

## 1 GENERAL

### 1.01 RELATED REQUIREMENTS

- .1 Division 1 - General Requirements
- .2 Section 04 03 07 - Historic - Masonry Repointing
- .3 Section 09 03 61 - Historic Repainting
- .4 Section 04 03 08 - Historic - Mortaring
- .5 Section 04 05 00 - Common Work Results for Masonry
- .6 Section 04 03 43 - Historic Works - Dismantling Stone Masonry

### 1.02 REFERENCES

- .1 Definitions:
  - .1 Raking: removal of loose/deteriorated mortar to a depth suitable for repointing until sound mortar, and/or 4x joint thickness and/or a specified mm depth mm is reached.
  - .2 Face repointing: filling and finishing of masonry joints from which mortar is missing has been raked out or has been omitted, minimum depth of 19mm.
  - .3 Tooling: finishing of masonry joints using tool to provide final contour.
  - .4 Low-pressure water cleaning: water soaking of masonry using less than 350 kPa water pressure, measured at nozzle tip of hose.
  - .5 Back pointing - The replacement bedding mortar applied to the deepest cut/deteriorated areas in the existing mortar.
- .2 CSA International
  - .1 CAN/CSA A23.1/A23.2-0], Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
  - .2 CAN/CSA A179-04(R2009), Mortar and Grout for Unit Masonry.

### 1.03 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 and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit WHMIS and MSDS sheets for material used in this section as per Division 1 requirements.
- .3 Samples:
  - .1 Provide labelled samples of materials used on project for approval before work commences.
- .4 Test and Evaluation Reports:
  - .1 Provide certified test reports showing compliance with specified performance characteristics and physical properties.

- .2 Provide laboratory test reports certifying compliance of mortar ingredients with specifications requirements.

#### 1.04 QUALITY ASSURANCE

- .1 Masonry Contractor:
  - .1 Use single Masonry Contractor for masonry work.
  - .2 Use only contractors competent to meet all performance criteria specified.
- .2 Masons:
  - .1 Use only contractors competent to meet all performance criteria specified.
- .3 Obtain approval from Departmental Representative for changes to qualified personnel.
- .4 Mock-ups:
  - .1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.
  - .2 Construct mock-up 1m x 1m to demonstrate raking and repointing procedures for each type of interior bearing wall masonry material specified in locations designated by Departmental Representative.
  - .3 Notify Departmental Representative minimum of 72 hours prior to construction of the mock-up.
  - .4 Perform mock-up of masonry cleaning with low pressure clean water and soft natural bristle brush.
  - .5 Construct mock-up under supervision of Departmental Representative to demonstrate a full understanding of specified procedures, techniques and formulations is achieved before work commences.
  - .6 Construct mock-up where directed by Departmental Representative.
  - .7 Work not to proceed prior to approval of mock-up. Allow 72 hours for inspection of mock-up by Departmental Representative before proceeding with masonry repointing work
  - .8 Accepted mock-up will demonstrate minimum standard for this work. Mock-up will remain as part of finished work.
  - .9 Mock-up's will be used to:
    - .1 Judge quality of work, substrate preparation, operation of equipment, material preparation and application, and curing methods.
    - .2 Determine joint finish required.
    - .3 Test to determine compliance with property requirements.
    - .4 Back pointing technique
    - .5 Face pointing technique
  - .10 Repeat mock-up until results obtained are to satisfaction of Departmental Representative.
  - .11 Accepted mock-up will demonstrate minimum standard for this work.
- .12 Site test existing mortar, using the wet-chemical acid digestion to determine the colour and texture of the existing sand to be matched.
- .13 Laboratory tests for mortar
  - .1 Contractor to include costs for provision of laboratory testing of existing and new repointing mortars during mock-ups and on a continuing weekly basis.

- .2 Test following properties, at a minimum, will be tested:
  - Compressive strength: 7 day and 28 day.
  - Air entrainment percentage.
  - Sample mortar for testing purposes directly on site.
  - Testing laboratory to be approved in writing by Departmental Representative.

#### 1.05 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 Store cementitious materials and aggregates in accordance with CAN/CSA A23.1.
  - .3 Store lime putty in plastic lined sealed drums.
  - .4 Keep material dry. Protect from weather, freezing and contamination.
  - .5 Ensure that manufacturer's labels and seals are intact upon delivery.
  - .6 Remove rejected or contaminated material from site.

