

# GUIDE SPEC

## SECTION 04 01 40

### *Maintenance of Stone Assemblies*

#### **SECTION 04 01 40 - MAINTENANCE OF STONE ASSEMBLIES**

#### **PART 1 GENERAL**

##### **1.1 SUMMARY OF WORK**

- A. Submit the following items in time to prevent delay of the work and to allow adequate time for review, do not order materials or start work before receiving the written approval:
  - 1. Samples of all specified materials and Material Safety Data Sheets (MSDS) as appropriate.
  - 2. Install mortar samples on building masonry. Execute one sample for Architect approval on ornamental and subsequently on flat work demonstrating stone repair techniques with the specified (or approved equal or better) stone repair mortar.

##### **1.2 QUALITY ASSURANCE/TEST REQUIREMENTS**

- A. Stone Repair Mortar Samples: Prepare a sample of each type of repair listed below, using masonry removed from the building where designated by the Owner. Prepare, install, and finish each sample repair according to the specifications. All samples must be applied to masonry. Prepare samples in an area where they will be exposed to the same conditions as will be present on the building during curing. Allow samples to cure at least seven but preferably fourteen days before obtaining Owner's approval for color match. Mortar colors will continue to lighten as they cure and are exposed to the weather, so samples should be installed as far in advance as possible. Samples should be viewed from a minimum distance of 12 feet.
- B. Project Architect to approval all replacement of stone units prior to execution.
- C. Patching of Existing Stone Benchmarks
  - 1. Spalls of less than 6" in diameter can be patched with stone repair mortar.
  - 2. Spalls larger than 6" and in locations nor readily visible can be repaired with a "Dutchman" patch. Depending on the location and size of the patch, complete replacement of the stone unit may be required.
  - 3. Smalls isolated cracks in the limestone can be filled with lime injection mortars.

##### **1.3 DELIVERY, STORAGE, AND HANDLING**

- A. Materials are to be delivered, stored, and handled to protect them from damage, extreme temperature, and moisture in accordance with Manufacturer's written instructions.
- B. Deliver and store material in Manufacturer's original, unopened containers with the production date shown on the container or packaging.

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- C. Comply with the Manufacturer's written specifications and recommendations for mixing, application, and curing of mortars.

#### 1.4 PROTECTION/SITE CONDITIONS

- A. Cold Weather Requirements: Do not work in temperatures below 40° F, when the substrate is colder than 40° F, or when the temperature is expected to fall below 40° F for 48 hours after installation of repair mortars. Building an enclosure and heating areas to maintain this temperature may only be done with the written approval of the Specifier.
- B. *Hot Weather Requirements:* **Protect repair mortar from direct sunlight and wind.** Do not use or prepare mortar when ambient air temperature is above 90° F.

#### PART 2 PRODUCTS

##### 2.1 MASONRY REPAIR MORTARS, ANCHORS, AND EPOXY

- A. Heritage Stone Repair Mortars are manufactured by U.S. Heritage Group, Inc., 3516 N. Kostner Street, Chicago, Illinois 60641 Phone: 773/ 286.2100 Fax: 773/ 286.1852. Heritage Stone Repair Mortars are mineral-based, single component products that are mixed with water. The material is formulated using only natural binders; no synthetic polymers or additives are used. It is vapor permeable. Skilled masons can easily apply Heritage Restoration Mortars; no special certification is required. Designed to decrease significantly the time required to complete stone repairs, HL 60 Heritage Repair Mortars for Limestone can be ready for sculpting in 3 hours at room temperature.
- B. Stone Anchors: Type 302 Threaded Solid Stainless Steel, use of carbon steel is prohibited. Anchors to be set in moisture insensitive epoxy resin. Diameter and length of anchor determined by conditions but generally are as follows - ¼" diameter anchors for reattachment of face bedding layers and small loose details as well as reinforcement of stone repair mortar; ½" diameter anchors for stone unit reattachment, lintel or architrave repair, large cracks, and large spalls.
- C. Epoxy: Moisture insensitive epoxy resins to be used for setting stainless steel anchors and filling adjacent related cracks. Utilize clay dams to plug flow of epoxy from the stone face; remove clay dam once epoxy set.
- D. Setting Buttons: Plastic, steel washers are prohibited from use.
- E. Substitutions: Approved equal or better.

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#### **PART 3 EXECUTION**

##### **3.1 WORKMANSHIP**

- A. Do not use any additives, such as bonding agents, accelerators, or retardants in the mortar.

