Master Format™ number and title selection is Section **04 21 00** - Clay Unit Masonry

Produced by Canada Brick, utilizing the Construction Specifications Canada (CSC) MasterFormat™. The section is dated 19-03-2024.

Optional text is indicated by brackets, [ ]. Delete unused optional text in your final specification copy.

The information is organized and presented to assist the specification writer in selecting the appropriate construction methodologies.

The specification writer is responsible for product selection as well as the use and application of this information, and should contact Canada Brick to ensure that size, types, finishes, etc. are available and that the associated specification information is valid and correct.

The intent of the Specification is by no means an all-inclusive masonry brick specification and therefore should only be used as a guide.

Every effort has been made to ensure that the contents are as accurate and complete as possible. Canada Brick cannot accept responsibility for any errors or omissions.

Comments for improvements are welcome and will be considered for future updating. Please forward your comments to aarish.khan@canadabrick.com.

**Section 04 21 00 – Clay Unit Masonry**

# GENERAL

## SECTION INCLUDES

*SPEC NOTE: List significant generic types of products work, or requirements specified.*

* + 1. This section includes clay masonry units used as brick veneer, and cavity construction.
	1. RELATED SECTIONS

*SPEC NOTE: List the section number and the section name. Edit the following paragraphs for the specific project. If sections are not referenced elsewhere in this section, delete the section from this article.*

* + 1. Section 01 33 00 - Submittal Procedures
		2. Section 01 43 00 - Quality Assurance
		3. Section 04 05 00 – Common Work Results for Masonry
		4. Section 04 05 13 - Masonry Mortaring
		5. Section 04 05 19 - Masonry Anchorage and Reinforcement
		6. Section 04 05 23 - Masonry Accessories
		7. Section 07 27 00 - Air Barriers
		8. Section 07 90 00 - Joint Protection

## REFERENCES

*SPEC NOTE: List standard references in the section, complete with designations and titles.*

* + 1. American Society for Testing and Materials (ASTM)
			1. ASTM C 207 - Standard Specification for Hydrated Lime for Masonry Purposes
			2. ASTM C1329 - Standard Specification for Mortar Cement
		2. Canada Brick
			1. Weatherproofing Masonry for the Northern Climates
		3. Canadian Standards Association (CSA)
			1. CAN/CSA-A82 - Fired Masonry Brick made from Clay or Shale
			2. CSA A179 - Mortar and Grout for Unit Masonry
			3. CSA A370 - Connectors for Masonry
			4. CSA A371 - Masonry Construction for Buildings
			5. CSA-A3000 Series - Cement Material (Portland Cement and Masonry Cement)
		4. International Masonry Institute (IMI)
			1. All-Weather Council: Recommended Practices and Guide Specifications for Cold Weather Masonry Construction

## SUBMITTALS

*SPEC NOTE: Include requests for relevant data to be furnished by the contractor before, during and/or after construction.*

* + 1. Product Data: Submit Canada Brick’s printed product literature, specifications, test reports in accordance with Section 01 33 00 - Submittal Procedures.
			1. Submit dimensional drawings of special

shapes.

* + 1. Samples:

*SPEC NOTE: Edit the following two articles for submission of physical samples for selection of finish, colour and/or texture.*

* + - 1. Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
			2. Submit not less than five representative samples for each type of brick specified or a suitable sample board to illustrate colour and texture.
		1. Tests: Submit test report of unit masonry to requirements of Section 01 33 00 - Submittal Procedures.
			1. Test samples in accordance with CSA A82.

*SPEC NOTE: This Article should include standards, limitations and criteria which establish an overall level of quality for products and workmanship for this section. Coordinate with Section 14 43 00 - Quality Assurance.*

* 1. QUALITY ASSURANCE
		1. Masonry Contractor: Company or person specializing in commercial masonry work [with [5] [ ] years [documented] experience].
		2. Installation of Masonry Work: To CSA-A371.
		3. Mock-up: Construct mock-ups in accordance with Section 01 45 00 - Quality Control. Locate mock-ups as may be required and where directed by Consultant.

