

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1      Section 02 83 10 - Lead Abatement - Minimum Precautions.
- .2      Section 02 83 12 - Lead Abatement - Maximum Precautions (optional).
- .3      Section 03 10 00 - Concrete Forming and Accessories.
- .4      Section 03 20 00 - Concrete Reinforcing.
- .5      Section 03 30 00 - Cast-in-place Concrete.
- .6      Section 04 03 07 - Historic - Masonry Repointing.
- .7      Section 04 03 08 - Historic - Mortaring.
- .8      Section 04 03 31 - Historic - Replacing Brick.
- .9      Section 04 03 41 - Historic - Repairing Stone.
- .10     Section 04 03 42 - Historic – Replacing Stone.
- .11     Section 04 03 43 - Historic - Dismantling Stone Masonry.
- .12     Section 05 50 00 - Metal Fabrication.
- .13     Section 06 03 15 - Historic - Splicing of Wood Components.

**1.2                REFERENCES**

- .1      CSA Group
  - .1      CAN/CSA-A179, Mortar and Grout for Unit Masonry.
  - .2      CAN/CSA-A371, Masonry Construction for Buildings.
- .2      International Masonry Industry All-Weather Council (IMIAC)
  - .1      Recommended Practices and Guide Specification for Cold Weather Masonry Construction.
- .3      Health Canada/Workplace Hazardous Materials Information System (WHMIS).
  - .1      Material Safety Data Sheets (MSDS).

**1.3                ADMINISTRATIVE REQUIREMENTS**

- .1      Pre-installation meetings: Conduct pre-installation meeting one week prior to commencing work of this Section, in presence of the mason supervisor and the Departmental Representative, to:
  - .1      The heritage context of the project.
  - .2      Verify project requirements, including mock-up requirements.
  - .3      Verify substrate conditions.
  - .4      Co-ordinate products, installation methods and techniques.

- .5 Sequence work of related sections.
- .6 Co-ordinate with other building subtrades.
- .7 Review manufacturer's installation instructions.
- .8 Review masonry cutting operations, methods and tools and determine worker safety and protection from dust during cutting operations.
- .9 Review warranty requirements.
- .2 Sequencing: sequence with other work in accordance with Section [01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart. Comply with manufacturer's written recommendations for sequencing construction operations.

#### **1.4 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 masonry and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Quebec, Canada.
  - .2 Submit shop drawings detailing temporary bracing required, designed to resist wind pressure and lateral forces during installation.
  - .3 Shop drawings must indicate dimensions and profiles of anchors, cramps and dowels.
- .4 Samples:
  - .1 Provide samples as follows:
    - .1 Stone samples according to Section 04 03 42 - Historic - Replacing Stone.
    - .2 Brick samples according to Section 04 03 31 - Historic - Replacing brick.
    - .3 Mortar samples according to Section 04 03 08 - Historic - Mortaring.
    - .4 Samples of each type of masonry anchorage, reinforcement and connector proposed for use, supplemented by specific requirements in the structural drawings.
    - .5 Samples: used for testing and when accepted become standard for material used.
- .5 Certificates: submit manufacturer's product certificates certifying materials comply with specified requirements.
- .6 Test and Evaluation Reports:

- .1 Submit certified test reports in accordance with Section 01 29 83 - Payment Procedures for Testing Laboratory Services.
- .2 Test reports to certify compliance of masonry units and mortar ingredients with specified performance characteristics and physical properties.
- .3 Submit data for masonry units, in addition to requirements set out in referenced CSA and ASTM Standards:
  - .1 Manufacturing date and shelf life;
  - .2 Initial rates of absorption of the masonry, saturation coefficient, and compressive strength of stones and bricks.
- .7 Installer Instructions: provide manufacturer's installation instructions, including storage, handling, safety and cleaning.

