

COMMON WORK RESULTS FOR MASONRY

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**Part 1            General**

**1.1                REFERENCES**

- .1 Canadian Standards Association (CSA International).
  - .1 CSA-A165 Series, Standards on Concrete Masonry Units.
  - .2 CSA A179, Mortar and Grout for Unit Masonry.
  - .3 CSA-A371, Masonry Construction for Buildings.

**1.2                SUBMITTALS**

- .1 Product Data.
  - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Samples.
  - .1 If required by Contract Administrator, submit samples in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Submit samples.
    - .1 Two (2) of each type of masonry unit specified.
    - .2 One (1) of each type of masonry accessory specified.
    - .3 One (1) of each type of masonry reinforcement, tie and connector proposed for use.
    - .4 As required for testing purposes.

**1.3                QUALITY ASSURANCE**

- .1 Test Reports.
  - .1 Certified test reports showing compliance with specified performance characteristics and physical properties.
  - .2 Submit laboratory test reports certifying compliance of masonry units and mortar ingredients with specification requirements.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

**1.4                DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver materials to job site in dry condition.
- .2 Storage and Protection.
  - .1 Keep materials dry until use, except where wetting of bricks is specified.
  - .2 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.

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**1.5 SITE CONDITIONS**

- .1 Site Environmental Requirements.
  - .1 Cold weather requirements.
    - .1 Supplement Clause 5.15.2 of 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 between 5 degrees C and 50 degrees C and protect site from windchill.
    - .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.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Masonry materials are specified in Related Sections.

**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 PREPARATION**

- .1 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.

**3.3 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.
- .3 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

**3.4 CONSTRUCTION**

- .1 Exposed masonry.

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- .1 Remove chipped, cracked, and otherwise damaged units, in accordance with CSA A-165, Clause 82.1 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 an 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 concrete to Section 03 30 00 - Cast-in-Place Concrete, where concrete fill is used in lieu of solid units.
  - .2 Use grout to CSA A179 where grout is used in lieu of solid units.
  - .3 Install building paper below voids to be filled with concrete or grout; keep paper 25 mm back from faces of units.
- .7 Provision for movement.
  - .1 Leave 40 mm space between top of non-load bearing walls and partitions and structural elements. Do not use wedges.
  - .2 Built masonry to tie in with stabilizers, with provision for vertical movement.
- .8 Loose steel lintels.
  - .1 Install loose steel lintels. Centre over opening width.
- .9 Control joints.

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- .1 Construct continuous control joints as indicated on the drawings.
- .10 Expansion joints.
  - .1 Build-in continuous expansion joints as indicated.
- .11 Interface with other work.
  - .1 Cut openings in existing work as indicated.
  - .2 Openings in walls: approved by Contract Administrator.
  - .3 Make good existing work. Use materials to match existing.
- 3.5 SITE TOLERANCES**
  - .1 Tolerances in notes to Clause 5.3 of CSA-A371 apply.
- 3.6 FIELD QUALITY CONTROL**
  - .1 Inspection and testing will be carried out by Testing Laboratory designated by Contract Administrator.
  - .2 The City will pay costs for testing.
  - .3 Cost for additional testing required as a result of defective materials will be the responsibility of the Contractor.
- 3.7 CLEANING**
  - .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
  - .2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
- 3.8 PROTECTION**
  - .1 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.

**END OF SECTION**

MASONRY MORTAR AND GROUT

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**Part 1            General**

**1.1                RELATED SECTIONS**

- .1            Section 01 33 00 - Submittal Procedures.
- .2            Section 04 05 10 - Common Work Results for Masonry.

**1.2                REFERENCES**

- .1            Canadian Standards Association (CSA International).
  - .1            CSA A179, Mortar and Grout for Unit Masonry.

**1.3                SUBMITTALS**

- .1            Product Data.
  - .1            Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
  - .2            Submit two (2) copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's mortar, grout, parging, colour additives and admixtures.
- .2            Samples.
  - .1            If required by Contract Administrator, submit samples in accordance with Section 01 33 00 - Submittal Procedures.
  - .2            Submit two size samples of mortar or coloured mortar.
- .3            Manufacturer's Instructions.
  - .1            Submit manufacturer's installation instructions.