*SPEC NOTE: If a mock-up of a size different than that suggested is required, edit the following article to suit requirements.*

*SPEC NOTE: Shade variation of mortar can occur due to different local cements, sand, mixing design, pigment loading, workmanship (tooling) and curing. The mortar colour does affect the overall colour tone of the masonry wall finish.*

* + - 1. Construct typical mock-up panel [1200 x 1200 mm] [48 x 48 in] to illustrate masonry units, coursing, mortar joints and movement control joints, texture, bond and workmanship. Construct a separate wall assembly for each type of brick or mortar as directed by consultant.

*SPEC NOTE: Edit the options in the following article to suit project requirements.*

* + - 1. Construct mock-up to illustrate [backup wall,] [exterior sheathing,] [air barrier,] [cavity wall insulation,] [connectors,] [weep holes,] [cavity vents,] [and] [through wall flashing]. Construct the wall assembly using brick from the same production run to be used on the building.
			2. Approvals
				1. Assemble sample wall two weeks prior to commencement of masonry work.
				2. When sample wall is complete, notify Consultant 24 hours before scheduled inspection and approval of mock-up.
				3. When mock-up has been inspected and approved by consultant proceed with masonry work.
				4. Remove mock-up when not approved and rebuild. Notify Consultant 24 hours before inspection and approval.
				5. When approved, mock-up will demonstrate minimum standard for this work.
				6. Mock-up is to remain in place for duration of work as a reference point.
		1. Do not proceed with work until mock-up has been approved. Only work which matches approved mock-up in all respects will be acceptable for project.
		2. Retain each approved mock-up for duration of the work and protect from damage.
		3. Mock-up may [not] remain part of the finished work as directed by consultant. Remove upon project completion if mock-up not incorporated into work.
	1. PRE-INSTALLATION MEETINGS
		1. Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer’s installation instructions and manufacturer’s warranty requirements. Comply with Section 01 31 00 - Project Management and Coordination, Project Meetings.

*SPEC NOTE: This Article should include special and unique requirements. Co-ordinate with Sections 01 65 00 - Product Delivery Requirements or 01 66 00 - Product Storage and Handling Requirements.*

* 1. DELIVERY, STORAGE AND HANDLING
		1. Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.
		2. Ensure that sufficient brick has been ordered to complete project from single production run.
		3. Ensure that special shape brick are ordered in time to be manufactured with the main order of brick to facilitate colour consistency.

*SPEC NOTE: Delete the following two articles if Section 04 05 13 - Masonry Mortaring is included in the Project Manual.*

* + 1. Deliver mortar materials in original unbroken and undamaged packages with the maker’s name and brand distinctly marked and, upon delivery, protect materials from the elements until required.
		2. Store or pile sand on a plank platform and protect from dirt and rubbish. Store mortar materials and sand to prevent deterioration or contamination by foreign materials.
		3. Deliver masonry units to the site. Prevent damage to units.
		4. Lift skids with proper and sufficiently long slings or forks with protection to prevent damage to units. Protect edges and corners.
		5. Store masonry units to prevent damage and staining of units.
		6. Stack units on timbers or platforms at least [75 mm] [3 in] above grade.
		7. Cover stored units with protective enclosure if exposed to weather.
		8. Do not use salt or calcium-chloride to remove ice from masonry surfaces.
		9. Split twin packs into single cubes before loading onto scaffold.
		10. All smooth finished brick shall be handled on wooden pallet.
		11. Extra on-site handling care shall be given to smooth finished brick.
	1. WASTE MANAGEMENT AND DISPOSAL

*SPEC NOTE: State information that will assist the contractor with dealing with disposal of construction waste materials in ways other than using landfill resources.*

* + 1. Deposit packaging materials in appropriate container on site for recycling or reuse.
		2. Avoid using landfill waste disposal procedures when recycling facilities are available.

