

Part 1 General

1.1 REFERENCES

- .1 Definitions:
 - .1 Low-pressure water soaking: less than 72 kPa (500 psi), measured at nozzle tip.
 - .2 Medium-pressure water soaking: minimum 72 kPa (500 psi) and maximum 144 kPa (1000 psi), measured at nozzle tip.
- .2 CSA Group
 - .1 CAN/CSA-Z94.4-[11], Selection, Use, and Care of Respirators.
- .3 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Assessment Act (CEAA), 2012.
 - .2 Canadian Environmental Protection Act (CEPA), 1999.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .5 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, (1992, c. 34).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide proposed cleaning method and type of protection from cleaning residue for in-place conditions.
- .3 Product Data:
 - .1 Provide technical data on cleaning materials, equipment, machinery, compressors, tools and nozzles.
- .4 Samples:
 - .1 Provide samples of cleaning materials for approval of Departmental Representative.
- .5 Test and Evaluation Reports:
 - .1 Provide test results.
 - .1 Provide one electronic copy of test results describing cleaning method, compressor equipment, water pressure at compressor, tools, nozzle size and distance from masonry surface used for cleaning of test patches.
 - .2 Proceed with cleaning upon receiving written approval by Departmental Representative concerning tested cleaning methods.

1.3 QUALITY ASSURANCE

- .1 Regulatory Requirements: ensure work is performed in compliance with CEPA, CEAA, TDGA and applicable Provincial regulations.

- .2 Comply with requirements of Workplace Hazardous Materials Information Sheet (WHMIS).
- .3 Qualifications:
 - .1 Manufacturers:
 - .1 Filling mortar: manufactured by company specializing in production of cementitious restoration materials with experience in production of filling mortar products and with a record of satisfactory in-service performance. Acceptable products Jahn International – Natural Stone Repair Mortar or approved equal.
 - .2 Masonry Contractor:
 - .1 Work of this Section: executed by contractor specializing in historic stone conservation work of this nature, using similar stone repair techniques with a minimum of 5 year of demonstrated experience.
 - .3 Foreperson:
 - .1 Provide competent trade foreperson specializing in type of work required.
 - .2 Experience: experience in conservation work similar to work of this Section. Must be present on site throughout Work.
 - .4 Installers:
 - .1 Executed by skilled trades people who have successfully completed a course of instruction provided by filling mortar manufacturer and hold a Training Workshop Certificate from said manufacturer. Maintain proof of credential for each installer at site.
- .4 Mock-ups:
 - .1 Do mock-up tests in accordance with Section 01 45 00 - Quality Control.
 - .2 Notify Departmental Representative 48 hours before commencing cleaning of each test patch.
 - .1 Obtain approval from Departmental Representative before commencing test.
 - .2 Coordinate location of mock-up on site with Departmental Representative.
 - .3 Before proceeding with mock up:
 - .1 Ensure area of testing is water tight and decorative elements are protected.
 - .2 Ensure contaminated water is kept in containers and their disposal respects environmental regulations.
 - .4 Conduct tests on building to determine effectiveness of cleaning methods.
 - .5 Start with lowest impact tests and stop testing when desired level of cleaning is achieved, stop testing immediately when damage is caused.
 - .6 Test brushing and spraying as alternative to pressure washing. Consult Departmental Representative to review test results. Use method approved by Departmental Representative.
 - .7 Areas to be test cleaned to include:

- .1 Limestone pillar supporting trellis in the Orientation Node;
- .2 Stone veneer of Orientation Node building.
- .8 Locate test patches in inconspicuous places directed by Departmental Representative.
- .9 Test patches: 1 m².
- .10 Conduct tests to determine best methods of protecting surrounding historic material, openings and plants during test cleaning procedure, and monitor for detrimental effects.
- .11 Do not proceed with work without approval of mock-up.
- .12 Allow 24 hours for inspection of mock-up by Departmental Representative.
- .13 Accepted mock-up will demonstrate minimum standard for work. Mock-up may remain as part of finished work.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off the ground in dry location and in accordance with manufacturer's recommendations.
 - .2 Replace defective or damaged materials with new.

