support is in place.
  - .2 Provide confirmation Departmental Representative that temporary bracing and support has been designed by professional engineer.
  - .3 Brace masonry walls as necessary to resist wind pressure and lateral forces during construction.
- .2 Moisture Protection:
  - .1 Keep masonry dry using waterproof, nonstaining 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 1.10 SITE CONDITIONS.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

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

**1.2 REFERENCES**

- .1 Canadian Standards Association (CSA International)
  - .1 CAN/CSA-A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CAN/CSA A179-14, Mortar and Grout for Unit Masonry.
  - .3 CAN/CSA A371-14, Masonry Construction for Buildings.
  - .4 CAN/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).

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Product Data:
  - .1 Provide manufacturer's printed product literature, specifications and datasheets. Include product characteristics, performance criteria, and limitations.
  - .2 Provide electronic copies of Workplace Hazardous Materials Information System (WHMIS) - Material Safety Data Sheets (MSDS). Indicate VOC's mortar, grout, parging, colour additives and admixtures. Expressed as grams per litre (g/L).
- .2 Samples:
  - .1 Samples: provide unit samples in accordance with Section 04 05 00 - Common Work Results for Masonry, supplemented as follows:
    - .1 Provide two full size samples of mortar.
    - .2 Provide confirmation of source or product data sheet, prior to mixing or preparation of mortars, to Departmental Representative and Consultant of:
      - .1 Aggregate: course aggregate, sand.
      - .2 Cement.
      - .3 Lime.
      - .4 Colour pigment samples.
- .3 Manufacturer's Instructions:
  - .1 Provide manufacturer's installation instructions.

**1.4 QUALITY ASSURANCE**

- .1 Test Reports: 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, supplemented as follows:

- .1 Submit laboratory test reports in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.
- .4 Mock-ups:
  - .1 Construct mock-ups in accordance with requirements of Section 04 05 00 - Common Work Results for Masonry, supplemented as follows:
    - .1 Construct mock-up sample panel of pointing.
    - .2 Sample panel: 3000 mm x 3000 mm using proposed procedures, colours, texture, finish and workmanship.

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

- .1 Deliver, store and handles masonry mortar and grout materials in accordance with Section 01 61 00 - Common Product Requirements, supplemented as follows:
  - .1 Deliver prepackaged, dry-blended mortar mix to project site in labelled plastic-lined bags each bearing name and address of manufacturer, production codes or batch numbers, and colour or formula numbers.
  - .2 Maintain mortar, grout and packaged materials clean, dry, and protected against dampness, freezing, traffic and contamination by foreign materials.

## **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 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, gray colour.
    - .1 Use low VOC products.
  - .2 Masonry Cement: to CAN/CSA-A3002 and CAN/CSA A179.
  - .3 Mortar Cement: to CAN/CSA-A3002 and CAN/CSA A179.
    - .1 Use low VOC products.

- .4 Packaged Dry Combined Materials for mortar: to CAN/CSA A179, using gray colour cement.
- .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.

## **2.2 COLOUR ADDITIVES**

- .1 Use colouring admixture not exceeding 10% of cement content by mass, or integrally coloured masonry cement, to produce coloured mortar to match approved sample. Admixtures to be approved prior to use. Use in accordance with the specific manufacturer's recommendations.
- .2 White mortar: use white masonry cement to produce mortar type specified.

## **2.3 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 S based on proportion specifications.
  - .2 Non-Loadbearing: Type O based on proportion specifications.
- .3 Mortar for Parapet walls, chimneys, unprotected walls: Type S based on proportion specifications.
- .4 Pointing Mortar: CAN/CSA A179, Type N 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 Mortar for Glass Block Masonry: CAN/CSA A179, Type S, using the property specification.
- .7 Pointing Mortar For Glass Block Masonry: CAN/CSA A179, Type S, using the property specification; with maximum 2 percent ammonium stearate or calcium stearate per cement weight.
- .8 Parging mortar: Type N to CAN/CSA A179.
- .9 Mortar for foundation walls, manholes, sewers, pavements, walks, patios and other exterior masonry at or below grade: Type M based on proportion specifications.
- .10 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 proportion specifications.
- .3 Mortar for grouted reinforced masonry: Type S based on proportion specifications.