## **1.5 QUALITY ASSURANCE - QUALIFICATIONS**

- .1 Masonry Contractor:
  - .1 Use single Masonry Contractor for masonry work.
  - .2 The Masonry contractor must be specialized in dismantling, reconstruction, restoration and repair work of historic stone and brick masonry works, using adequate techniques for such works, and must have a minimum 5 year record of successful performance on projects of similar scope and complexity to Work of this Contract.
  - .3 Masonry contractor to have good level of understanding of structural behaviour of masonry walls when masonry work involves replacing or repairing stones and bricks which are part of structural masonry work.
  - .4 The Masonry contractor must be able to demonstrate his competence and to submit three (3) completed historic stone masonry restoration projects, acquired over the last ten years on projects of similar scope and complexity to Work of this Contract.
- .2 Foreperson:
  - .1 Provide competent trade foreperson specializing in type of work required.
  - .2 Experience : minimum (5) years experience in dismantling, reconstruction, conservation and repair work of historic stone and brick masonry similar to work of this Contract. Must be present on site throughout Work.
- .3 Masons:
  - .1 Masons to have certificate of qualification with a minimum 5 years record of successful performance in dismantling, reconstruction, conservation and repair work of historic stone and brick masonry works.
  - .2 Masons to have proof of license certification for propriety restoration mortars.
  - .3 Plastic repairs: 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 Masons employed on this project throughout course of project must meet above requirements. Where, during course of project, masons leave work force, replacement masons must also meet requirements.

- .4 Manufacturers:
  - .1 Filling mortar: manufactured by company specializing in production of cementitious restoration materials with a minimum of (5) years experience in production of filling mortar products and with a record of satisfactory in-service performance.

## **1.6 QUALITY ASSURANCE - EXECUTION**

- .1 Perform work under the supervision of the Departmental Representative.
- .2 Perform work in accordance with established procedures for historic masonry conservation and *The Standards and Guidelines for the Conservation of Historic Places in Canada*, published by Parks Canada.
- .3 Shoring and cradling, and other temporary framing work needed to support the structure shall be designed by a qualified structural engineer, recognized, hired and paid by the general contractor, familiar with historic masonry structures and licensed to practise in the Province of Québec. Drawings to be stamped and signed by the aforementioned engineer.

## **1.7 QUALITY ASSURANCE - MOCK-UPS**

- .1 Mock-ups:
  - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control, as described herein and as specified in the applicable other Sections of the Specifications.
  - .2 Construct mock-ups under supervision of Departmental Representative to demonstrate a full understanding of specified procedures, techniques and formulations are achieved before work commences..
  - .3 Construct the following mock-ups:
    - .1 Chimney stalk below roof decking level: construct a representative mock-up (two courses of sandstone veneer with masonry and mortar core behind, and brick smoke shaft), showing the colours and finishes of the masonry, the reinforcing details, anchors, mortar joints, pointing, as well as the type of bond, and the quality of work.
    - .2 Chimney stalk above roof decking level: Same as previous, but with limestone veneer.
    - .3 Copings of the chimney stalks: once the masonry chimney stalk is rebuilt, construct a new concrete coping, according to the requirements of the structural drawings and specifications, showing the coordination of the anchor location for the new fall protection system with the brick smoke shafts and the concrete, the drainage slopes and the quality of work.
    - .4 Installation of chimney pots : Install one chimney pot showing the attachment system to the concrete coping and to the smoke shafts, and the quality of work