*SPEC NOTE: Check with supplier about returning brick skids to the factory for reuse.*

* + 1. Notify Canada Brick to collect skids when available.
		2. Keep all discarded packaging away from children.
	1. PROJECT ENVIRONMENTAL REQUIREMENTS

*SPEC NOTE: This article specifies the limitations and precautions for installation of clay brick masonry when particular temperature, humidity and other weather conditions are in effect.*

* + 1. CSA A371 - Masonry Construction for Buildings [Clause 5.16.2 Cold Weather Requirements] [Clause 5.16.4 Hot Weather Requirements]

## WARRANTY

*SPEC NOTE: Coordinate this Article with CCDC 2 and Section 01 78 00 - Closeout Submittals, Product Warranties. Consult with Canada Brick for specific test report.*

* + 1. Canada Brick will replace at no charge any clay brick masonry unit that has been proven to cause wall failure resulting from brick manufacturing defect.
1. **PRODUCTS**

*SPEC NOTE: For information on brick colours, dimensions, and physical attributes of clay bricks, refer to the Canada Brick Product Literature. The Product Literature is available from Canada Brick in hard copy or can be viewed electronically by visiting the Canada Brick website at* [*www.canadabrick.com.*](http://www.canadabrick.com.)

## MANUFACTURERS

* + 1. Canada Brick

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## MASONRY UNITS

*SPEC NOTE: For information on special sizes, shapes and colours, contact Canada Brick.*

*SPEC NOTE: The CSA A82 standard lists three different types of brick. The Type S brick listed below is the general-purpose brick for interior and exterior applications. If greater control on tolerance of size is required, choose a Type X brick. If more architectural effects are desired, choose a Type A brick. The specifier must stipulate the tolerances to be used for type A brick. The grade of the brick listed below is EG - External Grade. Grade EG brick should be used for all exterior applications in Canada and northern U.S.A.*

* + 1. Face brick:
			1. Burned clay brick: To CAN/CSA A82
				1. Type: [S] [X] [A]
				2. Grade: EG

*SPEC NOTE: Standard Canada Brick sizes are: Metric Modular, CSR, Metric Closure, Engineer Norman, Ontario, MAX, Metric Jumbo and Metric Norman. Check with Canada Brick for availability, delivery and suitability for specific projects.*

*SPEC NOTE: Visit Canada Brick technical resources online at* [*www.canadabrick.com*](http://www.canadabrick.com) *for actual brick dimensions.*

* + - * 1. Size: [ ]
				2. Colour and texture: [to match approved sample]
		1. Special Shapes and Sizes

*SPEC NOTE: Canada Brick requires approved scaled drawings showing all special shapes dimensions, angles and finished textured surfaces before special shapes are manufactured.*

*SPEC NOTE: Canada Brick will not price or manufacture special shapes without an approved scaled drawing showing all of the above information.*

*SPEC NOTE: Connect with Terry Klingspohn (**terry.klingspohn@canadabrick.com**) or Aarish Khan (**aarish.khan@canadabrick.com**) from Canada Brick for traditional and non-traditional special shapes and sizes.*

* + - 1. Special Shape:

## MORTAR MATERIALS

*SPEC NOTE: Delete the following article if mortar and grout are specified in this section of the Project Manual.*

* + 1. Mortar and grout in accordance with Section 04 05 13.

*SPEC NOTE: If the Project Manual includes Section 04 05 13 - Masonry Mortaring, delete the following articles.*

*SPEC NOTE: CSA A179 - Mortar Type ‘S’ is used for load bearing masonry and Mortar Type ‘N’ is used for non-load bearing masonry.*

* + 1. Mortar: CSA A179, Type [S] [N]
		2. Bond: [1/2 Running bond] [1/3 Running Bond] [Common Bond, Full Headers every 6th course] [Common Bond, Flemish Headers every 6th course] [English Bond, Dutch Corner] [Flemish Bond, Dutch Corner] [English Bond, English Corner] [Stacked]

*SPEC NOTE: Concave tooled mortar joints are the best joint profile for exterior masonry. Concave joints provide the best resistance to moisture ingress and minimize possible moisture problems such as leakage, efflorescence and spalling.*

* + 1. Joints: Exterior joint - [concave], Interior joints - [Concave] [Raked] [V-Shape] [Weathered] [Flushed] [Struck]
		2. Portland Cement: CSA-A3000, Type [GU]
		3. Masonry Cement: CSA-A3000 Type [N][S]
		4. Hydrated Lime: ASTM C 207, Type S
		5. Mortar Aggregate: CSA A179, [standard masonry] [white silica] type; clean, dry, protected against dampness, freezing and foreign matter.
		6. Colour Pigment: natural oxide pigment, [ ].