## **2.4 MORTAR MIXING**

- .1 Add mortar color in accordance with manufacturer's instructions. Provide uniformity of mix and coloration.
- .2 Use a batch type mixer in accordance with CAN/CSA A179.
- .3 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.
- .4 Re-temper mortar only within two hours of mixing, when water is lost by evaporation.
- .5 Use mortar within 2 hours after mixing at temperatures of 32 degrees C, or 2-1/2 hours at temperatures under 5 degrees C.

## **2.5 GROUT MIXES**

- .1 Bond Beams: minimum grout mix 10 to 12.5 MPa strength at 28 days or as otherwise indicated on drawings; 200-250 mm slump; mixed in accordance with CAN/CSA A179.
- .2 Lintels: minimum grout mix 10 to 12.5 MPa strength at 28 days or as otherwise indicated on drawings; 200-250 mm slump; mixed in accordance with CAN/CSA A179.
- .3 Grout: minimum compressive strength of 12.5 MPa at 28 days or as otherwise indicated on drawings. Maximum aggregate size and grout slump: CAN/CSA A179.

## **2.6 GROUT MIXING**

- .1 Mix grout ingredients in quantities needed for immediate use in accordance with CAN/CSA A179.
- .2 Add admixtures in accordance with manufacturer's instructions; mix uniformly.
- .3 Do not use calcium chloride or chloride based admixtures.

## **Part 3 Execution**

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

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

### **3.2 CONSTRUCTION**

- .1 Do masonry mortar and grout work in accordance with CSA A179, except where specified otherwise.
- .2 Apply parging in uniform coating of thickness indicated.

### **3.3 MIXING**

- .1 All 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. Mixing by hand must be pre-approved by the Owner's Representative.
- .2 Clean all mixing boards and mechanical mixing machine between batches.
- .3 Mortar must be weaker than the units it is binding.
- .4 Contractor to appoint one individual to mix mortar, for duration of project. In the event that this individual must be changed, mortar mixing must cease until the new individual is trained, and mortar mix is tested.

### **3.4 MORTAR PLACEMENT**

- .1 Install mortar to manufacturer's instructions.
- .2 Install mortar to requirements of CAN/CSA A179.
- .3 Remove excess mortar from grout spaces.

### **3.5 GROUT PLACEMENT**

- .1 Install grout in accordance with manufacturer's instructions.
- .2 Install grout in accordance with CAN/CSA A179.
- .3 Work grout into masonry cores and cavities to eliminate voids.
- .4 Do not install grout in lifts greater than 400 mm, without consolidating grout by rodding.
- .5 Do not displace reinforcement while placing grout.

### **3.6 CLEANING**

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
- .2 Remove droppings and splashings using clean sponge and water.
- .3 Clean masonry with low pressure clean water and soft natural bristle brush.

### **3.7 PROTECTION OF COMPLETED WORK**

- .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 04 05 00 - Common Work Results for Masonry.
- .2 Section 04 05 12 – Masonry Mortar and Grout.
- .3 Section 04 05 23 – Masonry Accessories.
- .4 Section 04 22 00 – Concrete Unit Masonry.

**1.2 REFERENCES**

- .1 ASTM International Inc.
  - .1 ASTM A36/A36M-14, Standard Specification for Carbon Structural Steel.
  - .2 ASTM A82/A82M-07, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
  - .3 ASTM A307-14, Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
  - .4 ASTM A580/A580M-16, Standard Specification for Stainless Steel Wire.
  - .5 ASTM A641/A641M-09a(2014), Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
  - .6 ASTM-A666-15, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- .2 Canadian Standards Association (CSA International)
  - .1 CAN/CSA-A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CAN/CSA A179-14, Mortar and Grout for Unit Masonry.
  - .3 CAN/CSA A370-14, Connectors for Masonry.
  - .4 CAN/CSA A371-14, Masonry Construction for Buildings.
  - .5 CAN/CSA G30.1809(R2014), Billet-Steel Bars for Concrete Reinforcement.
  - .6 CSA-S304-14, Design of Masonry Structures.
  - .7 CSA W186-M1990(R2016), Welding of Reinforcing Bars in Reinforced Concrete Construction.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Product Data:
  - .1 Provide manufacturer's printed product literature, specifications and datasheets illustrating products to be incorporated into project for specified products.
  - .2 Provide electronic copies of Workplace Hazardous Materials Information System (WHMIS) - Material Safety Data Sheets (MSDS).
- .2 Shop Drawings:

- .1 Provide drawings stamped and signed by professional engineer registered or licensed in Province of New Brunswick, Canada.
  - .2 Provide shop drawings detailing bar bending details, anchorage details, lists and placing drawings
  - .3 On placing drawings, indicate sizes, spacing, location and quantities of reinforcement and connectors.
- .3 Manufacturer's Instructions:
- .1 Provide manufacturer's installation instructions.

#### **1.4 QUALITY ASSURANCE**

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Section 04 05 00 - Common Work Results for Masonry.
- .4 Mock-ups:
  - .1 Construct mock-ups in accordance with Section 04 05 00 - Common Work Results for Masonry supplemented as follows:
    - .1 Construct mock-ups panel of anchorage installation and reinforcement installation.
    - .2 Sample panel: 3000 mm x 3000 mm]using proposed procedures, anchorage material, connectors, reinforcement material, and workmanship.

#### **1.5 FIELD MEASUREMENTS**

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

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

- .1 Deliver, store and handle masonry anchorage and reinforcing materials in accordance with Section 01 61 00 - Common Product Requirements, supplemented as follows:
  - .1 Deliver reinforcement and connectors, identified in shop and placement drawings.

### **Part 2 Products**

#### **2.1 MATERIALS**

- .1 Bar reinforcement: Steel to CAN/CSA A371 and CAN/CSA G30.18, Grade.
- .2 Connectors: to CAN/CSA A370 and CSA-S304.1.
- .3 Corrosion protection: to CSA-S304.1, galvanized to CSA-S304.1 and CAN/CSA A370.

- .4 Fasteners: installed post-construction:
  - .1 Screw Shields and Plugs: plastic, vibration-resistant, chemical-resistant, water-resistant, install in mortar joints.
  - .2 Bolts and Screws: size and type to suit application, locate where indicated.
  - .3 Nails: case-hardened cut or spiral nails, size and type to suit fastening application.
  - .4 Powder-Driven Fasteners: pin styles and lengths to suit fastening application in accordance with manufacturers use, load and hold recommendations.
  - .5 Adhesives: epoxies, mastics and contact cements for fastening applications, use in accordance with manufacturers' recommendations.
- .5 Ties: hot dip galvanized to CAN/CSA A370 Table 5.2 steel finish.
  - .1 Corrugated to CAN/CSA A370.
  - .2 Unit ties, to CAN/CSA A370: Z style, fabricated from cold-drawn steel, size to suit application.
  - .3 Adjustable Unit Ties: to CAN/CSA A370: proprietary type ties, type, style and size to suit application in accordance with manufacturer's recommendations.
  - .4 Joint Reinforcement Ties: to CAN/CSA A370:
    - .1 Single Wythe Joint Reinforcement: truss type:
      - .1 Steel wire, hot dip galvanized: to ASTM A641, Class 3 after fabrication.
      - .2 Cold drawn steel wire conforming to ASTM A82.
    - .2 Multiple Wythe Joint Reinforcement: truss type: without moisture drip; adjustable:
      - .1 Steel wire, hot dip galvanized: to ASTM A641 Class 3 after fabrication.
      - .2 Cold drawn steel wire conforming to ASTM A82.
- .6 Anchors: to CAN/CSA A370:
  - .1 Conventional Anchors: type steel bolts with bent bar anchors plate anchors through bolts, shape L, sized to suit application.
  - .2 Wedge Anchors: expansion anchors type wedge and bolt, sized to suit application.
  - .3 Sleeve Anchors: type sleeve and bolt, sized to suit application.
  - .4 Self-Contained Anchors: type double-glass/plastic vial system, with epoxy resin and hardener.
  - .5 Dovetail Anchors: galvanized to CAN/CSA A370 Table 5.2 uncoated finish.
  - .6 Anchor Bolts: conventional (unpatented) anchors, galvanized to CAN/CSA A370 Table 5.2 uncoated finish.
- .7 Conventional Bolts:
  - .1 Bolts: to ASTM A36, bar stock shop threaded, straight bolts with square or hex-headed nuts bent bar anchors, L shaped.
  - .2 Plate anchors: steel to ASTM A36, weld square of circular steel plate perpendicular to axis of steel bar threaded on opposite end.