- .5 Repairing stone:
  - .1 Filling with repair mortar, where former downspouts anchors were located, the holes left in the stone veneer of the existing walls;
  - .2 Filling the openings in the masonry floor of the attic: construct a representative mock-up (fill in one opening to mid-height), showing the solidity and precision of the assemblage, how the required clearance around existing pipes is respected), the repointing, as well as the type of bond, and the quality of work.
- .6 Repointing: on an existing chimney (sandstone), in the attic, in a location designated by the Departmental Representative, carry out, on a 1.5 m x 1.5 m area, the following procedures:
  - .1 Raking joints;
  - .2 Surface repointing: one (1) test respecting the mortar curing requirements.
- .7 Cleaning: upon completion of work and prior to cleaning the masonry surfaces of the chimney stalks (above roof level), conduct a cleaning test using a low pressure water jet only to remove dust, without damaging the stones, the mortar joints or other materials in adjacent works.
- .2 Mock-up used:
  - .1 To judge quality of work, substrate preparation, operation of equipment and material application.
- .3 Construct mock-up where directed by Departmental Representative.
  - .1 Coordinate and sequence activities accordingly.
- .4 Allow 72 hours for inspection of mock-up by Departmental Representative before proceeding with work.
- .5 Repeat mock-ups until satisfactory results are obtained to satisfaction of Departmental Representative (above and beyond the mock-up quantities mentioned in the specifications).
- .6 When accepted by Departmental Representative, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.
- .7 Start work only upon receipt of written approval of mock-up by Departmental Representative.

## **1.8 QUALITY ASSURANCE - INSPECTIONS**

- .1 Make mason's workshop accessible to Departmental Representative for review of current work-in-progress.

## **1.9 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 ground, in dry location, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect material from nicks, scratches, and blemishes.
  - .3 Keep materials dry until use except where wetting of bricks or stones is specified. Protect from freezing and contamination
  - .4 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.
  - .5 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

## **1.10 SITE CONDITIONS**

- .1 No work, especially erecting and assembling masonry, will be authorized in one or more of the following situations
  - .1 Above new copper roofing.
    - .1 Should work be carried out above surfaces where the decking has been repaired and where new plywood panels and membrane have been installed, the Contractor will have to take all precautions to protect these surfaces and repair any damage (plan for the installation of an additional layer of membrane).
  - .2 When the temperature is below 7 degrees C.
  - .3 Between October 30th, 2005, and April 1st, 2016.
- .2 Ambient conditions: assemble and erect elements only when temperatures are between 10 and 25 degrees C, surface temperature is above 10 degrees C and relative humidity is greater than 50% during installation.
  - .1 Curing conditions for repointing mortar: maintain conditions during 7 days, with 100 % humidity.
- .3 Weather Requirements: to CAN/CSA-A371 and to IMIAC - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.
- .4 Cold weather requirements:
  - .1 When ambient conditions do not meet requirements prescribed herein, provide enclosure system around curing area to ensure that stated environmental conditions are maintained for curing period. Take precautions to avoid overheating masonry.
    - .1 The use of heated temporary enclosures to maintain ambient and surface temperatures above 10 degrees C in cold weather is subject to the written approval of the material manufacturer and the Departmental Representative.
    - .2 Submit enclosure system for approval from Departmental Representative in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 To CAN/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 its 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 28 days, after mortar is installed.
- .4 Preheat unheated wall sections in enclosure for minimum 72 hours above 10 degrees C, before applying mortar.
- .3 Install thermometers and relative humidity probes inside the enclosure where masonry work is performed. Checking and temperature and relative humidity must be done three times a day (early morning, noon, and late afternoon) during all duration of masonry works. The contractor must transmit all data of all thermometers and probes on a weekly basis in Excel format to Departmental Representative. All readings under 15 degrees C and over 25 degrees C must be highlighted in the Excel file.
- .4 Remove work exposed to lower temperatures as directed by the Departmental Representative.
- .5 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 Do not use or prepare mortar when the ambient air temperature is above 32 degrees C at the location of the work.
  - .4 Spray mortar surface at intervals and keep moist for maximum of 3 days after installation.

## **1.11 WARRANTY**

- .1 For Work in this Section 04 05 00 - Common Work Results for Masonry, 12 months warranty period **is extended to 60 months.**

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Masonry materials are specified in the sections listed in item 1.1, RELATED REQUIREMENTS.