*SPEC NOTE: Use the following article to indicate manufacturers name, address, product name, model number, style number, name or other product identifier as well as means of contacting manufacturer.*

* + - 1. Acceptable material: [ ].

*SPEC NOTE: Colour match is normally achieved when admixture is between 4-5% of cement content by mass.*

* + - 1. Natural oxide pigment shall not exceed 10% of cement content by mass, or integrally coloured masonry cement, to produce coloured mortar to match approved sample.

*SPEC NOTE: Indicate masonry work requiring use of coloured mortar. Sample of coloured mortar must be available at time of tendering, as cost varies with colour. When admixtures are used, Property Specifications of CSA A179 applies.*

* + - 1. Use coloured mortar for [ ].
		1. Water shall be potable, clean and free of deleterious amounts of acids, alkalis or organic materials.
		2. Mortar should be used within two and a half hours of batching.
	1. ANCHORS AND TIES

*SPEC NOTE: Delete the following articles if reinforcement and connectors are specified in this Section of the Project Manual.*

* + 1. Reinforcement and connectors in accordance with Section 04 05 19 - Masonry Anchorage and Reinforcement
		2. Anchors: To CSA A370

*SPEC NOTE: Use the following article to indicate manufacturers name, address, product name, model number, style number, name or other product identifier as well as means of contacting manufacturer.*

* + - 1. *Acceptable material: [ ]*

*SPEC NOTE: Indicate type of wall ties required (i.e. face veneer anchored to masonry walls).*

* + 1. *Wall Ties: To CSA A370*
		2. *Joint Reinforcement: To CSA A370*

*SPEC NOTE: For Canadian construction use Level l, ll, lll depending on exposure. Level lll is stainless steel for building greater than 11 m in height and in areas of moderate to severe exposure. Level ll is hot dipped galvanized carbon steel and is used for most other situations.*

* + - 1. *Corrosion Protection: CSA A370 Level [l] [ll] [lll] [hot dip galvanized] [stainless] steel*

*SPEC NOTE: Use the following article to indicate manufacturers name, address, product name, model number, style number, name or other product identifier as well as means of contacting manufacturer.*

* + - 1. *Acceptable material: [ ]*
	1. *ACCESSORIES*

*SPEC NOTE: Delete the following article if flashings are specified in this Section of the Project Manual.*

* + 1. *Provide [flashings,] [weep hole, vents,] above doors and windows and at the bottom of all cavities in accordance with Section 04 05 23 - Masonry Accessories.*
			1. *Provide weep hole above doors and windows, at bottom of all cavities.*
			2. *Provide vents at top of wall and below continuous shelf angle location.*

*SPEC NOTE: Delete the following article if Section 04 05 23 - Masonry Accessories is included in the Project Manual.*

* + 1. *Sheet Metal: [Galvanized steel]*
1. ***EXECUTION***
	1. *EXAMINATION*
		1. *Verify that site conditions are ready to receive work.*
		2. *Beginning of installation means acceptance of site conditions.*
	2. *PREPARATION*
		1. *Supply metal anchors to Section 04 05 19 - Masonry Anchorage and Reinforcement for placement. Direct correct placement of metal anchors.*
		2. *Verify items provided by other sections of work are properly sized and located.*
	3. *CUTTING OF MASONRY UNITS*
		1. *Wet saw masonry units.*
		2. *Pre-soak units using clean water prior to cutting.*
		3. *Clean cut units using a stiff fibre brush and clean water. Allow units to surface dry prior to placement.*
	4. *INSTALLATION*

*SPEC NOTE: Include in this article requirements which are not included in Section 04 05 00 - Common Work Results for Masonry.*

*SPEC NOTE: For further information on bond and coursing height, refer to Canada Brick’s online technical literature at* [*www.canadabrick.com.*](http://www.canadabrick.com.)