#### 1.06 AMBIENT CONDITIONS

- .1 Maintain masonry temperature between 10 degrees C and 25 degrees C for duration of work.
- .2 When ambient temperature is below 10 degrees C:
  - .1 Store mortar materials for immediate use within heated enclosure. Allow mortar materials to reach minimum temperature of 10 degrees C before use.
  - .2 Ensure only aggregate and water are heated before use:
    - .1 Heat and maintain aggregate temperature to minimum 10 degrees C and maximum 30 degrees C.
    - .2 Heat and maintain water temperature to minimum of 20 degrees C and maximum of 30 degrees C:
  - .3 Provide hot water to a maximum 30 degrees C on site during cold weather.
  - .4 Provide enclosure system around curing area to ensure that stated conditions are maintained for curing period.
  - .5 Use heated temporary enclosures to maintain temperatures above 10 degrees C in cold weather only with written approval of material manufacturer and Departmental Representative.
  - .7 Submit enclosure system for approval from Departmental Representative.
- .3 Remove work exposed to temperatures lower than 10 degrees C as directed by Departmental Representative.
- .4 When ambient temperature is above 21 degrees C:
  - .1 Protect repointed areas from direct sunlight and wind.
  - .2 Use protective methods acceptable to the Departmental Representative.
- .5 Provide humid cure, above 80%, for a minimum of 7 days for each mortar laying process (back pointing, face pointing and repairs).

- .6 After 7 day cure period, finished work should be protected from weather and elements for a 21 day period.
- .7 Maintain aggregate temperature between 10 degrees C and 30 degrees.
- .8 Do not mix cement with water or with aggregate or with water-aggregate mixtures having higher temperature than 30 degrees C.
- .9 Maintain mortar mix temperature between 10 degrees C and 30 degrees C.

## 2 PRODUCTS

### 2.01 MORTAR

- .1 Mortar: in accordance with property Specification: as described in section 04 03 08 Historic Mortaring.
- .2 Soft bristle brushes
- .3 Water - Potable and free from impurities.
- .4 Burlap
- .5 Plugging chisel
- .6 Jointer
- .7 Trowels of various sizes and shapes to suite the work.

## 3 EXECUTION

### 3.01 SITE VERIFICATION OF CONDITIONS

- .1 Report in writing to Departmental Representative areas of deteriorated masonry not previously identified.
- .2 Stop work in that area and report to Departmental Representative immediately evidence of hazardous materials.

### 3.02 SPECIAL TECHNIQUES

- .1 Examine mortar joints.
  - .1 Examine horizontal and vertical joints to determine which were struck first and whether they are the same style, as well as aspects of workmanship which establish authenticity of original work.
  - .2 Replicate the style selected by Departmental Representative.
- .2 Test mortar joints.
  - .1 Procedure of testing: examine joints visually for obvious signs of deteriorated masonry.
  - .2 Test joints not visually deteriorated as follows:
    - .1 Test for voids and weakness by using hammers or other approved means.

- .2 Perform testing in co-operation Departmental Representative so that unsound joints can be marked and recorded.

### 3.03 RAKING JOINTS

- .1 Use manual raking tool to obtain clean masonry surfaces.
  - .1 Remove deteriorated and adhered mortar from masonry surfaces to full depth of deteriorated mortar but in no case less joint thickness 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 with non-ferrous brush without damaging texture of exposed joints or masonry units.
- .4 Flush open joints and voids; clean open joints and voids with low pressure water and if not free draining blow clean with compressed air.
- .5 Leave no standing water.
- .6 Raking of joints with power tools such as a hand held grinder will not be accepted.

### 3.04 REPOINTING:

- .1 Dampen joints.
- .2 Keep masonry damp while pointing is being performed.
- .3 Completely fill joint with mortar.
  - .1 If surface of masonry units has worn rounded edges keep pointing back from surface to keep same width of joint
  - .2 Avoid feather edges.
  - .3 Pack mortar solidly into voids and joints.
- .4 Build-up pointing in layers not exceeding 12 mm in depth.
  - .1 Allow each layer to set before applying subsequent layers.
  - .2 Maintain joint width.
- .5 Finish joints to match existing profile as directed by Departmental Representative.
  - .1 Tool, compact and finish using mason's slick to force mortar into joint.
- .6 Remove excess mortar from masonry face before it sets.

### 3.05 PROTECTION DURING CURING PROCESS

- .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 4 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.
  - .2 Install and maintain wetted burlap protection during the curing process:
    - .1 Minimum 7 days.
  - .3 Wet mist burlap only - ensure no direct spray reaches surface of curing mortar.
  - .4 Shade areas of work from direct sunlight and maintain constant dampness of burlap.
- .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 Provide humid cure, above 80%, for a minimum of 7 days for each mortar laying process (back pointing, face pointing and repairs).
- .8 After 7 day cure period, finished work should be protected from weather and elements for a 21 day period.

### 3.06 CLEANING

- .1 Clean surfaces of mortar droppings, stains and other blemishes resulting from work of this contract as work progresses.
- .2 Remove droppings and splashings using clean sponge and water.
- .3 Do further cleaning using stiff natural bristle brushes after mortar has attained its initial set and has not fully cured.
- .4 Clean masonry with stiff natural bristle brushes and plain water only if mortar has fully cured.
- .5 Clean masonry with low pressure 15 to 45 psi clean water and soft natural bristle brush.
- .6 Obtain approval of Departmental Representative prior to using other cleaning methods for persistent stains.
- .7 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

### 3.07 PROTECTION OF COMPLETED WORK

- .1 Protect adjacent finished work against damage which may be caused by on-going work.

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END OF SECTION