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**Part 3 Execution**

**3.1 INSTALLERS**

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

**3.2 MANUFACTURERS' INSTRUCTIONS**

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

**3.3 EXAMINATION**

- .1 Examine conditions, substrates and work to receive work of this Section.
- .2 Examine openings to receive masonry units. Verify opening size, location, and that opening is square and plumb, and ready to receive work of this Section.
  - .1 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .2 Proceed with installation after unacceptable conditions have been remedied and after receipt of written approval from Departmental Representative.
- .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 brick and stone masonry.
    - .2 Field conditions are acceptable and are ready to receive work.
    - .3 Built-in items are in proper location, and ready for roughing into masonry work.
  - .2 Commencing installation means acceptance of existing substrates.
  - .3 The removal of chimney pots and of a first concrete coping on an existing chimney stalk will have to be carried out in the presence of the Departmental Representative. The removal of the concrete will have to be carried out carefully and gradually in order to allow for the full recording of the original stone coping below.

**3.4 PREPARATION**

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

- .1 Construct shoring, cradling, and temporary framing work to support structure parts during removal and resetting operations, in accordance with approved drawings. Drawings to be stamped and signed by engineer experienced with historic masonry structures and registered in Province of Québec.
- .2 Leave work in safe condition when work is not in progress.
- .5 Seal and protect openings, doors, windows, and adjacent areas to prevent damage and spread of construction dust, water or other materials into the building.
- .6 Prevent scaffolding, hoists or construction equipment from bearing directly against masonry or roof. Provide lumber or plywood with padding of sufficient thickness to prevent damage.
- .7 Obtain Departmental Representative's approval prior to proceeding, for:
  - .1 Extent and type of stone to be replaced repaired or removed.
  - .2 Methodology and tools to be employed before commencing work.
- .8 Hazardous materials
  - .1 Considering the presence of lead in the mortar joints, take all precautions required when loosening stones and masonry, and dismantling chimney stacks, in accordance with Section 02 83 10 - Lead Abatement - Minimum Precautions or Section 02 83 12 - Lead Abatement - Maximum Precautions (depending on the assessment that will be carried out at the beginning of construction).

### **3.5 INSTALLATION**

- .1 Do masonry work in accordance with CAN/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 CAN/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 exposed masonry and replace with undamaged units.
- .2 Jointing:
  - .1 Allow joints to set just enough to remove excess water, then tool with jointer to provide smooth, joints true to line, compressed, and uniformly profiled.
  - .2 Tool sandstone veneer and brick masonry joints to match the existing ones.
  - .3 Tool limestone veneer joints with a concave profile (half-round or grooved).
- .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.
- .5 Wetting of bricks:
  - .1 Except in cold weather, wet bricks having initial rate of absorption exceeding 1 g/minute/1000 mm<sup>2</sup>: wet to uniform degree of saturation, 3 to 24 hours before laying, and do not lay until surface dry.
  - .2 Wet tops of walls built of bricks qualifying for wetting, when recommencing work on such walls.
- .6 Interface with other work:
  - .1 Cut openings in existing work as indicated.
  - .2 Openings in walls: approved and reviewed by Departmental Representative.
  - .3 Make good existing work. Use materials to match existing.

### **3.7 SITE TOLERANCES**

- .1 Tolerances in notes to CAN/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 and with Section 01 29 83 – Payment Procedures for Testing Laboratory Services.
  - .2 Notify inspection agency minimum of 48 hours in advance of requirement for tests.
  - .3 Perform site tests as required in Section 04 03 08 – Historic – Mortaring.

### **3.9 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Waste Management: separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

### **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 Bracing approved by Departmental Representative.
  - .3 Brace masonry walls as necessary to resist wind pressure and lateral forces during construction.

- .2 Moisture Protection:
  - .1 Keep masonry dry using waterproof, non staining 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 1.9, SITE CONDITIONS.

**END OF SECTION**