##### **3.2 PREPARATION FOR REPAIRS**

- A. Remove all loose mortar and masonry prior to installation of the repair mortar. "Sound" masonry with a hammer to verify its integrity. If necessary, cut away an additional 1/2" of the substrate to ensure the surface to be repaired is solid and stable. Remove any sealant residue.
- B. Where cramp anchors, threaded rod anchors, or dowels have been cut and pieces remain embedded in the substrate: Anchors that are free of rust, solidly embedded, and do not project beyond the surface of the masonry unit may remain. All others should be removed.
- C. Cut the edges of the repair area to provide a minimum depth of 1/4". The edges of the repair should be square cut. Do not allow any feathered edges in the repair area.
- D. Install mechanical anchors in all repair areas if specified on the Contract Drawing or as otherwise directed by the Architect.
- E. Clean all dust from surface and pores of the substrate, using clean water and a scrub brush.
- F. For very dry or porous surfaces, pre-wet the substrate ahead of time to prevent the substrate from drawing moisture out of the repair too quickly. Re-wet the surface immediately before applying the repair material.

##### **3.3 MIXING MORTAR FOR REPAIR**

- A. It is recommended that a dust mask be worn during mixing. Do not mix more material than can be used within 60 minutes. Discard any mixed material that has been unused for 60 minutes or more.
- B. All repairs require a minimum two-coat application consisting of a skim coat and a build-out coat. Additional build-out coats may be applied to meet the required thickness.

Skim coat: For the initial skim coat, mix approximately 5 parts dry powder to approximately 1 part potable water. The prepared mixture should be the consistency of peanut butter. Temperature and humidity will affect the amount of water required. Mixing may be done by hand or using a low-speed drill (300 to 450 rpm) for 2 to 4 minutes. Do not over mix.

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Build-Out Coat: The consistency of the mortar for the build-out coat should be similar to wet sand. For any additional build-out coats use slightly less water in the mix. Working time is approximately 60 minutes depending on temperature, humidity and wind conditions.

#### **3.4 APPLICATION OF REPAIR MATERIAL**

- A. Cut away all loose and deteriorated stone. Clean the area to be repaired with clean water and a bristle brush to remove any loose stone particles. Neutralize any salt deposits (efflorescence) with distilled water. Sound off and chisel out delaminated stone. Dampen with clean water until glistening with no standing water. Square cut edges of repair area using hand tools or pneumatic carving tools. Repair area should not be less than 1/4" in depth.
- B. Skim coat: Pre-wet the stone surface, so that it is glistening wet, with no standing water. Remove loose material from the stone and wash down the stone a second time. The installation of non-corrosive screws and wires when the stone repair exceeds 4" in thickness is recommended. Use trowels and plaster detailing tools to apply the skim coat to small areas. **IMPORTANT:** Make sure the skim coat adheres to all surfaces of the repair area of the stone. Check the skim coat after 5 minutes. Do not allow the surface of the skim coat to dry completely. If it does dry out, moisten the surface with clean water. The drying time will be affected by weather conditions, careful monitoring is critical. Additional Coats: Scoop wet mix from the mixing container by hand (wear latex gloves) or with a small trowel and apply it by pressing and rubbing it into the skim coat. Make sure to fill all pores and voids of the stone. The repair mortar may be built up to a thickness of 3" in one lift. Finger test each coat before applying the next. If the mortar moves under your finger, wait until it sets before applying the next coat. If additional coats are applied the next day or later, you must wet and scratch the previous coat before adding additional coats.

#### **3.5 FINISHING TECHNIQUES**

- A. The surface of the repair may be either tooled or scraped to the required finish. You may finish the same day or wait until the following day. For soft edges, carve the mortar when it is wet. For sharp edges, carve with sharp carving tools when it is partially cured. It may be desirable to wait longer for particular finishes. Always test finishing techniques before applying to large areas. Craftsmen should understand the timing of the finishing techniques, and make adjustments for weather conditions. Air chisels may be used to create the desired finishes.

#### **3.6 CURING PROCEDURE**

- A. Keep the repair area, plus an additional 2" (2 inches) surrounding the repair area damp for a minimum of 36 hours. Spray mist the repair area with clean water, covering with plastic sheeting to keep the repair area damp. Adjust curing methods to prevent the repair from drying out too quickly.

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- B. Curing methods will vary in different parts of the country and at different times of the year, calling for different amounts of water to be used in the first 36 hours after application. Adjustments also have to take into account how much time is remaining before freezing weather arrives.

#### **3.7 CLEAN UP**

- A. Remove mortar from tools and mixing equipment with water immediately after use. Repair mortar is difficult to remove after it has set.

END OF SECTION