**Part 2            Products**

**2.1                MATERIALS**

- .1            Use same brands of materials and source of aggregate for entire project.
- .2            Mortar and grout: conforming to CSA A179.
- .3            Aggregate: conforming to CSA A82.56.
- .4            Use aggregate passing 1.18 mm sieve where 6 mm thick joints are indicated.
- .5            Colour: ground coloured natural aggregates or metallic oxide pigments.
- .6            Water: clean, potable, free of injurious amounts of acids, alkalis and organic material.
- .7            Masonry cement: conforming to CAN/CSA-A8, Type H.

MASONRY MORTAR AND GROUT

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- .8 Portland cement: conforming to CAN/CSA-A5, Type GU.
- .9 Hydrated lime: conforming to CSA A82.43.
- .10 Mortar for all masonry:
  - .1 Type S based on Property specifications.
- .11 Dirt resistant additives: aluminum tristearate, calcium stearate, or ammonium stearate.
- .12 Grout: to CSA A179, Table 3.
- .13 Parging mortar: type S to CSA A179.

**Part 3 Execution**

**3.1 MIXING**

- .1 Do masonry mortar and grout Work in accordance with CSA A179 except where specified otherwise.
- .2 Mix grout to semi-fluid consistency.
- .3 Incorporate admixtures into mixes in accordance with Manufacturer's instructions.
- .4 Comply with cold weather requirements specified in CSA A371 Masonry Construction for Buildings.

**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 TESTING**

- .1 Testing for mortar materials will be carried out by an inspection and testing firm designated by Contract Administrator.
- .2 The City will pay cost for testing.
- .3 Cost for additional testing required as a result of defective materials will be the responsibility of the Contractor.
- .4 Submit samples of all materials proposed for testing.

**3.4 CLEANING**

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

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**END OF SECTION**

MASONRY ANCHORAGE AND REINFORCING

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**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 01 33 00 - Submittal Procedures.
- .2        Section 04 05 10 - Common Work Results for Masonry.

**1.2                REFERENCES**

- .1        Canadian Standards Association (CSA International).
  - .1        CAN/CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
  - .2        CSA-A370, Connectors for Masonry.
  - .3        CSA-A371, Masonry Construction for Buildings.
  - .4        CSA G30.14, Deformed Steel Wire For Concrete Reinforcement.
  - .5        CAN/CSA G30.18, Billet-Steel Bars for Concrete Reinforcement.
  - .6        CSA-S304.1, Masonry Design for Buildings.
  - .7        CSA W186, Welding of Reinforcing Bars in Reinforced Concrete Construction.
  - .8        CSA A179, Mortar and Grout For Unit Masonry.

**1.3                SUBMITTALS**

- .1        Product Data:
  - .1        Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
  - .2        Submit two (2) copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for epoxy coatings and galvanized protective coatings and touch-up products.
- .2        Shop Drawings :
  - .1        Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
  - .2        Shop drawings consist of bar bending details, lists and placing drawings.
  - .3        On placing drawings, indicate sizes, spacing, location and quantities of reinforcement and connectors.
- .3        Manufacturer's Instructions:
  - .1        Submit manufacturer's installation instructions.

**1.4                QUALITY ASSURANCE**

- .1        Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

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- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Bar reinforcement: to CSA-A371 and CAN/CSA G30.18, Grade 400.
- .2 Wire reinforcement: to CSA-A371 and CSA G30.14, truss type.
- .3 Connectors: to CSA-A370 and CSA-S304.
- .4 Corrosion protection: to CSA-S304, galvanized.

**2.2 FABRICATION**

- .1 Fabricate reinforcing in accordance with CAN/CSA-A23.1.
- .2 Fabricate connectors in accordance with CSA-A370.
- .3 Obtain Contract Administrator's approval for locations of reinforcement splices other than shown on placing drawings.
- .4 Subject to review by Contract Administrator, weld reinforcement in accordance with CSA W186.
- .5 Ship reinforcement and connectors, clearly identified in accordance with drawings.

**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 GENERAL**

- .1 Supply and install masonry connectors and reinforcement in accordance with CSA-A370, CSA-A371, CAN/CSA-A23.1 and CSA-S304.1 unless indicated otherwise.
- .2 Prior to placing concrete or mortar, obtain Contract Administrator's acceptance of placement of reinforcement and connectors.
- .3 Supply and install additional reinforcement to masonry as indicated.