1.5 SITE CONDITIONS

- .1 Ambient conditions:
 - .1 Do not use wet cleaning methods when there is threat of frost.
 - .2 Do not use chemical cleaners when temperature is below 10 degrees C.
 - .3 Follow manufacturer's written instructions on use of chemical cleaners in accordance with product's temperature range application.
 - .4 Provide shading to wall to avoid cleaning in full, hot sunlight.
 - .5 Do not clean if there is risk of chemical spray being blown onto surrounding historic material, publicly accessible areas or plants.
 - .6 Protect work in the event of high winds.

Part 2 Products

2.1 MATERIALS

- .1 Use clean potable water free from contaminants.
- .2 Treat water which has high metal content before use in cleaning.
- .3 Use air free from oil or other contaminants.
- .4 Use masking material to approval of Departmental Representative.

2.2 TOOLS AND EQUIPMENT

- .1 Use brushes with natural or soft plastic bristles.
- .2 Use scrapers of wood or plastic.
- .3 Use water pumps fitted with accurate pressure regulators and gauges capable of being preset and locked at maximum specified levels.
- .4 Use air compressors equipped with on-line oil filters to avoid spraying oil onto masonry.
- .5 Use gun equipped with pressure gauge at nozzle end.
- .6 Use plastic or non-ferrous metal piping and fittings.
- .7 Use nozzles that give nebulized droplet spray.

Part 3 Execution

3.1 SITE VERIFICATION OF CONDITIONS

- .1 Record existing conditions, by means of photographs, before and after cleaning. Advise Departmental Representative of potential complications.
- .2 Report to Departmental Representative conditions of deteriorated masonry or pointing not noted on Contract Drawings found before and during cleaning.
- .3 Obtain written approval of Departmental Representative before cleaning areas of deteriorated masonry.

3.2 PREPARATION

- .1 Protect operatives and other site personnel from hazards.
 - .1 Ensure good ventilation in work area.
 - .2 Ensure workers wear personal protective equipment in accordance with local regulations.
- .2 Place safety devices and signs near work areas as indicated and directed.
- .3 Repair openings and joints prior to cleaning where there is potential risk of water/chemical infiltration.
- .4 Provide a shelter around work area as directed by Departmental Representative.
 - .1 Obtain approval of sheltering method from Departmental Representative before commencing cleaning procedure.

3.3 PROTECTION OF IN-PLACE CONDITIONS

- .1 Cover and protect surfaces and non-masonry finishes not to be cleaned.
 - .1 Obtain approval of protection method from Departmental Representative before commencing cleaning procedure.
- .2 Protect vents, windows, and other openings, to prevent water entry.
 - .1 Protect masonry openings from water/chemical infiltration with polyethylene during cleaning.

- .3 Protect wood, glass, and metal adjacent to masonry.
- .4 Protect plants, gardens, shrubs from watering and chemicals
- .5 Hang tarpaulins from scaffolding to enclose water spray.
- .6 Protect cleaned surfaces to be painted from contact with rain and snow.
- .7 Protect rainwater leaders, eaves troughs and gutters from being blocked by residue.
- .8 Protect adjacent Work from spread of dust and dirt beyond work areas.
- .9 Protect building envelope from water infiltration.

3.4 EXECUTION OF CLEANING

- .1 Proceed with cleaning in accordance with written instructions of methods, systems, tools and equipment approved by Departmental Representative.
- .2 Dry brush or scrape accumulations from walls, ledges and cornices.
- .3 Pre-wet masonry surface when necessary. Work from bottom of wall upwards.
- .4 Do not exceed maximum pressure at nozzle or have nozzle closer to masonry than approved by Departmental Representative at tests.
- .5 Stop work when cleaning has detrimental effect on surrounding material and plants.
- .6 Avoid prolonged wetting and excessive water penetration.
- .7 Apply chemical cleaners approved by Departmental Representative based on mock-ups.
- .8 Brush and scrape only to supplement water washing.
- .9 Undertake prolonged water spray to soften and loosen heavy deposits, then brush. Remove thick incrustations with wooden or plastic scrapers.
- .10 Removal of vegetation or organic growth growing in or on masonry.
 - .1 Soak masonry with low-pressure water.
 - .2 Follow soaking by gentle scrubbing with natural bristle brushes and scraping with soft plastic or wood spatulas.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Rinse off masonry until no indications of chemicals are present to satisfaction of Departmental Representative.
- .3 Rinse from bottom to top and from top to bottom.
- .4 Clean up work area as work progresses. At end of each work day remove debris and waste from site.
- .5 Upon completion, clean and restore areas used for work to condition equal to that previously existing.
- .6 Waste Management: separate waste materials for reuse and recycling] in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

