

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 04 03 07 - Historic - Repointing.
- .2 Section 04 03 08 - Historic - Mortaring.
- .3 Section 04 05 00 - Common Work Results for Masonry.
- .4 Section 31 04 31 - Historic - Subgrade Shoring and Bracing.

**1.2 REFERENCES**

- .1 Reference Standards:
  - .1 CSA International
    - .1 CAN/CSA-A82, Fired Masonry Brick Made From Clay or Shale.
    - .2 CSA A82.3, Calcium Silicate (Sand-Lime) Building Brick

**1.3 ADMINISTRATIVE REQUIREMENTS**

- .1 Pre-installation Meeting:
  - .1 Conduct pre-installation meeting to verify project requirements and procedures, manufacturer's installation instructions and manufacturer's warranty requirements.

**1.4 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Provide manufacturer's printed product literature and data sheets for brick and materials and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
  - .1 Submit samples:
    - .1 Two of each type of masonry unit specified.
- .4 Certificates:
  - .1 Provide certificates signed by manufacturer certifying materials comply with specified performance characteristics, criteria and physical requirements.
- .5 Test Reports:
  - .1 Provide certified test reports showing compliance with specified performance characteristics and physical properties.

## **1.5 QUALITY ASSURANCE**

- .1 Qualifications
  - .1 Refer to Section 04 05 00 – Common Work Results for Masonry.
- .2 Mock-ups:
  - .1 Construct mock-up in accordance with Section 01 45 00 - Quality Control and Section 04 05 00 - Common Work Results for Masonry.
  - .2 Construct mock-up where directed by Departmental Representative.
  - .3 Notify Departmental Representative minimum of 48 hours prior to construction of the mock-up.
  - .4 Construct mock-up under supervision of Departmental Representative to demonstrate understanding of specified procedures, techniques and formulations is achieved before work commences.
  - .5 Work not to proceed prior to approval of mock-up. Allow 48 hours for inspection of mock-up by Departmental Representative. Accepted mock-up becomes standard for this Work.
  - .6 When mock-up accepted, proceed with pointing and repair work. Mock-up will remain as part of finished Work.

## **1.6 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:
  - .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
  - .2 Provide weather protection and construction protection in accordance with CSA-S304.1.
  - .3 Provide weather protection to newly opened sections in assembly.
  - .4 Protect bricks and store bricks to facilitate their resetting.
    - .1 Store dismantled masonry units on wood pallets, protected from exposure to water, elements, and potential mechanical damage within a fully covered under polyethylene.
    - .2 Submit storage and identification system to Departmental Representative for review.
    - .3 Store detached face bricks, back-up bricks and bricks showing evidence of soluble salts on separate pallets.
  - .5 Place detached bricks on wood surfaces during handling. Prevent contact with metal.
  - .6 When bricks are lowered to ground, place directly on wooden platform that will be used for transport or storage.
  - .7 Transport and keep bricks on wooden platforms.
  - .8 Ensure that sharp edges of bricks do not come into contact with hard objects.

- .9 At request of Departmental Representative, turn over any remaining salvaged bricks to Owner at completion of contract.
- .3 Packaging Waste Management: remove in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

## **1.7 AMBIENT CONDITIONS**

- .1 Maintain materials and surrounding air to minimum 10 degrees C prior to and for minimum 72 hours after completion of brick repairs.
- .2 Maintain temperature of mortar materials in accordance with Section 04 03 07 - Historic - Masonry Repointing.
- .3 Maintain masonry temperature between 10 degrees C and 25 degrees C for duration of the Work in accordance with Section 04 05 00 - Common Work Results for Masonry.