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**3.3 BONDING AND TYING**

- .1 Bond walls of two or more wythes using connectors in accordance with National Building Code (NBC) CSA-S304, CSA-A371 and as indicated.
- .2 Tie masonry veneer to backing in accordance with NBC, CSA-S304.1, CSA-A371 and as indicated.

**3.4 REINFORCED LINTELS AND BOND BEAMS**

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

**3.5 GROUTING**

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

**3.6 ANCHORS**

- .1 Supply and install metal anchors as indicated.

**3.7 LATERAL SUPPORT AND ANCHORAGE**

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

**3.8 MOVEMENT JOINTS**

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

**3.9 FIELD BENDING**

- .1 Do not field bend reinforcement and connectors except where indicated or authorized by Contract Administrator.
- .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.

**3.10 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.

**3.11 CLEANING**

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

MASONRY ANCHORAGE AND REINFORCING

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**END OF SECTION**

CONCRETE UNIT MASONRY

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**Part 1 General**

**1.1 RELATED SECTIONS**

- .1 Section 04 05 10 - Common Work Results for Masonry.
- .2 Section 04 05 12 - Mortar and Masonry Grout.
- .3 Section 04 05 19 - Masonry Anchorage and Reinforcing.

**1.2 REFERENCES**

- .1 Canadian Standards Association (CSA International)
  - .1 CAN3 A165 SERIES, CSA Standards on Concrete Masonry Units, covers: A165.1, A165.2, A165.3.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Standard concrete block units Type H/15/A/M : to CAN3-A165 Series (CAN3-A165.1).
  - .1 Classification: H/15/A/M
  - .2 Size: modular.
- .2 Special shapes: provide bull-nosed units for exposed corners. Provide purpose-made shapes for lintels and bond beams if required. Provide additional special shapes as indicated

**2.2 EXPOSED FACES**

- .1 Notwithstanding visual inspection requirements of CSA Standards, masonry units shall be free of surface indentations, surface cracks due to manufacture or chipping. Units so delivered shall not be used where exposed to view, but may be used where concealed.

**Part 3 Execution**

**3.1 WORKMANSHIP**

- .1 Build masonry work true-to-line, plumb, square and level, with vertical joints in proper alignment.
- .2 Tolerances for exposed masonry Work shall be:
  - .1 Variation from mean plane: 3 mm under 2.5 m straight edge.
  - .2 Variation in masonry openings: 6 mm maximum.

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- .3 Variation from plumb: 9 mm in 6 m.
- .3 Assume complete responsibility for dimensions, plumbs and level of this Work and constantly check same with graduated rod..
- .4 Masonry courses to be of uniform height, and both vertical and horizontal joints to be of equal and uniform thickness.
- .5 Extend non-load bearing portions to bottom surface of floor or roof construction above. Provide lateral support anchors attached to floor or roof above to requirements of CAN/CSA-S304. Fill topmost joint with mortar.
- .6 Extend non-load bearing portions to underside of floor or roof construction above and provide 25 mm deflection clearance. Install lateral support angles and insulation filler as detailed.
- .7 Construct walls upward in a uniform manner, no one portion being raised more than 1.2 m above another at any time. Build no more than 1.50 m of wall measured vertically in any one day.
- .8 Buttering corners of units, throwing mortar into joints and deep or excessive furrowing of bed joints will not be permitted. Do not shift or tap units after mortar has taken initial set. Where adjustments must be made after mortar has started to set, remove mortar and replace with fresh supply.

### **3.2 BLOCK WORK**

- .1 Lay concrete blocks in running bond, with thicker end of face shell upward. Coursing to be modular 200 mm for one block and one joint.
- .2 Use special shaped units where indicated, specified or required. Use bull-nosed units for exposed external corners, door and window jambs etc. Exposed open cells are not permitted.
- .3 Concrete masonry units shall have face shells and their end joints fully filled with mortar, and joints squeezed tight. Also fill webs at cores, to be reinforced and grouted and strike flush at core taking care to prevent mortar from falling into core.
- .4 Tie intersecting non-bearing walls together with masonry reinforcing every second course.
- .5 Do not tie intersecting non-bearing walls together in masonry bond, except at corners.

