

Masonry Procedures

Section revised and reissued by Addendum 03

## PART 1 - GENERAL

### 1.1 Summary

- .1 Section includes:
  - .1 Masonry procedures for masonry work, including temporary bracing.

### 1.2 Administrative Requirements

- .1 Conduct a pre-installation meeting in accordance with Section 01 31 19 and as follows:

### 1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 33 00.
- .2 *Product* data sheets:
  - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in masonry assemblies.
- .3 Shop drawings:
  - .1 Submit shop drawings for masonry unit wall assemblies indicating:
    - .1 Proposed locations of movement (control) joints.
    - .2 Types of masonry units, grade, texture, typical dimensions, colours, special shapes and shape dimensions.
    - .3 Layout/coursing for each type of masonry unit. Units are not to be cut without approval of *Consultant*. Layout using full brick masonry units.
  - .2 Submit engineered shop drawings for the following:
    - .1 Non-axial-load bearing masonry assemblies (post disaster applications).
    - .2 Masonry reinforcement.
    - .3 Masonry ties and connectors.
    - .4 Seismic design, connections, and restraint of wall assemblies.
- .4 Samples:
  - .1 2 of each type of brick masonry unit specified.
  - .2 2 of each type of concrete masonry unit specified.
  - .3 1 of each type of masonry accessory specified.
  - .4 1 of each type of masonry reinforcement and tie proposed for use.
  - .5 Pigmented mortar samples for each mortar colour for colour match verification by *Consultant*.

### 1.4 Quality Assurance

- .1 Qualifications:
  - .1 Installers:

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- .1 Shall have 5 years' experience, minimum, in application of *Products*, systems and assemblies specified and with approval of *Product* manufacturers.
- .2 Masonry contractor's qualifications:
  - .1 Membership in good standing in Canadian Masonry Contractors Association (CMCA).
- .2 Mock-ups:
  - .1 Quality control mock-ups for masonry veneer walls:
    - .1 Construct mock-up panel of each type of masonry veneered wall construction 3000 mm x 3000 mm (10' x 10') at locations designated by *Consultant* showing masonry colours and textures, use of reinforcement, ties, through-wall flashing, weep holes, jointing, coursing, mortar colours and workmanship.
    - .2 Select masonry units for use in mock-ups that represent the maximum variation in texture and colour.
    - .3 Mock-up shall remain in place until acceptance of masonry and as directed by the *Consultant*.

### 1.5 Site Conditions

- .1 Cold weather construction requirements:
  - .1 Comply with requirements of CAN/CSA A371-14, and as follows:

Air Temperature, °C	General requirements during construction
0 to 4	Sand or mixing water shall be heated to a minimum of 20°C and a maximum of 70°C.
-4 to 0	Sand and mixing water shall be heated to a minimum of 20°C and a maximum of 70°C.
-7 to -4	(1) Sand and mixing water shall be heated to a minimum of 20°C and a maximum of 70°C. (2) Source heat shall be provided on both sides of the walls under construction. (3) Windbreaks shall be employed when the wind speed exceeds 25 km/h.
-7 and below	(1) Sand and mixing water shall be heated to a minimum of 20°C and a maximum of 70°C. (2) Enclosures and supplementary heat shall be provided to maintain an air temperature above 0°C. (3) The temperature of the unit when laid shall be not less than 7°C.

- .2 Grout shall be placed in masonry at a minimum temperature of 20°C and a maximum temperature of 50°C.
- .3 Mortar temperature shall not exceed 50°C to avoid flash set.
- .4 Maintain dry beds for masonry and use dry masonry units only. Do not wet masonry units in winter.
- .2 Cold weather protection requirements:

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- .1 Comply with requirements of CAN/CSA A371-14, and provide protection requirements for completed masonry or sections not in progress shall be as follows:

Mean daily air temperature, °C	Protection
0 to 4	Masonry shall be protected from rain or snow for 48 h
-4 to 0	Masonry shall be completely covered for 48 h
-7 to -4	Masonry shall be completely covered with insulating blankets for 48 h
-7 and below	The masonry temperature shall be maintained above 0 °C for 48 h by enclosure and supplementary heat

- .3 Hot weather construction requirements:

- .1 Comply with requirements of CAN/CSA A371-14, and as follows:

- .1 The spreading of mortar beds shall be limited to 1.2 m, and the masonry units shall be set within 1 minute of spreading the mortar, when the air temperature is above:

- .1 38°C; or  
.2 32°C, with a wind velocity greater than 13 km/h.