- .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .2 Collect, neutralize and dispose of water and chemicals in accordance with contract requirements, applicable regulations and Canadian Environmental Protection Act, (CEPA).
- .7 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.6 PROTECTION OF WORK

- .1 Protect finished Work from damage until take-over.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Definitions:
 - .1 Repair of Stone: mechanical or plastic repair, done to restore original appearance and function of partly deteriorated stones.
 - .2 Filling: material used to rebuild broken or deteriorated part of stone.
 - .3 Adhesive: material used to fasten broken/fractured stone elements by direct application at fracture interface and/or by application to added reinforcing elements such as dowels.
 - .4 Mortar: material used to re-bed the stone element being repaired and to repoint adjacent mortar joints.
- .2 Reference Standards:
 - .1 ASTM International
 - .1 ASTM C144-11, Standard Specification for Aggregate for Masonry Mortar.
 - .2 ASTM A276-13a, Standard Specification for Stainless Steel Bars and Shapes.
 - .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-75.1-M88, Tile, Ceramic.
 - .3 CSA Group
 - .1 CAN/CSA-A179-04(R2014), Mortar and Grout for Unit Masonry.
 - .2 CSA-A3000-13, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for repair materials including anchors, grouts and mortars and include product characteristics, performance criteria, physical size, finish and limitations.
 - .1 Application/installation instructions.
 - .2 Laboratory test reports certifying compliance of products with specification requirements.
 - .3 Manufacturer's material safety data sheets (MSDS) for safe handling of specified materials and products, in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.

1.3 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

- .2 Record Documentation:
 - .1 Provide marked up set of drawings to provide referencing system identifying locations of stone repairs.
 - .2 Provide photographic record of stone repairs in accordance with Section 01 33 00 - Submittal Procedures.

1.4 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Manufacturers:
 - .1 Filling mortar: manufactured by company specializing in production of cementitious restoration materials with experience in production of filling mortar products and with a record of satisfactory in-service performance. Acceptable products Jahn International – Natural Stone Repair Mortar or approved equal.
 - .2 Masonry Contractor:
 - .1 Work of this Section: executed by contractor specializing in historic stone conservation work of this nature, using similar stone repair techniques with a minimum of 5 year of demonstrated experience.
 - .3 Foreperson:
 - .1 Provide competent trade foreperson specializing in type of work required.
 - .2 Experience: experience in conservation work similar to work of this Section. Must be present on site throughout Work.
 - .4 Installers:
 - .1 Executed by skilled trades people who have successfully completed a course of instruction provided by filling mortar manufacturer and hold a Training Workshop Certificate from said manufacturer. Maintain proof of credential for each installer at site.
- .2 Mock-ups:
 - .1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.
 - .2 Construct mock up of one stone pillar with sample of each type of repair specified, with specified materials and methods.
 - .3 Construct mock-up where directed by Departmental Representative.
 - .4 Select locations of mock-ups in consultation with Departmental Representative.
 - .5 Notify Departmental Representative 48 hours before commencing each mock-up.
 - .1 Obtain approval from Departmental Representative before commencing mock-up.
 - .6 Allow mock-ups of repairs to cure at least 3 days.
 - .1 Obtain Departmental Representative's approval for colour match.
 - .7 Allow 48 hours for inspection of mock-up by Departmental Representative before proceeding with stone repair work.
 - .8 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

- .9 Clean mock-up in accordance with Section 04 03 06 - Historic - Cleaning Masonry to demonstrate cleaning operations to Departmental Representative before starting cleaning work.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .1 Identification with grade, batch and production date shown on container or packaging.
- .3 Storage and Handling Requirements:
 - .1 Store materials off of the ground in dry location and in accordance with manufacturer's recommendations.
 - .2 Maintain a minimum ambient temperature of 10 degrees C in storage area.
 - .3 Replace defective or damaged materials with new.