### **3.3 MORTAR AND POINTING**

- .1 Make all joints uniform in thickness, straight, in line and with mortar compressed to form concave joints.

### **3.4 BUILDING IN**

- .1 Build in doors and window frames, steel lintels, sleeves, anchor bolts, anchors, nailing strips and other items to be built into masonry.

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- .2 Do not distort metal frames. Bed anchors of frames in mortar and fill frame voids with mortar or grout as walls are erected.

### 3.5 BEARINGS

- .1 Fill concrete block solid with 20 MPa concrete for two (2) courses below bearing points of structural members and where indicated on Drawings.
- .2 Install building paper and wire mesh reinforcing in the bed below the second block course from top.

### 3.6 CONTROL JOINTS

- .1 Provide continuous vertical control joints in concrete block partitions and walls at locations indicated, or at a maximum 7.6 m o.c.
- .2 Form control joints as detailed. Stop masonry reinforcing each side of joint.

### 3.7 EXPANSION JOINTS

- .1 Construct expansion joints where indicated, as detailed.

### 3.8 MASONRY REINFORCING

- .1 Concrete block walls and partitions shall be continuously reinforced and tied together with masonry reinforcing in every second block bed joint.
- .2 Place masonry reinforcing in first and second bed joints above and below openings. Reinforcing in first bed joint shall be continuous. Second bed joint reinforcing shall extend 600 mm beyond each side of opening.
- .3 Place continuous reinforcing in second bed joint below the top of walls.
- .4 Lap reinforcement minimum of 150 mm at splices and cut and bend corners.
- .5 Vertical reinforcing bars to be continuous into lintel, through intermediate bond beams and hooked into top of wall bond beams.

### 3.9 CUTTING MASONRY

- .1 Cutting of masonry units exposed in finished Work is to be done with accepted type power saw. Where electrical conduit outlets and switch boxes occur. Grind and cut units before services are installed.
- .2 Obtain Contract Administrator's permission before cutting any part of areaw hich may impair appearance or strength of the Work.
- .3 Patching of masonry is not permitted without Contract Administrator's authorization.

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**3.10 BOND BEAMS**

- .1 Install concrete block bond beams where indicated and where required for bearing of structural members.
- .2 Make bond beams of special blocks with two (2) deformed 15M reinforcing bars placed in bottom, and fill with 20 MPa concrete.

**3.11 REINFORCED BLOCK LINTELS**

- .1 Install reinforced concrete block lintels at openings where steel lintels are not indicated.
- .2 Cast and cure lintels in plank. Set special channel lintel blocks using specified mortar. Place wood stops at either end of lintel to prevent movement.
- .3 Place 25 mm of concrete in voids, place in deformed reinforcing bars and place concrete to level of block sides. Rod and tamp concrete well without disturbing reinforcing. Allow lintels to cure seven (7) days before removing shores.
- .4 Minimum bearing shall be 400 mm each side of opening.

**3.12 NAILING INSERTS**

- .1 Install nailing inserts as required for wall strapping set in mortar joints at 400 mm centres each way, to Manufacturer's instructions.

**3.13 PARGING**

- .1 Apply parging in a uniform coat, minimum 10 mm thick. Use sufficient pressure to ensure bonding.

**3.14 PROVISIONS FOR OTHER TRADES**

- .1 Provide openings in masonry walls where required or indicated.
- .2 Accurately locate chases and openings and neatly finish to required sizes.
- .3 Where masonry encloses conduit, ducts and piping, bring to proper level indicated and as directed. Do not cover any pipe or conduit chases or enclosures until advised that Work has been reviewed and tested.
- .4 Build masonry neatly around conduits, ducts, sleeves and piping passing through.

**3.15 CLEANING**

- .1 Standard block: Allow mortar droppings on masonry to partially dry then remove by means of trowel, followed by rubbing lightly with small piece of block and finally by brushing.
- .2 Point or replace defective mortar to match existing as required or directed.

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- .3 Scrub surfaces to be cleaned using non-acid cleaning solution of type which will not harm constructed masonry. Check masonry unit Manufacturer's data for acceptable solution. Clean trial test area and obtain permission to proceed.
- .4 Use large amounts of water and do cleaning in accordance with Manufacturer's instructions.
- .5 Repeat cleaning operations as often as necessary until Work is satisfactory.

**END OF SECTION**