## **Part 2 Products**

### **2.1 NEW FACE BRICK**

- .1 Dry press firebrick with the following properties:
  - .1 Size: to match existing.
  - .2 Colour: standard light beige.
  - .3 Texture: smooth.
  - .4 ASTM C-24
    - .1 Pyrometric cone equivalent: 29.
    - .2 Temperature Equivalent (melting): 3018 °F.
    - .3 Service Temperature (max. recommended): 2700 °F.
  - .5 ASTM C-133
    - .1 Modulus of Rupture: 977 psi
  - .6 ASTM C-20
    - .1 Apparent Porosity: 21,3 %
    - .2 Apparent Specific Gravity: 2,66 g/cc
    - .3 Bulk Density: 130,2 lb/ft<sup>3</sup>
    - .4 Water Absorption: 9,8%
  - .7 ASTM C-16 (Schedule 3% deformation)
    - .1 Load test at 2640 °F: -6,8
  - .8 ASTM C-27
    - .1 Classification: medium duty
  - .9 ASTM C-113 (Schedule B % linear)
    - .1 Reheat Change at 2550 °F: -2,8
  - .10 ASTM C-38, 2910 °F preheat
    - .1 Panel Spalling Loss: 9,5 % wt.

- .11 Thermal Conductivity
  - .1 At a mean temperature of 1600 °F: 1,33 W/m°C
- .12 Chemical Analysis, Wt. % (calcined basis)
  - .1 Silica: 62,93%
  - .2 Aluminum Oxide: 30,78%

## **2.2 EXISTING BRICK**

- .1 Use hard, sound, and clean old bricks salvaged on site only with Departmental Representative's approval. Use only bricks without evidence of soluble salts.
- .2 Special care must be taken during existing veneer dismantling and sorting work not to alter bricks.

## **2.3 MORTAR**

- .1 Mortar: in accordance with CAN/CSA A179, Section 04 03 08 - Historic - Mortaring].

# **Part 3 Execution**

## **3.1 SITE VERIFICATION OF CONDITIONS**

- .1 Check for evidence of repairs, cracks, moisture, soluble salts contamination and other defects not noted on Contract Drawings, and report to Departmental Representative before starting Work.
- .2 Stop work and report to Departmental Representative immediately evidence of hazardous materials.

## **3.2 PREPARATION**

- .1 Place safety devices and signs near work area as directed in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
- .2 Install and remove shoring or other supports in accordance with Section 31 04 31 - Historic - Subgrade Shoring and Bracing.
- .3 Install and remove self-supporting scaffolding in accordance with Section 01 52 00 - Construction Facilities.

## **3.3 BRICK REMOVAL**

- .1 Verify locations and dimensions of areas of Work with Departmental Representative.
- .2 In areas of work, identify salvageable bricks with Departmental Representative.
- .3 Remove identified areas of salvageable brickwork as follows:
  - .1 Cut out non-loadbearing brickwork in length as practicable.
  - .2 During removal, protect sound areas to remain. Use hand methods of removal.
  - .3 Remove adhered mortar from surface of adjacent bricks that remain in place.

### **3.4 BRICK SALVAGE**

- .1 Carefully clean, and store bricks for re-use. Store and protect bricks in accordance with article 1.7, DELIVERY, STORAGE AND HANDLING.

### **3.5 RAKING JOINTS**

- .1 Use manual raking tool to obtain clean masonry surfaces.
  - .1 Remove deteriorated and adhered mortar from masonry surfaces to sound mortar but in no case less than 25 mm leaving square corners and flat surface at back of cut.
  - .2 Clean out voids and cavities encountered.
- .2 Remove mortar without chipping, altering or damaging masonry units.
- .3 Clean surfaces of joints by compressed air without damaging texture of exposed joints or masonry units.