1.6 SITE CONDITIONS

- .1 Ambient conditions:
 - .1 Maintain a minimum temperature of 10 degrees C during and 48 hours after repair, throughout thickness of stone.
 - .2 Allow materials to reach minimum temperature of 10 degrees C prior to use.
 - .3 Maintain temperature between 21 and 24 degrees C during repair and 48 hours after, throughout thickness of stone.
 - .4 Provide temporary enclosures and heating equipment as required to maintain specified temperatures. Take precautions to avoid overheating masonry.
 - .5 Remove work exposed to lower temperatures as directed by Departmental Representative.
 - .6 Refer to manufacturer's instructions for environmental requirements of products.
 - .7 Hot weather / summer requirement:
 - .1 Shade stones from direct sunlight.

Part 2 Products

2.1 MATERIALS

- .1 Use materials from same manufacturer throughout the Work.
- .2 Portland cement : to CSA-A3000.
- .3 Sand: cleaned and graded in accordance to ASTM C144.
- .4 Water: clean and free of deleterious materials such as acid, alkali and organic material in accordance to CAN/CSA-A179.
- .5 Dowels: 10 mm diameter, threaded, stainless steel to ASTM A276, Type 304.

- .6 Deformed wire: stainless steel Type 304.
- .7 New stone:
 - .1 Similar mechanical, physical and aesthetic properties to existing stone.
 - .2 To approval of Departmental Representative.

2.2 MORTAR MIXES

- .1 Mortar: in accordance with CAN/CSA-A179.
- .2 Proportion Specification:
 - .1 In accordance with CAN/CSA-A179 and manufacturer's written instructions.

2.3 FILLING MIXES

- .1 Proprietary premixed stone patching material.
 - .1 Formulated to closely match colour, texture and physical properties of stone to be patched.
 - .1 Ensure formulated material only requires mixing with potable water at site.
 - .2 Mix characteristics: vapour-permeable, shrink resistant, frost and salt resistant.
 - .2 Filling mix: to match surrounding stones in texture, porosity and colour with a compressive strength of 13 to 19 N/mm².
 - .3 Mix proportions: in accordance with manufacturer written instructions. An acceptable product is Jahn International M70 Natural Stone Repair Mortar for Limestone or approved equal.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify masonry, staging and storage areas and notify Departmental Representative in writing of conditions detrimental to acceptable and timely completion of Work.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform in writing Departmental Representative areas of deteriorated masonry not previously identified.
- .2 Obtain Departmental Representative's approval and instructions for repair and replacement of masonry units before proceeding with repair work.
- .3 Stop work in that area and report to Departmental Representative immediately any evidence of hazardous materials.

3.2 PREPARATION

- .1 Obtain Departmental Representative's approval for tools to be employed prior to commencing work.

- .2 Obtain Departmental Representative's approval for alternative repair methodology and tools to be employed prior to commencing work.

3.3 PROTECTION

- .1 Prevent damage to stone surfaces, mortar joints, building, fencing, trees, landscaping, natural features, bench marks, pavement and utility lines which are to remain. Make good damage incurred.
- .2 Protect surrounding components from damage during work.
- .3 Ensure historic fabric is undamaged. Make good damage incurred.
- .4 Obtain Departmental Representative's approval for repair methodology.

3.4 REPAIR OF A FRACTURED STONE

- .1 Remove deteriorated portions of stone surface using low impact removal methods until sound surface is reached.
- .2 Remove elements which require minor repair. Do not damage existing Work.
- .3 Drill and epoxy grout new dowels as indicated on the drawings.
- .4 Use minimum 2 dowels per fracture.
- .5 Cut dowels slightly shorter than full depth of hole.
- .6 Ensure humidity, temperature, cleanliness and finish condition of stone is in accordance with epoxy resin manufacturer's instructions.
- .7 Insert 10 mm diameter dowels, and apply specified adhesive to holes and interface. Let adhesive cure in accordance with manufacturer's instructions.