- .2 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.

### 1.6 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.  
.2 Extended warranty:  
.1 Labour, materials, and workmanship for work of this section.  
.2 Duration: 2 years.

## PART 2 - PRODUCTS

### 2.1 Materials

- .1 Mortar and grout for masonry: in accordance with Section 04 05 13.  
.2 Masonry reinforcement and connectors: in accordance with Section 04 05 19.  
.3 Masonry accessories: in accordance with Section 04 05 23.  
.4 Brick masonry units: in accordance with Section 04 21 00.  
.5 Concrete masonry units: in accordance with Section 04 22 00.

## PART 3 - EXECUTION

### 3.1 Workmanship

- .1 Build masonry plumb, level, and true to line, with vertical joints in proper alignment. Lay masonry to tolerances specified in CAN/CSA A371-14.  
.2 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

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- .3 Masonry mortar and grout work: CAN/CSA A179-14 except where specified otherwise.
- .4 Masonry work: CSA S304-14, CAN/CSA A370-14, and CAN/CSA A371-14 except where specified otherwise.

### 3.2 General Erection Tolerances

- .1 Lay masonry units with required mortar joint thickness specified below, not to exceed 12.7 mm (1/2").
- .2 Construction tolerances:
  - .1 Maximum variation from plumb in vertical lines and surfaces of columns, walls and arrises:
    - .1 6.4 mm (1/4") in 3 m (10').
    - .2 9.6 mm (3/8") in a storey height not to exceed 6 m (20').
    - .3 12.7 mm (1/2") in 12 m (40') or more.
  - .2 Maximum variation from plumb for external corners, expansion joints and other conspicuous lines:
    - .1 6.4 mm (1/4") in any story or 6 m (20') maximum.
    - .2 12.7 mm (1/2") in 12 m (40') or more.
  - .3 Maximum variation from level of grades for exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines:
    - .1 6.4 mm (1/4") in any bay or 6 m (20').
    - .2 12.7 mm (1/2") in 12 m (40') or more.
  - .4 Maximum variation from plan location of related portions of columns, walls and partitions:
    - .1 12.7 mm (1/2") in any bay or 6 m (20').
    - .2 19 mm (3/4") in 12 m (40') or more.
  - .5 Maximum variation in cross-sectional dimensions of columns and thicknesses of walls from dimensions shown on drawings:
    - .1 Minus 6.4 mm (1/4").
    - .2 Plus 12.7 mm (1/2").
  - .6 Where masonry surfaces serves as substrate for thin-set tile and direct applied and insulated finish coatings, build to tolerance of 3.2 mm in 2440 mm (1/8" in any 8') under a straight edge.
- .3 Brick masonry units at building repairs: Layout coursing, bond, and joint bricks to match existing. Layout coursing and bond to achieve correct coursing heights to accommodate existing brick wall. Deviation in joint thickness shall not exceed +/- 3 mm.

### 3.3 Laying Masonry Units

- .1 Coursing design:

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- .1 Brick masonry units:
  - .1 One third running bond.
- .2 Concrete masonry units:
  - .1 Fifty percent running bond.
- .2 Installation and materials shall meet or exceed that of accepted samples and mock-up.
- .3 Units shall be cut only upon acceptance of *Consultant*. Walls are to be laid-up with full size masonry units.
- .4 Keep cavity space at cavity and/or veneer walls clear of mortar droppings and debris.
- .5 Remove loose and foreign materials from supporting bed surfaces to ensure bonding.
- .6 Do not tooth at wall terminations. Rake back 1/2 unit length where stop-off occurs in horizontal run of masonry.
- .7 Do not install masonry units with face or faces exhibiting chips, cracks, blemishes, texture variation, and other imperfections detracting from appearance when viewed from distance of 4600 mm (15').
- .8 Do not install defective, cracked, and broken masonry units.
- .9 Mixing and blending: Mix units from a minimum of 3 pallets to ensure uniform blend of colour and texture and comply with manufacturer's recommended installation requirements. Distribute masonry units of varying textures to avoid spotty appearance over wall surfaces exposed to view. Do not use units which contrast too greatly with overall range.
- .10 Maintain bracing of walls and piers continuously during construction until structure provides support.
- .11 Locate bearings and piers as indicated. Provide solid masonry units at bearings. Grout under bearing plates installed on masonry with non-shrink grout.
- .12 Extend masonry and partitions to deck, slab or structural members, as applicable, except where otherwise noted in the *Contract Documents*. Incorporate both lateral support and deflection space at termination of walls as required by this section.
- .13 Grouted reinforced masonry: incorporate reinforcing steel and construct masonry to indicated requirements.
- .14 Lay masonry level, true to line, square, plumb, and as indicated. Lay masonry courses in vertical alignment to ensure vertical joints align for full height of masonry and full height of building face.
- .15 Lay masonry in full bed of mortar, properly jointed with other work. Buttering corners of joints, and deep or excessive furrowing of mortar joints are not permitted.
- .16 Fully bond intersections, and external corners.
- .17 Do not adjust masonry units after placement. Where resetting of masonry is required, remove units, clean and reset in new mortar.
- .18 Cut masonry around obstructions, leaving maximum joint size as specified in this section (below).