* + 1. *Erect masonry in accordance with Section 04 05 00 - Common Work Results for Masonry.*

*SPEC NOTE: For further information on mortar joint types, refer to Canada Brick’s Technical Note titled “Weatherproofing Masonry for Northern Climates”.*

* + 1. *Jointing: Use concave tooled joints for all exterior exposed masonry.*
		2. *Mixing and blending: Mix units within each pallet and with other pallets to ensure uniform blend of colour and texture.*
		3. *Clean clay masonry as work progresses.*
	1. *COURSING*
		1. *Place masonry to lines and levels indicated.*
		2. *Maintain masonry courses to uniform width. Make vertical and horizontal joints equal and of uniform thickness.*
		3. *Lay masonry units in [running] bond.*
		4. *Masonry coursing should conform to design of building.*
		5. Maintain mortar joint thickness of 10 mm [3/8 in], plus or minus 3 mm (1/8 in). Adjust mortar joint thickness to accommodate variation in unit size in order to achieve specified coursing.

*SPEC NOTE: For all exterior masonry applications, a concave joint is necessary.*

## PLACING AND BONDING

* + 1. Lay masonry in full bed and head joints of mortar, properly jointed with other work.
		2. Buttering corners of joints, [and] deep or excessive furrowing of mortar joints are not permitted.
		3. Fully bond intersections and external corners.
		4. Isolate masonry partitions from vertical structural framing members with a control joint [as indicated].
		5. Do not adjust masonry units after laying. Where resetting of masonry is required, remove units, clean and reset in new mortar.

## BRICK VENEER AND CAVITY WALL

* + 1. Install weep hole vents in brick veneer at [800 mm] [31 in] maximum spacing horizontally [above through-wall flashing] [above shelf angles] [and] [at bottom of walls].
		2. Install cavity vents at [top of cavity space] at same spacing (optional).

## TOLERANCES

* + 1. Variation in vertical alignment: ±20 mm (±3/4 in)
		2. Variation in lateral alignment: ±13 mm (±1/2 in)
		3. Variation in level alignment - joints: ±13 mm (±1/2 in)
		4. Variation in relative alignment in 3 m (10 ft): ±6 mm (±1/4 in)
		5. Variation of mortar joint thickness: ±3 mm [±1/8 in]

## REINFORCEMENT AND ANCHORAGES

* + 1. For brick veneer, embed wall ties in masonry back-up at maximum 600 mm [24 in] oc vertically and 800 mm [32 in] oc horizontally. Place within 300 mm [12 in] of openings.

*SPEC NOTE: The actual tie spacing requirements are determined by the designer in accordance with the provisions of CSA A371.*

## MASONRY FLASHING

* + 1. Extend flashing through brick veneer, turn up and [bed into mortar joint of masonry] [seal to concrete] [seal into sheathing over [wood] [steel stud] framed] back-up.
		2. Install through-wall flashing to direct accumulated moisture from air space behind brick.
		3. Ensure bricks are set within one minute of

spreading mortar.

* + 1. Use mortar within two and a half hours of batching.

## MOVEMENT CONTROL JOINTS

* + 1. Do not continue horizontal joint reinforcing across movement control joints.
		2. Form movement control joints by leaving head joints between stacked units void of mortar, ready for application of bond breaker and joint sealant.
		3. Size joint in accordance with Section 07 90 00 – Joint Protection.

## COLD WEATHER MASONRY

*SPEC NOTE: Freezing mortar in the wet state will inhibit the hydration process and prevent the mortar from setting and gaining strength. Wet and frozen bricks have a very low absorption rate and will not bond properly to the mortar.*