3.5 MORTAR JOINT REPAIR

- .1 Make good damage incurred to mortar joints.

3.6 CLEANING

- .1 Obtain Departmental Representative's approval of cleaning operations before starting cleaning work.
- .2 Protect plants, grass, vegetation and adjacent grounds from excessive water accumulation
- .3 Clean stone work surfaces after repairs have been completed and mortar has set.
- .4 Clean stone surfaces of adhesive or mortar residue resulting from work performed without damage to stone or joints.
- .5 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .6 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.7 PROTECTION OF COMPLETED WORK

- .1 Protect finished work from impact damage for period of 2 weeks.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Structural Specifications
- .1 Section 01 33 00 Submittal Procedures.
- .2 Section 01 45 00 Quality Control.
- .3 Section 01 61 00 Common Product Requirements.
- .4 Section 01 73 00 Execution Requirements.
- .5 Section 01 74 11 Cleaning.
- .6 Section 01 78 00 Closeout Submittals.
- .7 Section 04 22 00 - Concrete Unit Masonry.
- .8 Section 05 50 00 - Metal Fabrications.
- .9 Section 07 84 00 – Firestopping
- .10 Section 07 92 00 - Joint Sealants.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-A165 Series-04, Standards on Concrete Masonry Units.
 - .2 CSA A179-04, Mortar and Grout for Unit Masonry.
 - .3 CSA-A371-04, 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 prior to commencing work of this Section and 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.

1.4 ACTION SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, limitations and colours.
 - .2 Provide two copies of Workplace Hazardous Materials Information System (WHMIS) - Material Safety Data Sheets (MSDS).
- .3 Shop Drawings:
 - .1 Provide drawings stamped and signed by professional engineer registered or licensed in Manitoba, Canada.
 - .2 Provide shop drawings detailing temporary bracing required, designed to resist wind pressure and lateral forces during installation.

1.5 INFORMATION SUBMITTALS

- .1 Installer Instructions: provide manufacturer's installation instructions, including storage, handling, safety and cleaning .
- .2 Manufacturer's Reports: provide written reports prepared by manufacturer's on-Site personnel to include:
 - .1 Verification of compliance of work with Contract.
 - .2 Site visit reports providing detailed review of installation of work, and installed work.

1.6 CLOSEOUT SUBMITTALS

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

1.7 MAINTENANCE MATERIAL SUBMITTALS

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

1.8 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Manufacturer: capable of providing field service representation during construction and approving application method.
 - .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 5 years 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 in accordance with Section 01 45 00 - Quality Control.
 - .2 Construct mock-up panel of interior burnished masonry wall construction, 1200 x 1800 mm in size, showing masonry colours and textures, use of reinforcement, ties, jointing, coursing, mortar and workmanship.

- .3 Mock-up used:
 - .1 To judge workmanship, substrate preparation, operation of equipment and material application.
- .4 Mock-up may remain as part of finished work.

1.9 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 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.

1.10 SITE CONDITIONS

- .1 Ambient Conditions: assemble and erect components when temperatures are above 4 degrees C.
- .2 Weather Requirements: to CSA-A371 and to IMIAC - Recommended Practices and Guide Specifications for Hot and Cold Weather Masonry Construction.
- .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.

Part 2 Products

2.1 MANUFACTURERS

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

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.
 - .1 Co-ordinate with Section 01 71 00 - Examination and Preparation
- .2 Examine openings to receive masonry units. Verify opening size, location, and that opening is square and plumb, and ready to receive work of this Section.
- .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.