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- .19 Build chases, do not cut them.
- .20 Lay hollow concrete masonry units so that shells rest and align.
- .21 Exposed cuts shall be made clean and true with a suitable masonry saw.

### 3.4 Exposed Masonry

- .1 Do not lay chipped, cracked, blemished, and otherwise damaged units whether exposed or concealed.
- .2 Do not lay concrete masonry units that will appear smooth or slick where exposed to view, whether painted or not finished.
- .3 Remove chipped, cracked, and otherwise damaged units and replace with undamaged units.
- .4 Maintain and control water-to-cement ratio, rate of hydration, environmental conditions, tooling of the mortar joints, and cleaning procedures, to produce masonry of uniform appearance matching accepted mock-up.

### 3.5 Jointing

- .1 Form tooled mortar joints whenever exposed to view, and behind cabinets, fitments, and wall accessories. Tool when mortar is thumb-print hard by tools having long bearing surface to avoid uneven depressions. Close cracks and crevices.
- .2 Tool with non-staining pointing tool to provide smooth, compressed, uniformly formed joints as follows:
  - .1 For exposed brick masonry:
    - .1 Concave.
  - .2 For exposed concrete unit masonry:
    - .1 Concave.
  - .3 For concealed masonry: strike flush joints concealed in walls and joints in walls to receive plaster, stucco, tile, insulation, resilient bases, or other applied material except paint or similar thin finish coating. Ensure that no mortar protrudes from joints on wall surfaces to receive materials and coatings.
  - .4 Joint thickness:
    - .1 Maintain mortar joint thickness of 10 mm (3/8"), unless otherwise specified or indicated.
    - .2 At masonry cut around obstructions: maximum joint size of 13 mm (1/2").
- .3 Make joints of uniform thickness with vertical joints in alignment.
- .4 Trowel point joints in unparged masonry at below grade locations in contact with earth.
- .5 Form reglets where indicated for metal flashing in masonry.
- .6 Remove loose or defective mortar when masonry is removed and replace.

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- .7 Rake out joints at junctions of masonry with concrete walls and columns, and at intersection of masonry walls and partitions where joint reinforcement is installed. These joints shall be sealed in accordance with Section 07 92 00.

### 3.6 Built-In Work

- .1 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.
- .2 Coordinate and cooperate in the provisions for setting, anchorage and alignment of built-in work.
- .3 Metal door frames:
  - .1 Build masonry around metal door frames.
  - .2 Ensure that anchors are secured solidly, and that frames are true and plumb.
  - .3 Fill back void of frames with Type N or S mortar unless otherwise indicated.
  - .4 Protect frame with protective covering and leave no mortar on exposed frame faces.

### 3.7 Reinforced Masonry

- .1 Conform to requirements of CAN/CSA A371-14.
- .2 Grout beneath bearing plates: Fill voids beneath steel bases bearing on masonry with approved non-shrink grout having minimum compressive strength at 28 days cure time of 35 MPa. In addition, use non-ferrous grout where grout is exposed to view, in-service moisture conditions, and weather.
- .3 Reinforced block lintels:
  - .1 Install reinforced block lintels over doorways, other openings and recesses as indicated.
  - .2 Support masonry units of reinforced block lintels built in place. Provide a level platform, true to the proper elevation and of sufficient strength to support the load without visible deflection. Maintain supports in place for a minimum of 7 days and for a period sufficient to permit the concrete to cure and gain sufficient strength to safely support loads.
  - .3 Lay masonry units with full mortar coverage on abutting edges with joints shoved tight. Where masonry construction is continued above the lintel, place the first course of masonry units on the lintel in full mortar bed.
  - .4 Fill voids of masonry units that form the fill depth of lintel beams at one time per beam, with grout having minimum compressive strength at 28 days curing time of minimum 35 MPa.