* + 1. Air temperature [0o to 4o C] [32o to 39o F]: Protect masonry from rain and snow for 24 hours minimum. Heat sand and mixing water to minimum 20o C (68o F), maximum 70o C (158o F).
		2. Air temperature [-4o to 0o C] [25o to 32o F]: Cover masonry for 24 hours minimum after completion of each portion of work. Heat sand and mixing water to minimum 20o C (68o F), maximum 70o C (158o F).
		3. Air temperature [-7o to -4o C] [19o to 25o F]: Provide heat on both sides of wall and use windbreaks when wind is in excess of [25 km/ hr] [15.5 mph]. Cover masonry with insulating blanket for 24 hours minimum after completion of each portion of work. Heat sand and mixing water to minimum 20o C (68o F), maximum 70o C (158o F). Use windbreaks when wind is in excess of 25 km/hr (15 mph).
		4. Completely enclose work and maintain air enclosed temperature above [0o C] [32o F] when outside air temperature is less than [-7o C] [19o F]. Ensure temperature of brick when laid is not less than [7o C] [45o F]. Maintain temperature of work above [0o C] [32o F] for 24 hours minimum after completion of each portion of work. Heat sand and mixing water to minimum 20o C (68o F), maximum 70o C (158o F).
		5. The protection periods mentioned above shall be increased from 24 hours to 48 hours unless Type 30 High Early Strength Portland Cement and Type S hydrated lime are used in the mortar.

## WARM WEATHER MASONRY

*SPEC NOTE: Most Canadian clay brick have an IRA less than 30g/ (min x 20000 mm2). However, in extremely hot weather, clay brick should be prewetted. The brick should be wet on the inside, yet surface dry. This can be achieved by letting water run over the cube of brick the previous day, or not sooner than 5 hours before the units are to be used.*

*SPEC NOTE: In very hot weather, the mortar will lose water rapidly, curtailing the hydration process, inhibiting the strength gain of the mortar and reducing the bond strength.*

* + 1. When air temperature is [38o C] [100o F] or greater, or [32o C] [90o F] with wind velocity in excess of [13 km/hr] [8 mph]:
			1. Prewet clay brick masonry units.
			2. Limit spread of mortar beds to [1.2 m] [4 ft]

length.

* + - 1. Ensure bricks are set within one minute of

spreading mortar.

* + - 1. Use mortar within an hour and a half of batching when temperature exceeds 25º C.

## PROTECTION

* + 1. Protect masonry work in accordance with CSA A371.
			1. Use straw, sand, sawdust or plastic sheeting spread out on the ground, below the wall under construction. Protect base of walls from rain-splatter, mud and mortar.
			2. Turn scaffold boards on edge at end of day to prevent possible rainfall from splashing mortar and dirt directly onto completed masonry. When turning scaffold boards, they should be angled away from the wall to prevent dirt from splashing onto the wall.
		2. Wall covering:

*SPEC NOTE: Covering masonry work in progress during inclement weather will minimize ingress of moisture and reduce potential for efflorescence.*

* + - 1. During erection, cover top of wall with waterproof membrane at end of each day or when work stops.
			2. Cover partially completed wall when work is not in progress.
			3. Extend protective cover minimum 600 mm (24 in) down both sides and secure in place.
			4. Brickwork below windows should be covered until the windows and sills are installed.
			5. Horizontal movement joints beneath shelf angles are to be caulked as soon as possible to prevent ingress of moisture.
		1. Load application:
			1. Do not apply uniform floor or roof loading for at least 12 hours after building masonry columns or walls.
			2. Do not apply concentrated loads for at least 3 days after building columns or walls.
	1. CLEANING

*SPEC NOTE: Refer to Canada Brick’s Technical Note “Cleaning Procedures for New Brickwork”.*

*SPEC NOTE: Canada Brick does not under any circumstances recommend the use of muriatic (hydrochloric) acid, high pressure cleaning or sand blasting. There is a tendency for residual staining and removal of sand coatings if these cleaning methods are used.*

* + 1. Preparation before cleaning:
			1. Cut out and replace any defective mortar joints.
			2. Dry clean wall.
			3. Remove large particles of mortar using wood paddles without damaging surface. Saturate masonry with clean water an flush off loose mortar and dirt.
			4. Protect all windows, sills, doors, trim and

other work.

* + 1. Clean clay masonry: [[10 m2] [107 ft2]] area of wall designated by Consultant] [mock-up panel specified in Section 04 05 00 - Common Work Results for Masonry] as directed below and leave for one week. If no harmful effects appear and after mortar has set and cured, 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] [one tsp]] trisodium phosphate and [[25mL] [one tsp]] household detergent dissolved in [[one litre] [4 cups]] of clean water using stiff fibre brush, 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/or other stains.

END OF SECTION