3.4 PREPARATION

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

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 in masonry walls then tool with flat jointer to provide smooth, joints true to line, compressed, uniformly flush with masonry face where flush joints are indicated.
- .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 Support of loads:
 - .1 Use 25 MPa concrete to Structural Specifications, 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; keep paper 25 mm back from faces of units.
 - .4 Refer to Structural drawings and notes.
- .6 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.
- .7 Loose steel lintels:
 - .1 Install loose steel lintels. Centre over opening width.
- .8 Control joints:
 - .1 Construct continuous control joints.
- .9 Movement joints:
 - .1 Build-in continuous movement joints.
- .10 Interface with other work:
 - .1 Cut openings in existing work as indicated.
 - .2 Openings in walls: reviewed by Departmental Representative.
 - .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 - Quality Control.
 - .2 Notify inspection agency minimum of 24 hours in advance of requirement for tests.

3.9 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
- .2 Progress Cleaning: in accordance with related masonry sections.
- .3 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 of masonry work during and after erection until permanent lateral support is in place.
 - .2 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 Structural Specifications
- .1 Section 01 33 00 Submittal Procedures.
- .2 Section 01 45 00 Quality Control.
- .3 Section 01 61 00 Common Product Requirements.
- .4 Section 01 73 00 Execution Requirements.
- .5 Section 01 74 11 Cleaning.
- .6 Section 01 78 00 Closeout Submittals.
- .7 Section 04 05 00 - Common Work Results for Masonry.
- .8 Section 05 50 00 - Metal Fabrications.
- .9 Section 07 84 00 – Firestopping
- .10 Section 07 92 00 - Joint Sealants.

1.2 REFERENCES

- .1 ASTM International Inc.
 - .1 ASTM E336-07, Standard Test Method for Measurement of Airborne Sound Attenuation Between Rooms in Buildings.
- .2 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A165 Series-2004, CSA Standards on Concrete Masonry Units [covers: A165.1, A165.2, A165.3].
 - .2 CAN/CSA A371-04, Masonry Construction for Buildings.
 - .3 CSA S304.1-04, Design of Masonry Structures.
- .3 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S101-07, Standard Methods of Fire Endurance Tests of Building Construction and Materials.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Product Data: provide product data, including manufacturer's printed data sheets and catalogue pages illustrating products to be incorporated into project for specified products.

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 01 45 00 - Quality Control and requirements of Section 04 05 00 - Common Work Results for Masonry supplemented as follows:
 - .1 Construct mock-up panel of unit masonry construction 1200 x 1800 mm.
 - .2 Approved mock-up may remain as part of the Work
 - .2 Provide self-adhesive air / vapour barrier as part of mock-up as described in Section 07 46 23.

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.
- .2 Packaging Waste Management:
 - .1 Separate and recycle waste materials in accordance with Section 01 74 11 – Cleaning.

Part 2 Products

2.1 MATERIALS

- .1 Standard concrete block units to CAN/CSA-A165 Series (CAN/CSA-A165.1) .
 - .1 Classification: H/15/A/M.
 - .2 Dimensions - Nominal: 140mm wide x 200 mm high x 400 mm long.
 - .3 Special shapes: provide square units for exposed corners. Provide purpose-made shapes for lintels, beams and bond beams. Provide additional special shapes as indicated.
 - .4 Profile/Texture for Architectural Concrete Unit Masonry:
 - .1 Surface texture: smooth face units.
 - .5 Colour:
 - .1 Integrally coloured pre-finished architectural concrete block with one or more faces ground to expose variegated colours of natural aggregates;

2.2 REINFORCING

- .1 Steel Reinforcing Bars: specified in Section 03 20 00 – Concrete Reinforcing.
- .2 Masonry Joint Reinforcing: to CSA A370, truss type, hot dip galvanized to ASTM A123, Level 2 corrosion protection after fabrication.
 - .1 Provide in lengths of not less than 3 m, with prefabricated corner and tee units.

- .3 Fabricate reinforcing in accordance with CAN/CSA-A23.1 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .4 Obtain Consultant's approval for locations of reinforcement splices other than shown on placing drawings.
- .5 Upon approval of Consultant, weld reinforcement in accordance with CSA W186.
- .6 Ship reinforcement clearly identified in accordance with drawings.
 - .1 Refer to drawings and Room Finish Schedule for locations.

2.3 CONNECTORS

- .1 Connectors in accordance with Structural Specifications..