- .3 Through bolt rods: to ASTM A307 threaded rod or threaded ASTM A36 bar stock.
- .8 Adhesive Anchors: proprietary systems, pre-mixed, self-contained system with double glass vial system to contain epoxy, consisting of resin, hardener and aggregate.

## **2.2 FABRICATION**

- .1 Fabricate reinforcing in accordance with CAN/CSA-A23.1 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .2 Fabricate connectors in accordance with CAN/CSA A370.
- .3 Obtain Departmental Representative's and Consultant's approval for locations of reinforcement splices other than shown on placing drawings.
- .4 Upon approval of Departmental Representative and Consultant, 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 and Consultant 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 and Consultant of proposed source of material to be supplied.

## **Part 3 Execution**

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

- .1 Comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

### **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, CAN/CSA-A23.1 and CSA-S304.1 unless indicated otherwise.
- .2 Prior to placing concrete, mortar and grout, obtain Departmental Representative's and Consultant'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 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 150 mm.
  - .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.

### **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 will not be 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 Consultant.
- .2 When field bending is authorized, bend without heat, applying a slow and steady pressure.
- .3 Replace bars and connectors which develop 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 and Consultant approval of placement of reinforcement and connectors, prior to placing mortar or grout.

**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 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 04 05 00- Common Work Results for Masonry.
- .2 Section 04 05 19 - Masonry Anchorage and Reinforcing.

**1.2 REFERENCES**

- .1 ASTM International Inc.
  - .1 ASTM D2240-15, Standard Test Method for Rubber Property - Durometer Hardness.
- .2 Canadian Standards Association (CSA International)
  - .1 CAN/CSA A371-14, Masonry Construction for Buildings.
  - .2 CAN/CSA-ISO 14021-00(R2014), Environmental Labels and Declarations - Self Declared Environmental Claims (Type II Environmental Labelling).

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Product Data:
  - .1 Provide manufacturer's printed product literature, specifications and datasheets. Include product characteristics, performance criteria, and limitations.

**1.4 FIELD MEASUREMENTS**

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

**1.5 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store and handle masonry accessories in accordance with Common Product Requirements supplemented as follows:
  - .1 Keep fillers and adhesives dry, protected against dampness, and freezing.
  - .2 Store packaged materials off ground and in accordance with manufacturer's written instructions.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Movement joint filler: purpose-made elastomer 70 durometer hardness to ASTM D2240 of size and shape indicated.
  - .1 Use low VOC products.

**Part 3 Execution**

**3.1 APPLICATION**

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

**3.2 INSTALLATION: MATERIALS**

- .1 Install continuous movement joint fillers in movement joints at locations indicated on drawings.

**3.3 CLEANING**

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 04 05 00 - Common Work Results for Masonry
- .2 Section 04 05 12 – Masonry Mortar and Grout
- .3 Section 04 05 19 - Masonry Anchorage and Reinforcing
- .4 Section 04 05 23 - Masonry Accessories

**1.2 REFERENCES**

- .1 ASTM International Inc.
  - .1 ASTM E336-16, Standard Test Method for Measurement of Airborne Sound Attenuation Between Rooms in Buildings.
- .2 Canadian Standards Association (CSA International)
  - .1 CAN/CSA-A165 Series-14, CSA Standards on Concrete Masonry Units (covers: A165.1, A165.2, A165.3).
  - .2 CAN/CSA A371-14, Masonry Construction for Buildings.
- .3 South Coast Air Quality Management District (SCAQMD), California State (SCAQMD)
  - .1 SCAQMD Rule 1168-[05], Adhesives and Sealants Applications.
- .4 Underwriters' Laboratories of Canada (ULC)
  - .1 CAN/ULC-S101-14, Standard Methods of Fire Endurance Tests of Building Construction and Materials.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Product Data:
  - .1 Product Data: provide product data, including manufacturer's printed data sheets and catalog pages illustrating products to be incorporated into project for specified products.
- .2 Samples:
  - .1 Two of each type of concrete masonry unit specified.
- .3 Submit manufacturer's installation instructions.

