

**Part 1            General**

**1.1            PRICE AND PAYMENT PROCEDURES**

- .1    Provide unit prices for each repair application as follows:
  - .1    Shallow surface repair.
- .2    Payment for this work will include all costs associated with supplying materials, and executing work as described herein and reflected in the Contract.

**1.2            REFERENCES**

- .1    Canadian Standards Association (CSA International)
  - .1    CAN/CSA A3000-13, Cementitious Materials Compendium.
  - .2    CSA A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction.

**1.3            ACTION AND INFORMATIONAL SUBMITTALS**

- .1    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, physical size, finish, limitations and colours.
  - .2    Provide copy of Workplace Hazardous Materials Information System (WHMIS) - Material Safety Data Sheets (MSDS).
- .3    Samples
  - .1    Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
  - .2    Provide samples as follows:
    - .1    One sample of repair mortar.
    - .2    One sample of bonding agent.

**1.4            DELIVERY, STORAGE AND HANDLING**

- .1    Waste Management and Disposal:
  - .1    Separate waste materials for reuse and/or recycling in accordance with Waste Management Plan.
  - .2    Place materials defined as hazardous or toxic in designated containers.
  - .3    Ensure emptied containers are sealed and stored safely.
  - .4    Use trigger operated spray nozzles for water hoses.
  - .5    Designate cleaning area for tools to limit water use and runoff.

**1.5            QUALITY CONTROL**

- .1    Maintain repaired concrete above 5°C and below 30°C for a minimum of three days after placing.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Repair Mortar
  - .1 Two-component, polymer-modified, cementitious, trowel grade, prepackaged; suited for repair of concrete sills; to CSA A23.1.
  - .2 For repairs exceeding a thickness of 50 mm, extend polymer modified mortar, using clean 10 mm aggregate in accordance with manufacturer's instructions.
- .2 Portland cement with 40% fly ash replacement; to CAN/CSA A3000 A5, Type GU.
- .3 Reinforcing bars: to CAN/CSA G30.18, Grade 400.
- .4 Mixes
  - .1 Proportion normal density concrete in accordance with CSA A23.1, Alternative 1, to give following properties for all concrete.
  - .2 Cement
    - .1 Type GU Portland cement, Class C1 for all concrete repairs as per CSA A23.1.
    - .2 Minimum compressive strength at 28 days: 35 MPa.
    - .3 Nominal maximum size of coarse aggregate: to CSA A23.1.
    - .4 Slump: to CSA A23.1.
    - .5 Air content: concrete to contain purposely entrained air in accordance with CSA A23.1, Table 4.
    - .6 Admixtures: to CSA A23.1.
- .5 Bonding Agent
  - .1 Three-component, water based epoxy resin/cement bonding agent suited for the proposed application.
- .6 Deformed wire: 2 mm diameter, stainless steel Type 304.
- .7 Pressure grout compound for repair of cracking in shotcrete: Acceptable product by Daubois.

**Part 3 Execution**

**3.1 PREPARATION**

- .1 Prepare surface for repair. Provide 13mm deep straight edge around perimeter of area to be removed, unless noted otherwise on Drawings.
- .2 Clean all surface rust from exposed reinforcing.
- .3 Immediately after cleaning of exposed reinforcing is completed, the surface will be checked by the Departmental Representative for fractured concrete, or loose aggregate. This material shall be removed using hand tools.

**3.2 APPLICATION**

- .1 Repairs to Wall Surface
  - .1 Do not place repair mortar when temperature is below 10°C.

- .2 Remove all dust and loose material from the prepared surface of the existing shotcrete and concrete wall by oil free compressed air before the application of bonding grout.
- .3 Wet down area to be repaired for a period of twelve (12) hours and again, one (1) hour before placing repair mortar.
- .4 Remove excess water from the surface using oil free compressed air, immediately prior to application of the bonding agent.
- .5 Brush bonding agent onto the wetted, prepared surface, as per manufacturer's instructions. Ensure that the surface receives a thorough even coating and that the rate of progress is sufficient so that the slurry does not dry up before repair mortar is placed.
- .6 Apply repair mortar or polymer modified mortar as soon after application of bonding agent as recommended by the manufacturer.
- .7 Apply repair mortar to build surface repair to finished lines. Acceptable minus tolerance of finished surfaces is 1.5 mm.
- .8 Finish repair mortar in accordance with CSA A23.1. Provide positive drainage. Surface should be wood floated only. The use of power and steel trowels is not permitted.
- .9 Place one layer of wet burlap on the surface of the repair mortar repair as soon as the surface will support it without deformation. Overlap strips of burlap by at least 75 mm. Thoroughly soak burlap for 24 hours prior to placing. Place a layer of polyethylene film immediately on the wet burlap. Lap the polyethylene film a minimum of 150 mm and securely hold in place against displacement.
- .10 Wet cure repair mortar for three (3) days.

### **3.3 CONSTRUCTION**

- .1 Cast in place concrete work in accordance with CSA A23.1.

### **3.4 PRESSURE GROUTING**

- .1 Install pressure grout in accordance with manufacturer's instructions.

### **3.5 FINISHES**

- .1 Formed surfaces exposed to view: sack rubbed finish in accordance with CSA A23.1.

### **3.6 CURING**

- .1 Cure and protect concrete in accordance with CSA A23.1.

### **3.7 FIELD QUALITY CONTROL**

- .1 Concrete testing: to CSA A23.2 by testing laboratory designated and paid for by Departmental Representative.
- .2 Give Testing Firm minimum 24 hours of notice before each concrete pour.
- .3 A standard strength test for each 25m<sup>3</sup> of concrete placed but not less than one test for concrete placed each day. Each strength test sample will consist of three cylinders with proper identification and field data. One specimen will be tested at 7 days and two at 29 days. Cylinders will be stored in metal lined curing boxes at a temperature of +10 degrees Celsius until shipped to the testing laboratory.
- .4 One or more standard slump tests with each standard strength test.

- .5 Cooperate fully with testing agency personnel and provide information and access as required and directed.

**END OF SECTION**