### **3.6 BRICK REPLACEMENT**

- .1 Install masonry ties as indicated. Prior to placing mortar, obtain approval of Departmental Representative of placement of ties and connectors.
- .2 Co-ordinate bond pattern, coursing height and joint width with existing brickwork in area selected by Departmental Representative.
- .3 Mix and blend brick units within each pallet and with other pallets to ensure uniform blend of colour and texture.
- .4 Except in cold weather, pre-wet bricks having an initial rate of absorption exceeding 30 g/minute-194 cm<sup>2</sup> to uniform degree of saturation, 3 to 4 hours before laying. Do not lay until surface is dry or damp only, with no standing water.
- .5 Clean dust and brick fragments from slot. Before proceeding with Work, inspect cleaned surface with Departmental Representative.
- .6 Dampen slot's surfaces before applying mortar.
- .7 Apply mortar and lay bricks.
  - .1 Lay bricks on full beds of mortar.
  - .2 Fill vertical joints buttered and placed full in face and back-up bricks, and at vertical joint between wythes.
  - .3 Lay bricks and tool joints in one operation, tooling with a round jointer to provide smooth joints compressed uniformly concave.
  - .4 Rake bedding mortar back to a minimum depth of 25 mm and make ready for pointing with pointing mortar in separate operation.
    - .1 Provide minimum 3 day damp cure to bedding mortar prior to pointing.
- .8 Apply pointing mortar:
  - .1 Fill raked joints with pointing mortar.
- .9 Finish joints to match those of existing brickwork, in area identified by Departmental Representative.

- .10 Keep new mortar damp for (7) days at a minimum temperature of 10 degrees C.
- .11 Clean finished brickwork as work progresses.
  - .1 Remove mortar splashings on exposed brickwork.
  - .2 Leave no mortar on face of bricks.
  - .3 Remove mortar staining before it sets.
  - .4 Clean masonry with clean water and soft bristle brush only.
- .12 Inspect finished brickwork with Departmental Representative.

### **3.7 REPOINTING:**

- .1 Do pointing work in accordance with Section 04 03 07 - Historic - Masonry Repointing.
- .2 Dampen joints and porous masonry units.
- .3 Keep masonry damp while pointing is being performed.
- .4 Completely fill joint with mortar.
  - .1 Masonry units with worn rounded edges: maintain joint width by pointing back from exterior face.
  - .2 Avoid feather edges.
  - .3 Pack mortar solidly into voids and joints.
- .5 Build-up pointing in layers not exceeding 25 mm in depth.
  - .1 Allow each layer to set before applying subsequent layers.
  - .2 Maintain joint width.
- .6 Tool and finish joints to match existing profile and as directed by Departmental Representative.
  - .1 Tool, compact and finish using jointing tool and mason's slick to force mortar into joint.
- .7 Remove excess mortar from masonry face before it sets.

### **3.8 CLEANING**

- .1 Clean brick work surfaces after repairs have been completed and mortar has set.
- .2 Clean brick surfaces of adhesive or mortar residue resulting from work performed without damaging bricks or joints.
- .3 Waste Management: separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

### **3.9 PROTECTION OF WORK**

- .1 Cover completed and partially completed work not enclosed or sheltered at end of each work day.
  - .1 Membranes should extend to 0.5 m over surface area of work and be tightly installed to prevent finished work from drying out too rapidly.

- .2 Cover with waterproof tarps to prevent weather from eroding recently repointed material.
  - .1 Maintain tarps in place for minimum of (2) weeks after repointing.
  - .2 Ensure that bottoms of tarps permit airflow to reach mortar in joints.
- .3 Anchor coverings securely in position.
- .4 Damp cure:
  - .1 Provide damp cure for pointing mortars.
    - .1 Install and maintain wetted geotextile protection during the curing process:
      - .1 Minimum (7) days.
    - .2 Wet mist geotextiles only - ensure no direct spray reaches surface of curing mortar.
    - .3 Shade areas of work from direct sunlight and maintain constant dampness of geotextiles.
    - .4 Cover wetted protection tarps with polyethylene sheets or nylon tarps.
- .5 Protect from drying winds. Pay particular attention at corners of structure.
- .6 Maintain ambient temperature of minimum 10 degrees C after repointing masonry for:
  - .1 Minimum (7) days in summer.
  - .2 Minimum (30) days in cold weather conditions using dry heated enclosures.
- .7 Protect adjacent finished work against damage which may be caused by on-going work.

**END OF SECTION**