**1.4 QUALITY ASSURANCE SUBMITTALS**

- .1 Certificates: provide in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .2 Test and Evaluation Reports: provide certified test reports in accordance with Section 04 05 00 - Common Work Results for Masonry.

- .3 Pre-Installation Meetings: conduct pre-installation meeting in accordance with Section 04 05 00 - Common Work Results for Masonry to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.
- .4 Mock-ups:
  - .1 Construct mock-ups in accordance with Section 04 05 00 - Common Work Results for Masonry supplemented as follows:
    - .1 Construct mock-up panel of exterior and interior concrete unit masonry construction 1200 x 1800 mm.

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

- .1 Deliver, store and handle concrete unit masonry in accordance with Section 04 05 00 - Common Work Results for Masonry.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Standard concrete block units: to CAN3-A165, Series (CAN3-A165.1)
  - .1 Classification: H/10/A/M
  - .2 Size: modular.
  - .3 Special shapes: provide bull nosed units for exposed corners. Provide purpose-made shapes for lintels and bond beams. Provide additional special shapes as indicated.
- .2 Acoustical concrete block units: to CAN3-A165 Series (CAN3-A165.1) purpose made with slots to provide the acoustical characteristics specified.
  - .1 Classification: H/15/D/M
  - .2 Size: modular
  - .3 Noise reduction coefficients:
    - .1 Minimum NRC of .75 for 200 mm wide units with two slots and two cavities with noncombustible fibrous filler elements when surface painted before testing.
- .3 Fire rated concrete block: to CAN/CSA-A165 Series (CAN/CSA-A165.1) as modified below.
  - .1 Classification: H/15/B/M except as modified by fire resistance requirements specified below.
  - .2 Fire resistant characteristics: aggregate used in units and equivalent thickness of units to the Supplement to the National Building Code of Canada 2015, and in accordance with CAN/ULC-S101, for fire-resistance ratings indicated.
  - .3 Size: modular.
  - .4 Special shapes: provide bull- nosed units for exposed corners. Provide purpose-made shapes for lintels and bond beams and provide additional 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 MORTAR MIXES**

- .1 Mortar and mortar mixes in accordance with Section 04 05 12 - Masonry Mortar and Grout.

**2.5 GROUT MIXES**

- .1 Grout and grout mixes in accordance with Section 04 05 12 - Masonry Mortar and Grout.

**2.6 CLEANING COMPOUNDS**

- .1 Use low VOC products.
- .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.

**2.7 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.

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Verify surfaces and conditions are ready to accept work of this Section.
- .2 Commencing installation means acceptance of existing substrates.

**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: 200mm for one block and one joint.

- .3 Jointing: concave 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.
  - .4 Install special site cut shaped units.
- 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 MORTAR PLACEMENT**
  - .1 Place mortar in accordance with Section 04 05 12 - Masonry Mortar and Grout.
- 3.7 GROUT PLACEMENT**
  - .1 Place grout in accordance with Section 04 05 12 - Masonry Mortar and Grout.
- 3.8 CONSTRUCTION**
  - .1 Cull out masonry units, in accordance with CAN/CSA A165 and reviewed 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 concave; strike concealed joints flush.
- .13 After mortar has achieved initial set up, tool joints.
- .14 Do not interrupt bond below or above openings.

### **3.9 REPAIR/RESTORATION**

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

### **3.10 CLEANING**

- .1 Progress Cleaning:
  - .1 Standard and Acoustical 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.

### **3.11 PROTECTION**

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

**END OF SECTION**