2.4 MORTAR AND GROUT MIXES

- .1 Mortar and mortar mixes in accordance with Structural Specifications.

2.5 CLEANING COMPOUNDS

- .1 Compatible with substrate and acceptable to masonry manufacturer for use on products.
- .2 Cleaning compounds compatible with concrete unit masonry and in accordance with manufacturer's written recommendations and instructions.

2.6 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 that field conditions are acceptable and are ready to receive work.
- .2 Verify items provided by other sections of work are properly sized and located.
- .3 Verify that built-in items are in proper location, and ready for roughing into masonry work.
- .4 Examine work of other Sections upon which work of this Section is dependent. Should discrepancies be found which affect the proper performance of the work of this section, do not commence work until such discrepancies have been resolved..

3.2 PREPARATION

- .1 Protect adjacent finished materials from damage due to masonry work.
- .2 Direct and coordinate placement of metal anchors supplied to other sections.

- .3 Provide temporary bracing during installation of masonry work to CSA-A371. Maintain in place until building structure provides permanent bracing.
- .4 Establish lines, levels, and coursing; protect from disturbance.
- .5 Verify that items built-in under other sections are properly located and sized.

3.3 INSTALLATION

- .1 Concrete block units:
 - .1 Bond: running as shown on drawings.
 - .2 Coursing height:
 - .1 Standard Masonry Block: 200 mm for one block and one joint.
 - .3 Jointing:
 - .1 Interior Masonry Block: Concave where exposed
- .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 REINFORCING

- .1 Install reinforcement in accordance with CAN/CSA A370, CAN/CSA A371, CAN/CSA-A23.1 and CSA-S304.1 unless indicated otherwise.
- .2 Before placing grout, obtain Consultant's approval of placement of reinforcement.
- .3 Horizontal Joint Reinforcement:
 - .1 Install horizontal joint reinforcement 400 mm on centre.
 - .2 Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 400 mm each side of opening.
 - .3 Place joint reinforcement continuous in first and second joint below top of walls.
- .4 Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.5 CONNECTORS

- .1 Install connectors in accordance with Structural Specifications.

3.6 MORTAR AND GROUT PLACEMENT

- .1 Place mortar in accordance with Jointing specification and Structural Specifications.

3.7 CONSTRUCTION

- .1 Cull out masonry units, in accordance with CAN/CSA A165 and approved range of colour samples, with chips, cracks, broken corners, excessive colour and texture variation.

- .2 Build in miscellaneous items such as bearing plates, steel angles, bolts, anchors, inserts, sleeves and conduits.
- .3 Construct masonry walls using running bond unless otherwise noted.
- .4 Build around frames previously set and braced. Fill behind hollow frames within masonry walls with mortar or grout and embed anchors.
- .5 Fit masonry closely against electrical and plumbing outlets so collars, plates and covers overlap and conceal cuts.
- .6 Install movement joints and keep free of mortar where indicated.
- .7 Hollow Units: spread mortar setting bed from outside edge of face shells. Gauge amount of mortar on top and end of unit to create full joints, equivalent to shell thickness. Avoid excess mortar.
- .8 Solid Units: apply mortar over entire vertical and horizontal surfaces. Avoid bridging of airspace between brick veneer and backup wall with mortar.
- .9 Ensure compacted head joints. Use full or face-shell joint as indicated.
- .10 Tamp units firmly into place.
- .11 Do not adjust masonry units after mortar has set. Where resetting of masonry is required, remove, clean and reset units in new mortar.
- .12 Tool exposed joints concave; strike concealed joints flush.
- .13 After mortar has achieved initial set up, tool joints.
- .14 Do not interrupt bond below or above openings.

3.8 REPAIR/RESTORATION

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

3.9 FIELD QUALITY CONTROL

- .1 Site Tests, Inspection: in accordance with Section 04 05 00 - Common Work Results for Masonry.

3.10 CLEANING

- .1 Clean in accordance with Section 01 74 00 - Cleaning.

3.11 PROTECTION

- .1 Brace and protect concrete unit masonry in accordance with Industry standards

END OF SECTION