Part 1 General

1.1 RELATED REQUIREMENTS

1. Section 04 05 19 - Masonry Anchoring and Reinforcing

1.2 REFERENCE STANDARDS

1. CSA Group (CSA)
    1. CSA A23.1:19/CSA A23.2:19, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete
    2. CAN/CSA-A179-14, Mortar and Grout for Unit Masonry.
    3. CSA-A3000-18, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

1.3 ADMINISTRATIVE REQUIREMENTS

1. Pre-Installation Meetings:
    1. Conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Section 01 45 00 - Quality Control.
2. Scheduling of Work:
    1. Submit work schedule indicating anticipated progress stages within time of final completion shown in bid document.
    2. Take measures necessary to complete work within approved schedule time. Schedule may not be changed without approval of Consultant.

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, product literature and data sheets for grout and include product characteristics, performance criteria, physical size, finish and limitations.
3. Site Quality Control Submittals:
    1. Submit a copy of the site log daily to Consultant. Record the location where the grout was installed and the volume of grout installed at each location.
    2. Submit a written description of methodology and equipment list, at least 14 days before beginning grout work.
4. Test Reports:
    1. Submit test results during site work as directed by Consultant as follows:
        1. Air content: Grout mix in plastic state.
        2. Grout compressive strength: at 28, 56 and 112 days or as otherwise required.

1.5 QUALITY ASSURANCE

1. Qualifications:
    1. Minimum of 5 years of experience in lime mortar or grout preparation for person responsible for mixing grout.
    2. Mix grout by the same person throughout the project.
2. Certificates:
    1. Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
3. Testing Standards:
    1. Ensure use of correct instruments for testing strength and air content in mortar. Do not use concrete testing equipment.
    2. Conduct required testing in accordance with the following standards:
        1. Cube strength to CAN/CSA-A179, Annex B.
        2. Air content to CAN/CSA-A179.
4. Test Reports:
    1. Submit test results during site work as directed by Consultant as follows:
        1. Air content: Grout mix in plastic state.
        2. Cementitious and epoxy grout compressive strength at 7 and 28 days or as otherwise required.
        3. Lime grout compressive strength at 28, 56 and 112 days, or as otherwise required.
5. Mock-ups:
    1. Construct mock-ups in accordance with [01 45 00 - Quality Control].
    2. Submit grout installation method.
    3. Construct 1000 x 1000 mm mock-up.
    4. Mock-up will be used to judge quality of work, substrate preparation, and material application.
    5. Locate mock-up as indicated by project drawings.
    6. Notify Consultant 24 hours before commencing mock-up.
        1. Obtain approval from Consultant before commencing mock-up.
    7. Allow 24 hours for inspection of mock-up before proceeding with work.
    8. When accepted, mock-up will demonstrate minimum standard for this Work. Approved mock-up may remain as part of finished work.

1.6 DELIVERY, STORAGE AND HANDLING

1. Carried out in accordance with Section 01 61 00 - Common Product Requirements.

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 in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
    2. Protect from weather conditions, freezing and contamination.
    3. Remove rejected or contaminated material from site.
    4. Store materials at temperatures between 5 to 38 degrees C, unless otherwise stated by manufacturer.
    5. Replace defective or damaged materials with new.

1.7 SITE CONDITIONS

1. Ambient conditions:
    1. During grouting and 48 hours after grouting, maintain temperature of masonry elements to be grouted above 5 degrees C throughout their thickness.
    2. Provide and maintain temporary enclosure and heating equipment to maintain specified temperatures.

Part 2 Products

2.1 MATERIALS

1. Water: Clean and free from contaminants and organic material in accordance to CSA A23.1/A23.2.
2. Pre-bagged lime-based grout mix:
    1. King HL-5;
    2. Daubois Grout F-20; or
    3. Approved equivalent.

2.2 EQUIPMENT

1. Mechanical Mixer: Size compatible with volume of mortar grout prepared.
2. Mechanical regulator to prevent segregation of ingredients after mixing and ensure injection continuity.
3. Injection pump, capable of recommended maximum and minimum pressures recommended by grout supplier.
4. Maintain mixing equipment in good working order. Ensure that necessary spare parts are available on site.

Part 3 Execution

3.1 EXAMINATION

1. Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for grout installation in accordance with manufacturer's written instructions.

1. Visually inspect substrate in presence of Consultant.
2. Before start of work, report possible structural masonry problems and conditions that do not conform to those specified, including existing voids or possible openings which risk being compromised when grout will flow to Consultant
3. Inform Consultant of unacceptable conditions immediately upon discovery.
4. Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.2 INSPECTION

1. Provide required assistance to facilitate taking of grout samples and inspection work.
2. Inspect surfaces of structure before commencing injection work.

3.3 SITE LOG

1. Maintain log of grouting work containing a variety of information, including:
    1. Course of pumping data including calibration of equipment used.
    2. Grout Components (products, additions, admixtures and water) and quantity pumped.
    3. Pumping mode.
    4. Injection site.
    5. Pumping pressure at injection sites.
    6. Readings of pressure and flow injection taken, either by data loggers or manually.
    7. Equipment used.
    8. Staff on site.
    9. Drilling plan.

3.4 PREPARATION

1. Ensure substrate is free from loose material.
2. Prepare joints before grout injection:
    1. Backpoint open mortar joints to contain grout.
    2. Install helical ties as indicated on project drawings.
3. Wet surfaces deep into substrate.
4. Drill holes in mortar joints where required to insert grouting tubes.
    1. Depth of grout hole to be drilled varies depending on depth of sound material.
    2. Spacing of grout holes: 300mm horizontal, 300mm vertical.

3.5 INSTALLATION

1. Proceed with grouting after deep repointing and wall core consolidation are achieved by removing and resetting loose masonry.
2. Grout from the bottom of the wall to the top.
3. Seal leaks with mortar.
4. Do not exceed lifts of 1200 mm for one working day. Allow grout to set for 24 hours before proceeding with the next lift.
5. Inject specified grout through tube under low pressure. Continue to fill grout tube to refusal, pause for five minutes and repeat procedure until no more grout can be injected. Record quantity of grout inserted in each tube on as-built drawings (or equal).
6. Pour grout until void is full. If the grout volume for one hole reaches10 litres, stop grouting and notify Consultant. Proceed with grouting only as directed by Consultant.
7. Take great care not to allow the grout, and/or water, to seep inside the wall and damage the interior finishes. Damage to the interior finishes caused by undue care must be repaired at the Contractor's expense.
8. Remove grout tubes after initial set of grout has occurred. Fill holes with back pointing mortar.
9. Proceed with finish pointing only after all grouting is complete.

3.6 CLEANING

1. Progress Cleaning: Clean in accordance with Section 01 74 11 - Cleaning and Waste Management.
    1. Leave Work area clean at the end of each day.
    2. Clean surfaces of grout droppings, stains and other blemishes resulting from work of this Contract as work progresses and at the end of each working day.
    3. Remove droppings and splashes using clean sponge and water. Do not use vinegar or chemicals unless instructed in writing by Consultant.
2. Final Cleaning: Upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning and Waste Management.

End of Section