### 3.8 Provision for Movement

- .1 Deflection space:
  - .1 Incorporate deflection space between tops of non-load-bearing walls/partitions and structure to prevent transference of structural loads to masonry.

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- .1 Exterior masonry wall deflection space: 12.7 mm (1/2").
- .2 Interior masonry partition deflection space: 25 mm (1").
- .2 Coordinate work of this section with installation of lateral supports.

### 3.9 Loose Lintels

- .1 Loose lintels: Install loose lintels as required to suit required openings. Set and level lintels, centred over opening width, on a 20 mil PVC slip-sheet membrane, placed over bed or mortar. Allow suitable movement joint at ends of lintels for expansion and contraction movement at exterior lintels.

### 3.10 Lateral Supports

- .1 In addition to requirements of *Contract Documents*, provide horizontal and vertical wall and partition lateral support anchors in accordance with CAN/CSA A370-14.

### 3.11 Movement (Control) Joints

- .1 For masonry without openings, space vertical movement joints at no more than 7620 mm (25') on centre.
- .2 For masonry with multiple openings, provide symmetrical placement of movement joints and reduced spacing of no more than 6096 mm (20 ft) on center.
- .3 Place movement joints at changes in wall direction, changes in building heights, at door and window locations where necessary and directed, at major changes in thickness of wall.
- .4 Extend movement joints to top of masonry, including parapets.
- .5 Review and coordinate movement joint locations with the *Consultant* prior to installation of masonry.

### 3.12 Temporary Bracing

- .1 Provide temporary bracing to masonry walls.

### 3.13 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 45 00 and perform field control tests in accordance with CSA S304-14.

### 3.14 Adjusting and Cleaning

- .1 Clean masonry in accordance with masonry manufacturer's written requirements. Remove masonry and install new masonry, if masonry is damaged by cleaning work.
- .2 Use proprietary PH-neutral cleaning solution with water as approved by manufacturer of masonry units in accordance with manufacturer's written directions.
- .3 Test cleaning agent and procedures by cleaning small, inconspicuous sample location prior to commencement of overall cleaning work. Review cleaning test area with *Consultant* and obtain acceptance in writing prior to cleaning remainder of areas requiring cleaning.



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- .4 Soak wall with clean water and flush off loose dirt and mortar.
- .5 Apply specified cleaning agent in accordance with the manufacturer's direction, working from top to bottom.
- .6 Rinse areas thoroughly with clean water to remove cleaning solutions, dirt, and mortar residue.
- .7 Remove mortar from exposed masonry face immediately after pointing and prior to full set to avoid mortar staining of masonry units. Remove efflorescence and mortar deposits from surfaces to receive coatings and surfaces which are exposed to view. Remove masonry and install new masonry, if mortar staining cannot be removed without damaging masonry work.
- .8 Remove mortar droppings from flashings and other materials immediately to prevent damage and discolouration.
- .9 Remove efflorescence and mortar deposits from surfaces to receive coatings or surfaces which are exposed to view, occurring within a time period of 1 year after date of *Substantial Performance of the Work*.

### 3.15 Protection

- .1 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.
- .2 Protect other materials and finishes from contamination by mortar droppings.
- .3 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.

### 3.16 Individual Brick Replacement

- .1 Remove only brick approved by the *Consultant* by means that will not cause further deterioration. Remove to sound brick.
- .2 Lay replacement brick with new materials.

### 3.17 Re-Pointing – Isolated Brick Repairs

- .1 Re-point in the following manner cracked, debonded, eroded or otherwise deteriorated mortar joints in the brick masonry where indicated and approved by the *Consultant*.
- .2 Rake out existing mortar to a depth of 19 mm to 25 mm. Remove mortar by means that will not cause damage to adjacent masonry units and mortar joints.
- .3 Remove loosened or disintegrated materials beyond this point.
- .4 Wash clean joints.
- .5 Remortar joint by tightly packing the specified mortar into the joints.
- .6 Tool mortar to provide a concave joint.

END OF SECTION